ACTION OF THE CONVENING AUTHORITY

The formal report of aircraft accident investigation conducted under the provisions of AFI 51-503, by Colonel Frank Laras, USAF, NS Rota, Spain, into the mishap involving C-130E, S/N 63-7854, assigned to 463rd Airlift Group, Little Rock Air Force Base, Arkansas, is attached. The mishap occurred at Al Jaber Air Base, Kuwait, on 10 December 1999. The report complies with applicable regulatory and statutory guidance, and on that basis is approved.

RONALD C. MARCOTTE
Lieutenant General, USAF
Vice Commander, Air Mobility Command

Executive Summary

Date, time, and location of accident: 10 December 1999, 2306 Zulu/0206 Kuwait local time; at Ahmed Al Jaber Air Base, Kuwait.

Mishap Aircraft: C-130E, Tail Number 63-7854, 61st Airlift Squadron, 463rd Airlift Group, Little Rock Air Force Base, Arkansas. The aircraft was assigned to the 9th Air Expeditionary Group, Al Salem AB, Kuwait, at the time of the mishap.

Summary of Events: The mishap aircraft, call sign Flash07, departed Al Salem AB on 9 Dec 99 with 6 crewmembers and 80 passengers. It arrived at Kuwait City International (KCIA) and discharged its passengers. The aircraft next flew to Al Jaber AB, picked up passengers and returned to KCIA. These three sorties were accomplished without incident and there were no aircraft problems. At 0157L, 10 December, the mishap aircraft departed KCIA with 86 passengers bound for Al Jaber AB. The crew initiated a visual final approach descent from 2600 feet AGL, approximately 4.5 miles (two minutes) from the approach end of the runway. The pilot began with about a 3-degrees of glide slope, at about 640-fpm rate of descent. He soon transitioned to a 6 to 7-degree glide slope with a 1600 to 1700 fpm rate of descent for the remainder of the approach. The pilot never recognized his landing picture, with reference to the runway, and failed to transition to a normal visual glide path for landing. At about 125 feet AGL, descending at 28 feet per second, the aircraft entered a fog bank. The flight engineer called "Go Around" one to two seconds after entering the fog bank (70 to 100 feet AGL). The pilot initiated the go-around procedure (full power and nose up) about a second after the flight engineer's "Go Around" call. The aircraft was too low (approximately 50 feet AGL) to break its descent rate and start a climb. As a result, it impacted the ground 2890 feet short of the runway threshold.

Number of Injuries/Deaths: Three fatalities, seven injuries – two were serious.

Damage Description: The aircraft sustained approximately $3.8 million in damage, primarily to the main landing gear assemblies and associated fuselage. Non-U.S. property damage included destruction of an U.S antenna belonging to the Government of Kuwait; cost of damage is yet unknown.

Statement of Opinion:
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.

I find, by clear and convincing evidence, that the cause of the mishap was the crew's failure to follow governing directives and complacency in flight operations. As a result, the crew suffered spatial disorientation at a critical phase of flight; thereby, resulting in the crew's loss of situational awareness and failing to recognize an unsafe descent. The following factors contributed to the cause of the mishap: lack of pilot leadership and discipline; lack of support from the copilot, navigator, and flight engineer; and overall lack of sound judgment by the flight deck crew.

Dated this 20th day of March 2000

FRANK LARAS, Colonel, USAF
President, Accident Investigation Board

Summary of Facts

1. AUTHORITY, PURPOSE, AND CIRCUMSTANCES

1.1 Authority: At the direction of Lieutenant General Walter S. Hogle, Vice Commander, Air Mobility Command (AMC/CV Memorandum, 13 December 1999, AMC/CV Memorandum, 5 January 2000, and AMC/CV Memorandum, 12 January 2000), this AFI 51-503 investigation was convened. The investigation concerns the aircraft mishap involving an Air Mobility Command (AMC) C-130E, S/N 63-7854, which occurred at Ahmed Al Jaber Air Base (Al Jaber AB), Kuwait, on 10 December 1999. The following individuals were appointed to investigate the mishap (Tab Y):

Accident Investigation President:	Colonel Frank Laras 625 AMSS/CC PSC 819 Box 59 FPO AE 09645
Legal Advisor:	Lieutenant Colonel HQ AMC/JAO Scott AFB IL 62225
Technical Advisor: (Pilot)	Lieutenant Colonel 40 AS/DO Dyess AFB TX 79607
Technical Advisor: (Flight Surgeon)	Lieutenant Colonel 60th MDG/AMDS Travis AFB CA 94535
Technical Advisor: (Maintenance)	Major 317 MXS/LGL Dyess AFB TX 79607
Technical Advisor: (Aircrew Life Support)	Master Sergeant 437 OSS/OSL Charleston AFB SC 29404

1.2. Purpose. This investigation was conducted to determine the relevant facts and circumstances of the accident and to determine the cause or causes of the aircraft mishap which occurred at Al Jaber AB on 10 December 1999. The results of the accident investigation are used to provide concerned persons with a report of the facts and circumstances surrounding the accident, to find and preserve evidence for use in claims, litigation, disciplinary action, adverse administrative proceedings, and for all other purposes deemed appropriate by competent authority.

The primary sources for information and fact gathering relevant to this mishap were the aircrew's testimony and the aircraft's flight data recorder. During the course of the investigation only the flight engineer and the copilot elected to provide testimony to the investigating officer. The pilot and the navigator exercised their right to remain silent. The copilot elected to remain silent after providing initial testimony.

1.3. Circumstances: The mission was designed to deliver members departing the Area of Operations (AOR) to Kuwait City International Airport (KCIA), and to distribute newly arrived personnel to the operational bases at Al Jaber AB and Ali Al Salem Air Base (Al Salem AB), Kuwait.

2. ACCIDENT SUMMARY

The mishap aircraft, call sign FLASH07, departed Al Salem AB, Kuwait for KCIA at 1941 ZULU (Greenwich Mean Time or "Z") on 9 December 1999 (Tab H-4), with six crewmembers, two aircraft crew chiefs, and 80 passengers. Local time at Kuwait is ZULU plus three hours. They landed at 2003Z, de-planed the passengers with engines running and departed for Al Jaber AB at 2021Z with no passengers, arriving at 2041Z. After loading 53 passengers, FLASH07 departed Al Jaber AB at 2101Z bound for KCIA. At 2121Z FLASH07 touched down at KCIA and proceeded to the AMC ramp where they shut down engines and downloaded 53 passengers.

After a 96-minute delay for passenger processing, they loaded 86 passengers and departed for Al Jaber AB at 2257Z. At approximately 2306Z, while executing a visual approach to runway 15R at Al Jaber AB, the aircraft struck the ground 2890 feet short of runway threshold and 40 feet to the left of runway centerline (Tabs A-4, R-2, S-2). This approach to runway 15R was being conducted below weather minimums and in violation of landing restrictions on runway 15R. Joint Task Force-South West Asia (airlift coordination cell director) approval for this approach had not been granted. The mishap resulted in the death of three passengers and the injury of seven more (Tab A-4). No crewmember sustained significant injuries.

Approximately 1000 feet beyond the initial impact site, FLASH07 struck the Instrument Landing System (ILS) antenna assembly, resulting in destruction of 50% of the standing localizer antenna structure (Tab P-2). The cumulative effects of the two impacts succeeded in stripping the main landing gear from the mishap aircraft (Tabs A-4, S-3, S-5). The crew was able to execute a go-around and returned to KCIA for a successful no-gear landing at 2351Z.

Property damage included the partial destruction of the ILS antenna array at Al Jaber AB and approximately $3.8 million damage to the mishap aircraft (Tab M-10). No major damage was identified at KCIA runway as a result of the no-gear landing. The ILS at Jaber AB is under repair and costs have not been determined. HQ AMC has handled all questions regarding this accident. This mishap received national media attention.

3. BACKGROUND

Al Jaber AB is a joint operations base with Kuwait Air Force F-18s and USAF A-10s and F-16s. USAF aircraft and personnel pull 90-day rotations enforcing the United Nations established no-fly zone in southern Iraq.

Al Salem AB is a joint operations base with various Kuwaiti support organizations and four USAF C-130s. The C-130s provide intra-theater airlift support for all theater US forces enforcing the no-fly zone in southern Iraq.

KCIA serves as the logistics hub for US forces operating in the Kuwait AOR. Personnel arrive and depart the AOR through the Air Terminal Operations Center (ATOC) located on the military ramp.

4. SEQUENCE OF EVENTS

4.1. Mission. The mission was to deliver US personnel to and from KCIA for weekly rotator transportation to and from Europe and the United States. The command authority authorizing the mission was the 9th Expeditionary Group Commander at Al Salem AB. Captain Russell A. Hedden, serving as the Deputy for Operations, signed the AMC Form 41, Flight Authorization. This flight authorization designated Captain as the Aircraft Commander. All crewmembers were active duty personnel (Tab K-3).

4.2. Planning. All preplanning requirements were completed. Preplanning requirements were minimal since this was a regularly scheduled mission. No flight plans were required as the aircraft operated on tower-to-tower Instrument Flight Rules (IFR) clearances (Tab K-4, V-3, V-20, V-21). Tower-to-tower clearance is done by filing your flight plan by radio with your local controlling tower. In this case, the KCIA tower contacted the Al Jaber AB tower with FLASH07's routing and expected time of arrival at Al Jaber AB.

4.3. Preflight. The aircrew showed at 1750Z (Tab O-71), and accomplished all normal preflight procedures to include check Notices to Airman (Tabs K-6, K-7), the flight itinerary, and route of flight. This was the aircrew's first night flight in theater. They received a weather brief at 1800Z from the Al Salem AB weather shop (Tab K-8). The forecast called for mostly Visual Meteorological Conditions (VMC) throughout the duration of the mission. The aircrew was also informed that weather at Al Jaber AB would be temporarily below Visual Flight Rules (VFR), with 2400 meters visibility, a 5000 foot ceiling, and thunderstorms and rain showers in the vicinity (Tab K-8). International Civil Aviation Organization (ICAO) VFR minimums require 5000 meters visibility or better (Tab BB-11). Of particular note, the forecast temperature was 16 degrees Centigrade (61 degrees Fahrenheit) and the dewpoint was 15 degrees Centigrade (59 degrees Fahrenheit), a recipe for low fog. Aircraft preflight was accomplished with no discrepancies noted. Engine start was uneventful (Tab H-2).

4.4. Summary of the Accident. The initial aircraft taxi and takeoff was routine. The pilot executed all takeoffs and landings. The first sortie from Al Salem AB to KCIA was also uneventful. After the aircrew delivered the departing Al Salem passengers, they flew their empty aircraft to Al Jaber AB, picked up the departing members, and delivered them to KCIA. This sortie from KCIA to Al Jaber AB was also uneventful. (Tabs K-2, JJ-5). When the aircraft departed Al Jaber AB at 2101Z, the tower called visibility at 1500 meters, still below visual minimums (Tabs H-4, N-2). The first successful landing into Al Jaber AB on runway 15R was completed in violation of weather minimums and the approach plate instructions. The crews only option given the weather was to fly the ILS approach to runway 33L.

The aircraft returned to KCIA at 2121Z and delivered the departing passengers to the air terminal (Tab H-4). At this point, there was a one hour and thirty six minute wait for inter-theater airlift to deliver relief personnel for distribution to Al Jaber AB and Al Salem AB. While the pilot and the navigator went into ATOC to get the weather forecast, the copilot took a nap in her seat while the flight engineer slept on the flight deck bench (Tab V-3, V-15).

The Al Jaber AB weather office confirms receiving a call from KCIA regarding the weather at Al Jaber Ab between 2201Z and 2300Z. Al Jaber AB reported their weather as visibility at 1600 meters (1 mile), ceiling partially obscured and broken, with fog at the airfield. The Al Jaber AB weatherman also gave instructions for the aircrew to call the tower on approach for runway visibility since the runway was not visible from the Al Jaber AB weatherman's vantage point (Tab O-110).

The pilot and the navigator returned to the aircraft and discussed the weather, including the fog, with the rest of the crew. The aircrew briefed a visual approach, and decided on two instrument approach backups--Very High Frequency Omni-directional Ranging/Tactical Air Control and Navigation (VORTAC) 15 Right (15R) approach and an ILS 33 Left (33L) approach--should either be needed (Tab V-3, V-22, V-41, V-44). Based upon the briefed weather conditions and the VORTAC 15R night IFR restriction to USAF aircrews the only authorized approach was the ILS to runway 33L.

After take-off on the mishap leg, the aircraft flew configured with gear down and flaps at 50 percent the entire trip (Tab V-3, V-25). It is normal procedures to fly with the gear down and the flaps set for flights of short duration. Prior to departure from KCIA, the crew discussed the weather situation and planned to fly the VORTAC 15R approach to obtain a visual on the landing runway (Tab V-22). While not considered a causal factor in the aircraft mishap, it is worthwhile to note that the VORTAC 15R Department of Defense (DoD) approach plate contains a note requiring a command authority waiver to accomplish the approach at night under Instrument Flight Rules (IFR) (Tab O-121). The JTF-SWA Commander had not granted authority to the mishap crew's unit, the 9th Expeditionary Airlift Squadron, to fly this approach during night instrument conditions. Nevertheless, the crew elected to fly the VORTAC 15R approach rather than the published ILS approach to runway 33L, which would have provided them with course

and glide slope information (Tab V-22). Flying the Al Jaber AB VORTAC 15R approach during night IFR violated the DoD approach plate instruction.

The aircrew visually acquired the runway at five to six miles out (Tab V-20). The runway was well lit, including its approach lights (Tab V-4, V-24). During descent, the flight engineer noted a fog bank near the approach end, but did not inform the rest of the crew (Tab V-24). He believed it was far enough from the runway that it should not be a factor (Tab V-4). No one else on the crew mentioned seeing the fog bank (Tab V-69). The aircrew never requested visibility from the tower as the Al Jaber AB weather office had directed, in violation of AFMAN 11-217. Instead, they transitioned to a visual approach when they called the runway in sight (Tab V-4, V-20) without canceling IFR, a violation of AFI 11-202V3. Had they requested the visibility, the tower was calling surface visibility at approximately 500 meters with a nil ceiling. The runway visual range (RVR) instrument at Al Jaber AB was reading a visibility of approximately 330 meters (Tab O-108). Both tower readings were below landing minimums (Tab O-120, O-121). Beginning an en route descent or published approach when the weather required for the approach is below the required minimums violates AFI 11-202V3.

The mishap pilot, Captain , was flying the aircraft during the entire approach (Tab V-21). He initiated a steep descent of six to seven degrees (normal would be two and a half to three degrees) about four and a half miles from the field at an altitude of 2600 above ground level (AGL), one minute and 48 seconds from impact (Tabs O-156, HH-2 through HH-8). Despite the steep angle of descent, the rest of the crew recognized nothing out of the ordinary and felt comfortable with the approach (in fact, the copilot stated she thought they were in a normal three-degree glide slope during the approach) (Tabs V-4, V-20, V-32). The flight engineer testified all checklists were complete and everything appeared routine (Tab V-4).

The steep approach angle resulted in descent rates of 1600 to 1700 feet per minute (fpm) throughout the approach. Ground speed dropped from 150 knots at the start of the approach to near 131 knots at impact. The high descent rate actually positioned the aircraft at or near a normal visual descent point at 1.2 miles from the runway (calculated for a three degree glide path) (Tabs HH-2 through HH-8). However, both pilots failed to recognize this point and continued their high rate of descent. In addition, neither the instructor navigator nor the evaluator engineer recognized the potentially dangerous situation developing and made no input to the pilots. At .63 miles from the runway, the mishap aircraft was approximately 125 AGL, still in a 1700 fpm descent rate, when it entered the fog bank and the aircrew lost sight of the runway (Tabs V-4, V-20, HH-2 through HH-8).

The flight engineer called "go around" approximately one to two seconds after the aircraft entered the fog with a confirmation call from the copilot. The pilot initiated the go-around with the engineer calling power settings, "700, 800, 900..." before the aircraft collided with the ground (Tabs V-4, V-20).

The aircraft got airborne again and flew four to five feet above the ground for another 1000 feet when it collided with the ILS antenna assembly, shearing off the left third of the antenna array level with the concrete pad. The aircraft then climbed to altitude and the crew prepared for their emergency no-gear landing at KCIA. The KCIA crash, fire, and rescue team foamed the runway for the landing. The crew executed the emergency landing with no further injuries to personnel on board or significant additional damage to the aircraft.

4.5. Impact. At 2306Z, the aircraft impacted the ground 2890 feet short of Al Jaber AB's runway 15R threshold and 40 feet left of runway centerline (Tab A-4, S-2). The primary impact point was focused in the main landing gear area. At impact, gear struts and associated hardware were driven into the cargo area inflicting fatal injuries to the three passengers sitting in the wheel well area (Captain , Airman First Class , and Airman First Class) (Tabs S-4, S-6, X-2 through X-4, Z-3, Z-5). All of the seriously injured passengers were sitting in the main wheel well areas.

The initial impact resulted in the loss of all main landing gear assemblies. The aircraft also struck the ILS antenna, causing additional damage to the right horizontal stabilizer and the right inboard flap (Tabs A-4, S-7, Z-6).

4.6 Life Support Equipment, Egress and Survival: No deficiencies were found with Aircrew Life Support (ALS) survival or protective equipment. The mishap aircraft ALS equipment inspections were all current (Tabs GG-2, GG-3).

At KCIA, the mishap crew safely executed a landing without main landing gear. Most of the passengers exited through the rear troop doors, which had been opened during the execution of the emergency checklist (Tabs V-40, V-46). Others left through the crew entrance door as did the mishap flight deck crew (Tab V-5).

4.7. Search and Rescue (SAR). No SAR assets were required to recover the mishap aircraft and aircrew. Kuwaiti civilian nationals performed crash, fire, and rescue services at KCIA.

4.8. Recovery of Remains: Immediately upon landing, all injured passengers were transferred to the hospital. The remains of the deceased victims were transferred from Al Farwania Hospital, Kuwait, to Landstuhl Regional Medical Center, Germany, for post-mortem exams on 11 Dec 99. Lt Col , USA, MC, Armed Forces Regional Medical Examiner, signed the death certificates (Tab X-2 through X-4).

5. MAINTENANCE

5.1. Forms Documentation. The aircraft, C-130E tail #63-7854, was accepted by the Air Force on 18 November 1963 and has flown 26,483.8 hours.

5.1.1. The Air Force Technical Order (AFTO) Forms 781A documents aircraft problems identified by aircrew members and maintenance personnel. A Red X identifies a problem that grounds an aircraft and a Red Diagonal (/) identifies minor maintenance problems that are non-grounding in nature. All Red X write-ups must be fixed before the aircraft can be flown; whereas, Red Diagonal (/) write-ups are non-critical in nature and may be deferred until the aircraft is down for extended maintenance. The mishap aircraft had no open Red X discrepancies. There were three open write-ups in the AFTO Form 781As (Tab H-10), but none of the following write-ups are considered factors in this mishap:

a. Job Control Number 0695306, Red Diagonal (/), entered 10 March 1999, "#3 Engine Horsecollar Drain has 1" crack." This problem was being deferred until the next engine change. This portion of the system drains fluids from the engine bay should any of the hoses/lines leak. It has no bearing on aircraft in-flight operations and did not contribute to the aircraft landing short of the runway.

b. Job Control Number 0699002, Red Diagonal (/), entered 10 March 1999, "#3 Engine Firewall (Aft/Outboard Side) temporarily repaired crack, needs permanent repair upon engine change." The full-up repair was being deferred until the next engine change, because of the relative inaccessibility of the component. The firewall helps contain high temperatures from spreading beyond the engine compartment. It has no bearing on aircraft in-flight operations and did not contribute to the aircraft landing short of the runway.

c. Job Control Number 285B500, Red Diagonal (/), entered 14 October 1999, "Norm Brake Xmitter [transmitter] Shock Mounts Worn." This repair action was awaiting parts (AWP). The component is a set of small rubber shock absorbers surrounding the brake transmitter (a small signal converter) in the nose landing gear wheel well. It is common for this material to lose resiliency over time and become worn. It has no bearing on aircraft in-flight operations and did not contribute to the aircraft landing short of the runway.

5.1.2. The AFTO Form 781K is used to record maintenance actions to be accomplished at the next major maintenance downtime. AFTO Form 781K write-ups are "delayed discrepancies" – non-critical repair actions that may be postponed and do not cause the aircraft to be grounded. There were six minor write-ups in the AFTO Form 781K (Tab H-11). None of the following AFTO Form 781K write-ups are considered factors in this mishap:

a. Job Control Number 287B391, entered 13 Oct 1999, "ISO (Isochronal) Inspection Card 1-040 Item 2 not complied with. [With foam insulation removed from cargo door, inspect structure for corrosion (not applicable to aircraft with less than 4,800 hours)]." This inspection removes an adhesive-backed foam rubber pad from the inside of the cargo door and inspects for corrosion on the door's inner skin. The unit deferred this labor-intensive inspection for inclusion in the next scheduled PDM (Programmed Depot Maintenance). Neither the lack of this inspection nor the presence of corrosion on the ramp could cause the aircraft to land short of the runway.

b. Job Control Number 287B392, entered 13 October 1999, "Isochronal (ISO) Inspection Card 1-225 Item 5 not complied with. (If Taper-Lok fasteners are installed in wing-to-fuselage attachment angle at Fuselage Station 597 and Butt Line 61 left and right, inspect in accordance with –36)." This inspection requires jacking and shoring the aircraft and removal of Taper-Lok (close tolerance, high shear strength, tapered) fasteners at the wing-to-fuselage joint. Once the fasteners are removed, each hole is NDI'd (non-destructively inspected) for cracks. Following the inspection, the hole needs to be reamed out, Hi-Tigue fasteners installed, and the aircraft down-jacked. A Hi-Tigue fastener is a close-tolerance, high shear strength fastener that cold-works the hole for improved fatigue resistance. The unit deferred this labor-intensive inspection for inclusion in the next scheduled PDM. Lack of this inspection did not cause the aircraft to land short of the runway.

c. Job Control Number 2871000, entered 14 October 1999, "Aft cargo toilet bent." The system remained operational and repair was being deferred until the aircraft could sit down for a long enough time to replace the system. This component has nothing whatsoever to do with aircraft's flying or handling characteristics and did not contribute to the mishap.

d. Job Control Number 293B901, entered 20 October 1999, "GTC [Gas Turbine Compressor] compressor has broken stud." This maintenance is being deferred until the next GTC change. The GTC is a small turbine-driven motor in the front of the left wheel well pod that provides additional power during ground operations or as an emergency power source in-flight. Loss of this stud would not cause GTC failure, nor would it make the aircraft land short of the runway.

e. Job Control Number 293B988, entered 26 October 1999, "Corrosion in right beavertail Fuselage Station 1041 upper end and extends aft." This portion of the aircraft is the unpressurized structure aft of the cargo compartment and below the aircraft's rudder/vertical stabilizer. This

structure was intact following the mishap and could not have played a role in causing the ground collision.

f. Job Control Number 3289003, entered 24 November 1999, "Copilot's BDHI [Bearing Distance Heading Indicator] incorrect part number in accordance with Time Compliance Technical Order 1691." Awaiting parts, supply document number X246AM93288401. This component is not the same as the one called out in technical manuals. Though operationally the same, it poses problems for fleet-wide configuration control. The operation of this BDHI is transparent to the user. During the final approach to landing, the crew would not be referencing this instrument. This component is not considered to be a factor in this mishap.

5.1.3. Time Compliance Technical Orders (TCTOs) were reviewed (Tabs U-6, U-7). In all, the aircraft had 66 TCTOs accomplished in its 36 years. TCTOs are technical orders to modify or inspect aircraft within certain time periods. All required TCTOs had been complied with on the mishap aircraft. There were six open TCTOs at the time of the mishap. None were past the mandatory aircraft grounding date. All of the TCTOs were in work within the unit [being installed by a local Contract Field Team (CFT)]. Aircraft 63-7854 was scheduled to receive the upgrades before the aircraft ground date for each TCTO. None of the open TCTOs are considered factors in this mishap. They are:

a. TCTO 1C-130-1313 is a depot level modification that upgrades the autopilot and installs Ground Collision Avoidance System (GCAS). The aircraft ground date for the TCTO is 1 Nov 2001. The GCAS system warns pilots of an impending collision with the ground. However, when an aircraft is configured for landing (landing gear down and flaps at 50%) the system is inhibited (it presumes that you want to touch the ground) and does not make the "Pull Up - Pull Up" call. Since the aircraft was configured for landing throughout the mishap flight, the presence of GCAS would not have prevented this mishap.

b. TCTO 1C-130-1339 and its supplement, TCTO 1C-1301339U, are depot-level modifications that upgrade the aircraft electrical system to a common configuration. 15 February 2001 and 29 November 2002, respectively are the grounding dates for these TCTOs. The presence or absence of this modification would not have caused the aircraft to land short of the runway.

c. TCTO 1C-130-1454 is a depot level modification that installs an Automatic Communications System on aircraft with SCNS (Self-Contained Navigation System). This modification installs a processor that allows high-frequency communications for over-the-horizon capability. The ground date for this TCTO is 4 February 2001. The presence or

absence of this modification would not have caused the aircraft to land short of the runway.

d. TCTOs 1C-130-1626 and 1C-130-1573 are depot modifications to the Bleed Air System ducting. This upgrade is being conducted in several phases; these are the next two phases scheduled for this aircraft. The TCTO ground dates are 15 October 2002 and 15 April 2007 respectively. This system takes hot, high-pressure air from the engine compressor to provide leading edge anti-icing, aircraft environmental conditioning, and pressurization. The presence or absence of this modification would not have caused the aircraft to land short of the runway.

5.1.4. Time Change Items (TCIs) are critical components that are replaced periodically based either on number of hours flown or number of calendar days since component installation. No TCIs were overdue (Tabs H-12, H-13). A TCI is considered overdue only when they exceed the due date or flight hours limitation by more than 10%.

5.1.5. The aircraft forms AFTO 781A and AFTO 781H were reviewed for completeness and accuracy. There were several aircraft form documentation errors that included not entering the date in the proper block, failure to use "minimum signature" (first initial and full last name) in the "Discovered By" block, and incorrectly entering the total Airframe Time (this mistake cascaded into the last four AFTO Forms 781H). None of the documentation errors identified would cause the aircraft to impact the ground short of the runway (Tabs H-6 through H-8).

5.2. Inspections.

5.2.1 Previously scheduled maintenance included:

a. Last Programmed Depot Maintenance (PDM) – Ogden Air Logistics Center, Hill AFB, Utah – 31 January to 6 March 1997 [this PDM was combined with a #4 ISO Inspection (major)] (Tab D-3).

b. Last ISO Inspection #3 (minor) – Little Rock AFB, AR – 13 to 21 October 1999. During this ISO, the Nose Landing Gear (NLG) was replaced (a TCI) and the Main Landing Gear (MLG) received complete servicing as part of the #3 ISO work package (Tab D-3).

c. Unprogrammed Depot Level Maintenance (UDLM) performed at Little Rock AFB from 26 October through 16 November 1999. The aircraft came out of ISO and immediately entered heavy maintenance. During this time, maintenance personnel performed cargo ramp repairs, identified and corrected pressurization leaks, and repaired cracks in secondary structure (non-primary load carrying members) throughout the aircraft. None of the discrepancies encountered during heavy maintenance would have contributed to the mishap.

5.2.2. There were no overdue special inspections in the AFTO Form 781As. The next scheduled records inspection was the 30 Day Document Review slated for completion on or about 26 December 1999. The next Home Station Check (HSC) was scheduled for 11 April 2000 (Tab H-10).

5.3. Maintenance Procedures. The 61st Airlift Squadron, Little Rock AFB AR, maintenance procedures were not reviewed because there are no aircraft systemic or mechanical underpinnings considered causal or contributory to this mishap.

5.4. Maintenance Personnel and Supervision. The 61st Airlift Squadron was responsible for all maintenance and servicing of the mishap aircraft. Maintenance personnel and maintenance supervision were not examined for causal factors since there are no aircraft systemic or mechanical underpinnings considered causal or contributory to this mishap.

5.5. Fuel, Hydraulic, and Oil Inspection Analysis

5.5.1. Fuel samples were taken from the vehicle servicing the aircraft and from the aircraft fuel tank sumps. The Quality Assurance Office of the fuels laboratory at Al Salem AB tested the fuel sample from truck 911-64 in accordance with T.O. [technical order] 42B-1-1. They tested the sample to include analysis of water content, conductivity, color, particulate matter, and fuel system icing inhibitors (FSII). The sample passed in all categories (Tab J-7). The military fuels lab at Aviano AB, Italy, performed tests on the aircraft fuel samples from the mishap aircraft (Tabs J-8 through J-17). Because of the limited sample size (4 oz) from each tank, the lab performed visual checks and a microscopic analysis of particulate matter within the samples. Lab technicians then combined all of the samples to test the fuel specifications (Tab J-8). The individual samples contain some sediment and trace amounts of water--typical of sump samples and the fuel recovery process. All fuel samples were considered satisfactory for use (Tab U-5).

5.5.2. Hydraulic fluid samples taken from the booster and utility hydraulic systems were sent to the Air Force fuels testing laboratory at Aviano AB. Lab technicians found minor traces of water in both samples--typical of hydraulic fluid that has been in use. No other fluids or contaminants were found (Tabs J-21, J-22).

5.5.3. The Al Jaber AB SOAP (Spectrometric Oil Analysis Program) laboratory analyzed oil samples taken from each engine. SOAP analysis looks for the presence of trace materials in the oil that indicate abnormal engine wear. In all engines, levels of iron, copper, magnesium, nickel, and tin were within normal limits (Tabs J-19, J-20). Samples from engines #2 and #4 have higher than normal presence of Silicon [59 and 18 ppm (parts per million) vice a normal of 5 ppm]. This would in no way impede proper operation of the engines. SOAP testing has been of limited value to analyze and troubleshoot the Allison T-56 engine. The C-130 community no longer performs oil

sample analysis as a matter of routine operations.

5.5.4. The Quality Assurance office of the Fuels Laboratory at Al Salem AB analyzed oxygen samples from LOX (Liquid Oxygen) Cart 0520 that serviced the mishap aircraft. They performed the tests in accordance with T.O. 42B-6-1-1 and the oxygen passed with no deficiencies (Tab J-18).

5.5.5. Based upon analysis of all fluid samples taken, aircraft fluids are not considered factors in this mishap.

5.6. Unscheduled Maintenance

5.6.1. Aircraft forms from 21 October (end of ISO) through 10 December (mishap) 1999 were reviewed for aircraft discrepancies. Aircrew or maintenance personnel identified the discrepancies listed below with the associated corrective actions:

a. 23 November 1999 – First flight after ISO – Copilot's airspeed indicator lights inoperative – Removed and replaced bulbs.

b. 23 November 1999 – First flight after ISO - Pilot's hot microphone inoperative - Adjusted knob on pilot's interphone box.
c. 24 November 1999 – #1 Propeller low oil light on start – Serviced 2 quarts hydraulic fluid IAW (in accordance with) 61JG-20-1 (T.O. 1C-130H-2-61JG-20-1). This is misleading because the propeller system actually uses hydraulic fluid, not oil. The servicing actions are correct.

d. 24 November 1999 - GTC will not run without boost pump – Ran GTC without boost pump on - No defect.

e. 24 November 1999 – Left stabilizer and fin tip went into overheat and appeared not to cycle. No overheat warning light – Operational check OK.

f. 24 November 1999 – SKE (Station Keeping Equipment) glideslope bar inop in SKE. Works OK in ILS (Instrument Landing System) – Reseated pilot's ADI (Attitude Direction Indicator).

g. 24 November 1999 – #2 engine oil quantity gage did not move in flight - Removed and replaced #2 engine oil quantity transmitter.

h. 29 November 1999 – #2 Compass Inoperative – Removed, replaced, balanced, and operational checked (good) #2 N-1 Amp

i. 6 December 1999 – Pilot's altimeter extremely hard to adjust – Bent knob

In every case, the corrective actions resolved the discrepancies because there are no repeat write-ups in the AFTO Forms 781A (Tab H-2). Note that items a. through h. occurred between ISO and departure from home station and item i. was in-theater.

Following heavy maintenance, the aircraft departed Little Rock AFB for the Middle East. Enroute to Kuwait (30 November to 4 December 1999) the aircraft landed four times (total - 25.8 hours flying time) with no discrepancies. The aircraft flew seven sorties in theater (total – 5.9 hours flying time) before encountering its only discrepancy (item i.). The aircraft flew 19 more sorties (total – 14.6 hours flying time) with no discrepancies before the mishap.

5.6.2. Post-mishap inspections and analyses, combined with the fact that the aircraft flew 31 sorties (total – 46.3 hours flying time) with only one minor defect, confirms that none of the write-ups referenced above were factors in this mishap. Furthermore, there were no crew discussions on the Cockpit Voice Recorder (CVR) (Tabs O-131 through O-149) about aircraft problems (other than the loss of the main landing gear). These facts demonstrate that aircraft maintenance was not a cause of this mishap.

6. AIRCRAFT AND AIRFRAME SYSTEMS

6.1. Structures and Systems. Systems and structures that could have played a role in this mishap were examined.

6.1.1. Aircraft Structures - A C-130 structural engineer from Warner-Robins Air Logistics Center inspected the aircraft and found no evidence of pre-existing weakness or flaws (Tabs J-2 through J-4). All structural damage occurred during the aircraft mishap.

6.1.2. Mishap Propulsion System – All portions of the propulsion system were working properly prior to and following the mishap (Tabs O-131 through O-149, V-31).

6.1.3. Mishap Cockpit Components and Instruments – A 61st Airlift Squadron (AS) maintenance team performed checks on cockpit components and instruments and found all within acceptable limits (Tabs J-5, J-6, U-4, BB-3, BB-4).

6.1.4. Mishap Flight Control Systems – All portions of the flight control system were working properly prior to and following the mishap (Tabs O-131 through O-149, V-31).

6.2. Conclusions. Testing and analysis of aircraft systems, components and structures did not identify any defects that contributed to this mishap. Testimony from crew chiefs, crew members, and maintenance personnel along with systems tests, aircraft forms, and fluid samples indicate there were absolutely no problems with the aircraft that caused it to impact the ground a half-mile short of Runway 15R at Al Jaber AB.

7. WEATHER

7.1. Forecast Weather. The initial weather forecast for the mission area was briefed to the mishap aircrew on 9 December 1999 at 1800Z. The forecast called for mostly Visual Meteorological Conditions (VMC) throughout the duration of the mission. The aircrew was also informed that weather at Al Jaber AB would be temporarily below Visual Flight Rules (VFR), with 2400 meters visibility, a 5000 foot ceiling, and thunderstorms and rain showers in the vicinity (Tab K-8). Under these weather conditions only the ILS approach to runway 33L was authorized.

At approximately 2230Z the crew obtained an updated weather forecast from the KCIA, Air Terminal Operations Center. At the time the Al Jaber AB weather office advised KCIA that visibility at Al Jaber AB was at 1600 meters, ceiling partially obscured and broken, with fog at the airfield. Under these weather conditions only the ILS approach to runway 33L was authorized.

7.2. Observed Weather. At the time of the mishap, observed weather at Al Jaber AB was SCT000 (due to one half of the ceiling obscured by fog) with one-mile visibility. Al Jaber AB tower was reporting approximately 500 meters visibility and runway visual range (RVR) of 330 meters during the mishap time period (Tab O-110).

7.3. Conclusion. Based on the weather update the crew received at Kuwait International, they had adequate information to determine the weather at Al Jaber AB was less than required to fly the VORTAC 15R approach. Nevertheless, the crew chose to plan this non-precision approach to runway 15R, in violation of AFI 11-202V3, when a precision approach to runway 33L was available. In addition, had the crew checked the weather, in accordance with AFMAN 11-217, before starting their en route descent they would have been notified by tower the weather at Al Jaber AB was below required minimums for either instrument approach (VORTAC 15R or ILS 33L).

8. CREW QUALIFICATIONS

8.1. Training. All available formal training records were reviewed for each crewmember on the mishap aircraft. The only significant finding was in the pilot's aircraft commander (AC) preparation and upgrade training folders. The pilot completed AC School September-October 1999. During several of his AC upgrade rides, his instructors identified problems with an erratic aim-point resulting in lower than normal approaches. Aim-point control improved as individual sorties progressed, but reoccurred on subsequent training flights (Tabs CC-2 through CC-10). All other training records were normal with no significant findings.

8.2. Experience. The aircraft commander had recently completed AC upgrade and had less than 100 hours pilot-in-command time (Tab CC-15). He was considered an average pilot (O-103). The copilot was considered one of the most mature, competent, and confident pilots in the squadron. In addition, squadron supervisors tried to offset the

relative inexperience of the pilots by selecting other flight deck personnel whom they considered to be highly experienced. The navigator, an instructor, was considered to have above average skills. The flight engineer, an evaluator, was considered the most experienced member of the flight deck crew. He was classified as one of the top two or three engineers in the squadron (Tab O-103, V-68). Neither loadmaster was considered a factor in the mishap.

8.2.1. Captain , the mishap pilot, is a basic aircraft commander with 51.7 hours pilot-in-command time. He has 1184.3 total hours; 796 C-130 hours and 388.3 other (Tab G-2). He completed AC Upgrade on 18 October 1999, and was still in his first 100 hours. Both his AC preparatory course and formal AC upgrade training folder write-ups reflect problems with erratic aim-point and centerline control, resulting in lower than normal approaches often left of centerline (Tabs CC-2 through CC-10). Captain had six check-rides in the C-130; two were less than Q1. One was Q3 for air-dropping a load three and a half miles short of the drop zone; the other one was Q2 for over-speeding the air-deflector doors during a tactical escape (Tabs CC-11 through CC-17). Q1 means fully qualified; Q2 means qualified with minor discrepancies; and Q3 means unqualified. Captain 30/60/90 day flying hour breakdown is 36.7/78.1/111.8 respectively (Tab G-2).

8.2.2. First Lieutenant the mishap copilot, had 857 total flying hours; 475.6 hours were in the C-130 and 309.5 hours were classified as other (Tab G-2). There were no training records available from Lt initial qualification course since it has been more than a year since she accomplished her training and the records have been destroyed. All of her check-rides were Q1 with minor write-ups (Tab CC-18). She was considered above average (Tab O-103). Lt 30/60/90 day flying hour breakdown is 29.5/75.2/97.1 respectively (Tab G-2).

8.2.3. Captain , the mishap navigator, is an instructor navigator with 1320.8 total hours; 1185.7 C-130 hours and 135.1 other (Tab G-2). All of his check-rides were Q1 with minor write-ups (Tab CC-19, CC-20). Captain 30/60/90 day flying hour breakdown is 31.9/54.2/96.2 respectively (Tab G-2).

8.2.4. Technical Sergeant , the mishap flight engineer, is an evaluator engineer with 2592.9 total hours; 1501 C-130 hours and 1091.2 other (Tab G-2). All of his check-rides were Q1 with minor write-ups (Tab CC-21). TSgt was considered one of the top engineers in the 61st AS (Tabs O-103, V-68). TSgt 30/60/90 day flying hour breakdown is 33.7/36.2/38.2 respectively (Tab G-2).

8.2.5. Senior Airman , mishap loadmaster, is not considered a factor in the mishap. SrA 30/60/90 day flying hour breakdown is 5.9/10.9/10.9 respectively (Tab G-2).

8.2.6. Senior Airman , mishap loadmaster, is not considered a factor in the mishap. SrA 30/60/90 day flying hour breakdown is 14.5/41.6/62.8 respectively (Tab G-2).

9. MEDICAL

9.1. Qualifications

9.1.1. Captain the mishap pilot, was medically cleared for flying duty on his last physical examination in accordance with Air Force Instruction (AFI) 48-123, Chapter 7.5 and Attachment 7 (Tabs DD-3, DD-4). This was certified at his flying physical exam performed 22 November 1999, and was current through December 2000 (Tab DD-3). A subsequent post medical examination determined Captain was not medically qualified based on an Optometry exams performed 30 December 1999 and 3 January 2000. These exams revealed old peripheral retina scars secondary to presumed ocular histoplasmosis syndrome (POHS) (Tabs DD-5 through DD-7). These are very subtle, usually benign, retinal changes from an infection. An ophthalmologic consult performed 17 January 2000 confirmed there are no signs of central retinal changes and he has excellent vision at this time (Tab DD-8). His condition was not acute, and his vision was unaffected. He had flown multiple prior missions without visual difficulties and stated no night vision complaints on his 22 November 1999 physical exam (Tab DD-4). POHS will require a waiver per AFI 48-123, A7.6.5.2 and A7.6.5.4 for any future consideration to fly (Tabs BB-5, BB-6, DD-7)

Captain has a history of mild near-sightedness (compound myopic astigmatism or CMA) and was previously assigned eyeglasses to fly (Tabs DD-9, DD-10). He passed his 28 December 1998 Optometry exam with uncorrected vision (without glasses) to 20/20 in each eye (Tab DD-11). He passed the 22 November 1999 flight physical with correctable vision from 20/25 to 20/20. Based on this exam, he should have worn his glasses while flying. He was not wearing his glasses at the time of the mishap (Tab V-69). The 30 December 1999 Optometry evaluation and 17 January 2000 Ophthalmology examination show he wore eyeglasses to pass (Tabs DD-5, DD-6, DD-8). This eyewear requirement is annotated on the 30 December 1999 AF Form 1042 assigning Duties Not Involving Flying (DNIF) (Tab DD-12).

Captain completed Tanker, Transport, Bomber (TTB) Physiological refresher training on 22 May 1998, which expires on 31 May 2001 (Tab DD-13).

9.1.2. First Lieutenant the mishap copilot, was medically qualified in accordance with AFI 48-123, Chapter 7.5 and Attachment 7, for flying duty on the day of the mishap. Her last flying physical exam was performed 23 February 1999 and was current through May 2000 (Tab DD-14). Lieutenant completed TTB Physiological refresher training on 31 August 1999, which expires on 31 August 2004 (Tab DD-15).

9.1.3. Captain , the mishap navigator, was medically qualified in accordance with AFI 48-123, Chapter 7.5 and Attachment 7, for flying duty on the day of the mishap. His last flying physical exam was performed 1 November 1999 and was current through March 2000 (Tab DD-16). Captain completed TTB Physiological refresher training on 27 May 1998, which expires on 31 May 2001 (Tab DD-17).

9.1.4. Technical Sergeant , the mishap flight engineer, was medically qualified in accordance with AFI 48-123, Chapter 7.5 and Attachment 7, for flying duty on the day of the mishap. His last flying physical exam was performed 24 August 1999 and was current through March 2000 (Tab DD-18). TSgt completed TTB Physiological refresher training on 9 June 1998, which expires on 30 June 2001 (Tab DD-19).

9.1.5. Senior Airman , the mishap loadmaster, was medically qualified in accordance with AFI 48-123, Chapter 7.5 and Attachment 7, for flying duty on the day of the mishap. His last flying physical exam was performed 2 November 1999 and was current through November 2000 (Tab DD-20). SrA completed TTB Physiological refresher training on 5 January 1999, which expires on 31 January 2004 (Tab DD-21).

9.1.6. Senior Airman , the mishap loadmaster, was medically qualified in accordance with AFI 48-123, Chapter 7.5 and Attachment 7, for flying duty on the day of the mishap. His last flying physical exam was performed 12 May 1999 and was current through May 2000 (Tab DD-22). SrA completed TTB Physiological refresher training on 2 February 1999, which expires on 28 February 2004 (Tab DD-23).

9.2 Crew Member Health. Post-accident medical examination records of the aircrew were reviewed. Injuries were confined to mild musculoskeletal strain and stiffness of the neck/back and some extremities. Spinal X-rays were completed on all crewmembers and were unremarkable. One finding (probably old) on SrA shows slight anterior compression of the mid-back (5^{th} thoracic) vertebrae bone and normal surrounding anatomy. He has never offered any symptomatic back complaints to this area (Tab X-5). Toxicology studies performed on the mishap crew were reported by the Armed Forces Institute of Pathology in Washington, D.C. and revealed no evidence of drugs, alcohol, or carbon monoxide present at the time of the crash (Tabs EE-2 through EE-7).

9.3. Passenger Health. There were two seriously injured passengers and five minor injuries. All the affected passengers were seated in the left or the right-side main gear wheel-well areas and the injuries were related to the initial impact (Tabs V-48 through V-67). One seriously injured passenger suffered six broken ribs, with related chest and lung injuries, a fractured left arm, and a fractured left collarbone. He is expected to fully recover from his wounds (Tabs X-6, X-7). The other seriously injured passenger sustained a large left flank laceration, left cerebellar and right frontal brain hemorrhages, brain swelling, cervical (neck) injuries, and four broken ribs with related chest injuries. This passenger will require extensive rehabilitation and faces possible permanent

disabilities (Tabs X-6, X-7).

Of the minor injuries, one passenger suffered three broken ribs, and four passengers sustained head lacerations (Tabs X-6, X-7). In addition to those mentioned, many passengers complained of minor nausea, foot injuries, or back pain. They were all treated and released (Tab X-8).

9.4. Pathology: There were three passenger fatalities. The remains of all three expired individuals were identified by visual examination and confirmed by dental examination. Post-mortem exams were accomplished by the U.S. Army Europe Regional Medical Command, Landstuhl Regional Medical Center, Germany, by Captain USA, MC, and Lt Col USA, MC, Armed Forces Regional Medical Examiner, on 12 December 1999 (Tabs X-2 through X-4). The cause of death in each case was multiple blunt force injuries secondary to the C-130 mishap. Manner of death was by accident (Tabs X-2 through X-4). Death was instantaneous for A1C and within 10-30 minutes for Captain and A1C per eyewitness accounts. Captain and A1C went immediately into shock, showed no indication of pain, and soon became unconscious (Tabs V-48 through V-67).

Firefighters, security forces personnel, other passengers, and crewmembers riding aboard the mishap aircraft exerted heroic efforts in administering first aid to the injured. In three cases, they performed cardiopulmonary resuscitation (CPR) on the fatally injured for the better part of an hour before relinquishing their charges to Kuwaiti emergency personnel (Tabs V-48, V-50, V-58, V-62, V-64, V-66).

9.5 Lifestyle: No unusual activities, duty/domestic/physical stressors, habits, or behavior were noted in any of the crewmembers just prior to deployment, following arrival, or during their first week in theater (Tabs V-3 through V-44, FF-2 through FF-19).

9.6 Crew Rest and Crew Duty Time: Crew rest and crew duty time requirements appear to have been adhered to in accordance with AFI 11-202, Volume 3 (Tabs BB-7 through BB-10, FF-2 through FF-19). The crew's last flight was on 6 December 1999, flying four sorties totaling 2.9 hours (Tab G-3, G-11, G-15, G-20, G-25, G-29). All crewmembers had eaten on 9 December 1999, and described similar foods consumed for dining facility lunch and supper leading up to the night time mishap (Tabs FF-2 through Tab FF-19).

10. OPERATIONS AND SUPERVISION

10.1. Operations The 9th Expeditionary Airlift Squadron (EAS) operates from Al Salem AB. No flight plans were required for this particular mission as the aircraft operated on an IFR tower-to-tower clearance between the identified locations (Tab K-4). The 9th EAS operations staff provided a mission folder containing crew orders, mission set-up (frag), Notice To Airmen (NOTAMs), Global Decision Support System (GDSS) cuts, and theater specific instructions for various locations (Tabs K-2, K-3, K-6, O-123 through O-130). Al Salem AB USAF weather personnel provided weather briefs to

aircrews (Tab K-8).

Operations tempo for this unit is considered average. During normal operations, crews can expect to fly every two to three days. Most missions are weekly scheduled support missions that vary very little from week to week. The missions are considered fairly routine air-land missions of the point A to point B variety with very little inherent challenges associated (Tab V-72).

10.2. AOR Supervision. Authorizing activity for this mission was the 9th Air Expeditionary Group, Al Salem AB (Tab K-3). The mishap navigator, Captain acting in his capacity as Deputy Detachment Commander, signed the crew orders (Tab K-3). Neither the 9th Air Expeditionary Group nor the 9th Expeditionary Airlift Squadron supervision appears to have any bearing on this accident.

10.3. 61st AS Leadership. The 61st AS Commander and Deputy for Operations selected the squadron crews for deployment to Southwest Asia. The crews were put together after analysis of individual crewmember performance and experience. The mishap pilot was a brand new aircraft commander with 796 hours in the C-130 and 51.7 hours of pilot-in-command time. His evaluation record had two of three operational flight evaluations graded at less than fully qualified. His evaluation write ups, airdropping a load three and one half miles short of the drop zone and over speeding the air deflector doors on a tactical escape, point to a lack of situational awareness (Tab CC-11 through CC-14) during critical phases of flight. The mishap copilot had 475 hours in the C-130. The squadron leadership selected an instructor navigator and an evaluator flight engineer to compliment the mishap pilots' experience. The pilot combination had 1271 C-130 primary/secondary hours between them.

11. HUMAN FACTORS ANALYSIS

Consideration was given to scheduling and dispatch pressures, on/off-duty interpersonal relationships, as well as individual characteristics to include attitude, awareness, disorientation, familiarity, drugs, health, morale, psychological considerations, emotions, nutrition, alcohol, fatigue, crew rest, complacency, illusions with visual, auditory, vestibular, kinesthetic perceptual factors, judgment, personality, and task-load saturation. Aircrew members had all previously flown together, felt confident and trusting in each other, and expressed readiness to fly the mission, both physically and psychologically (Tabs V-3 through V-44, V-46 through 49, FF-2 through FF-19).

The Board considered fatigue and decided that it was not a causal factor in the mishap. The aircrew met all crew rest requirements. The flight engineer and the copilot testified that they took naps while on the ground at KCIA (Tabs V-3, V-15). The copilot said she awoke from her nap "a 100% better" (Tab V-15).

12. GOVERNING DIRECTIVES AND PUBLICATIONS

12.1. Directives and Publications. The following directives and publications applied to this mission:

TO 1C-130-101..... C-130 Aircraft Usage
TO 1C-130A-9..... Cargo Loading Instructions
TO 1C-130E-1..... Flight Manual C-130E
TO 1C-130E-1-4..... Self Contained Navigation System
TO 1C-130E-1-1..... Flight Manual Performance Data
AFI 11-2C-130 VOL 1..... C-130 Aircrew Training
AFI 11-202 VOL 2..... Aircrew Standardization/Evaluation Program/Training
AFI 11-202 VOL 3..... General Flight Rules
AFI 11-401..... Flight Management
AFI 13-217..... Assault Zone Operations
AFI 48-123.....Medical Examinations
AFM 11-217 VOL 1..... Instrument Flight Procedures
AFM 11-217 VOL 2..... Instrument Flight Procedures
AFM 51-9..... Aircraft Performance
AFM 51-40..... Air Navigation
AMCI 11-208..... Tanker/Airlift Operations
MCR 55-130 VOL 1..... C-130 Operations
MCR 55-130 VOL 2..... C-130 Tactical Operations
ASSR..... Airfield Suitability and Restriction Report
GDSS..... Global Decision Support System
Southern Watch Aircrew Flimsy
9th AEG Aircrew Flimsy
9th AEG Aircrew Flimsy Supplement
9th EAS Crew Read File and FCF Library

12.2. Directives Violated.

12.2.1. The crew briefed and planned to use the VORTAC 15R approach into Al Jaber AB if the weather was not good enough for a visual approach. This was a deviation to the instructions on the approach plate. The approach plate had a note that stated USAF crews required permission from their major command and/or the commander exercising operational control of the aircraft to fly VORTAC 15R at night during instrument conditions (Tab O-121). Approval to fly the VORTAC 15R at Al Jaber AB at night during instrument conditions was not granted.

12.2.2. The crew violated AFI 11-202V3 when they elected to fly a published approach (Al Jaber AB VORTAC 15R) when the weather required for the approach was below the required minimums.

12.2.3. The crew violated AFMAN 11-217 when they failed to contact the Al Jaber AB tower to check weather prior to beginning their en route descent.

12.2.4. The pilots violated AFMAN 11-217 when they failed to monitor their flight instruments during night conditions on the approach to Al Jaber AB. Failure to monitor their flight deck instruments during reduced visibility may have led to spatial disorientation.

12.2.5. The pilot deviated from Air Force directives when he did not wear his glasses to fly. The pilot had 20/25 vision in both eyes correctable to 20/20 with glasses (Tab DD-4, BB-12, BB-13).

13. NEWS MEDIA INVOLVEMENT

After an initial report on CNN, the mishap received significant media attention in the *Air Force Times* and central Arkansas, since the mishap aircraft was assigned to the 61st AS at Little Rock AFB, AR.

14. ADDITIONAL MATTERS

14.1. Spatial Disorientation. One potential contributor to this mishap may be lack of ambient visual orientation cues due to minimal surrounding light sources at Al Jaber AB (Tabs V-4, V-20, V-69). This lack of peripheral visual cues may have contributed to the pilot's spatial disorientation and failure to recognize his transition point to the normal glide slope. This condition creates considerable difficulty for the pilot, by requiring focal vision alone to accomplish what is normally accomplished with both focal and ambient vision. As a result, he passed through this transition point and allowed the aircraft to continue its 1700-fpm descent rate impacting short of the runway.

14.2. First-Aid and Life-Saving Efforts. Despite the fact the impact and the resulting damages and injuries came as a complete surprise to every passenger aboard the flight, everyone reacted in a manner which reflects great credit upon themselves and the United States Air Force. Several members disregarded their own personal safety while attempting to save the lives of the fatally injured and the seriously injured passengers. Others contributed their self-aid and buddy-care skills in less dramatic ways. All of their efforts deserve recognition and gratitude.

Although space limitations and the serious condition of the injured prevented the rescuers from moving them very far from the gaping holes in the aircraft, the members listed below gave primary care and CPR virtually throughout the 42-minute flight. After the no-gear landing at KCIA, they continued their efforts until relieved by Kuwaiti emergency personnel:

MSgt	Firefighter	96th CES	Eglin AFB, FL
SSgt	Crew Chief	61st AS	Little Rock AFB, AR

SrA	Firefighter	77th MSS	McClellan AFB, CA
SrA	Firefighter	82nd CES	Sheppard AFB, TX

Other members who assisted in these CPR efforts include:

SrA	Firefighter	12th CES	Randolph AFB, TX
SrA	Firefighter	62nd CES	McChord AFB, WA

Although he did not require CPR, MSgt sustained extremely serious injuries and may have expired had it not been for prompt, courageous action by several individuals. They used pressure to reduce the blood flow from a serious lower back injury and treated him for shock while carefully extricating him from the wreckage and moving him away from the hole in the right wheel well. Those members were:

TSgt	Security Forces	436th SFS	Dover AFB, DE
SrA	Firefighter	12th CES	Randolph AFB, TX
SrA	Firefighter	62nd CES	McChord AFB, WA

Finally, the compassionate care given by the following individuals to the members who expired should not be overlooked:

Maj	Maintenance	366th OSS	Mountain Home AFB, ID
TSgt	Medical Tech	12th AMDS	Randolph AFB, TX
SrA	Security Forces	49th SFS	Holloman AFB, NM

For details, see Tab O and Tabs V-48 through V-67.

14.3. Final Matters. The board considered the following factors and decided there was no evidence any of them applies; therefore, they are not discussed in detail in this report: local area orientation; intelligence; threat environment; and air traffic control. The aircraft pressure altimeter was correctly set at 30.06 and radar altimeter at 466 feet.

FRANK LARAS, Colonel, USAF
President, Accident Investigation Board

Statement of Opinion

DISCLAIMER

Under 10 U.S.C. 2254(d), any opinion of the accident investigator as to the cause or causes 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 any person referred to in those conclusions or statements.

1. Cause. I find, by clear and convincing evidence, the cause of the mishap was the crew's failure to follow governing directives and complacency in flight operations. As a result, the crew suffered spatial disorientation at a critical phase of flight; thereby, resulting in the crew's loss of situational awareness and failing to recognize an unsafe descent.

At 2257Z, a C-130E, aircraft number 63-7854, departed KCIA for Al Jaber AB, a ten-minute flight. The takeoff, climb, and level off phases of flight were uneventful. The crew initiated a visual final approach descent from an altitude of 3000 feet mean sea level or 2600 feet AGL. The crew violated regulations AFMAN 11-217 when they failed to check weather before beginning their en route descent and AFI 202V3 when they began an approach for which the airfield weather was below required minimums for the approach. They were approximately 4.5 miles (two minutes) from the approach end of the runway when they started their descent. The pilot initiated his descent with about three degrees of glide slope, using about 640-fpm rate of descent. After about 15 seconds, the mishap pilot transitioned to a six to seven degree glide slope with a 1600 to 1700 fpm rate of descent for the remainder of the approach. The crew became complacent during the approach and failed to monitor their instruments, which is critical during night flying with reduced visibility. As a result, the pilots became spatially disoriented and failed to recognize their landing picture, with reference to the runway, and failed to identify a normal visual descent point.

A normal visual descent point should have occurred at about 460 feet AGL and 5000 feet short of the runway. At this point, the pilot should have transitioned back to a 2.5 to 3 degree glide path, which would have placed the aircraft 50 feet above the runway threshold in position for a safe landing. Instead, he continued his steeper descent.

At about 125 feet AGL, descending at 28 feet per second, the aircraft entered a fog bank. At this point, none of the flight crew were aware of their current altitude and close proximity to the ground. The flight engineer called "Go Around" one to two seconds

after entering the fog bank (70 to 100 feet AGL). The pilot initiated the go around procedure (full power and nose up) about a second after the flight engineer's "Go Around" call. The aircraft was too low (approximately 50 feet AGL) to break its descent rate and start a climb. At 2306Z, the mishap aircraft impacted the ground, 2890 feet short of the end of the runway and 40 feet left of centerline, on approach to runway 15R at Al Jaber AB, Kuwait.

2. Contributing Factors. The following factors contributed to the cause of the mishap: lack of pilot leadership and discipline; lack of support from the copilot, navigator, and flight engineer; and overall lack of sound judgment by the flight deck crew.

2.a. Lack of Pilot Leadership and Discipline. The pilot was a brand new aircraft commander with 51.7 hours pilot-in-command experience at the time of the mishap. He graduated from aircraft commander school on 18 October 1999. The night of the mishap the pilot failed to set the tone in the flight deck and allowed the crew to become complacent in their duties. He violated numerous regulations placing him in a situation he could not overcome. Judging by the mishap pilot's performance records, I would classify him as one who needed an experienced copilot, navigator, and flight engineer to monitor his actions and decisions as an aircraft commander, particularly during his initial transition period of becoming a seasoned aircraft commander.

2.b. Lack of Support from the Copilot, Navigator, and Flight Engineer. Squadron leadership knew the pilot experience was not the optimum solution for this crew. They selected a strong copilot, an instructor navigator, and an evaluator flight engineer to complement the pilot. Squadron leadership believed this wealth of expertise would help support the new aircraft commander.

Squadron leadership rated the copilot as average to above average. They selected her to offset an inexperienced aircraft commander. The facts in this mishap demonstrate their faith was misplaced on this flight. On the mishap approach, the copilot made her radio calls but did nothing to avoid the mishap. She failed to recognize the point at which the pilot should have transitioned to a normal glide path for a safe landing. In fact, she failed to recognize the aircraft was on a steep glide path throughout the approach. She did not monitor instruments properly and lost all situational awareness with reference to the altitude of the aircraft, distance from the runway, descent rate, and the rapidly approaching terrain.

The navigator is critical to the crew during the approach phase. He is responsible for coordinating arrival procedures with the pilot. He is also required to use all available navigation aids to keep the aircraft clear of terrain and obstructions at night and in instrument flying conditions. The navigator was standing in the window during the initial part of the approach scanning for other aircraft. However, he is still responsible for assisting the crew with the approach; for example, providing information such as recommended glide path, wind drift, distance from the runway, recommended altitudes,

and terrain clearance. It is apparent the navigator either became complacent in his duties or lost situational awareness with respect to the altitude of the aircraft, the high rate of descent, and the rapidly approaching terrain.

The flight engineer is primarily responsible for monitoring aircraft systems and configuration. However, he also has the responsibility to scan outside and bring up anything unusual to the aircrew's attention. The mishap flight engineer saw the fog bank during descent and failed to report it to the rest of the crew. He thought the aircraft was going to over fly the fog bank since it was far enough back from the approach end of the runway. Although the fog bank did not cause the mishap, notifying the crew of its existence might have broken the chain of events leading to the mishap.

2.c. Lack of Sound Judgment by the Flight Deck Crew. The crew displayed a lack of sound judgment throughout the mishap sortie.

The first error in judgment came when the crew planned and briefed for their approach on the mishap flight into Al Jaber AB. Throughout the night, the crew received information the weather at Al Jaber AB was continuously deteriorating. The Al Salem AB weatherman informed the crew at mission show time that Al Jaber AB visibility would be temporarily down to 2400 meters with thunderstorms and rain showers in the vicinity. The first time the crew landed at Al Jaber AB, approximately two and one half-hours prior to the mishap, the crew reported to tower two to three miles visibility on the ground. When the crew departed from Al Jaber AB twenty minutes later, the tower reported 1500 meters visibility.

After the crew landed at KCIA, the pilot and navigator got a weather update for Al Jaber AB, approximately one hour prior to the mishap. The Al Jaber AB weatherman was calling for partially obscured ceiling with a surface visibility of 1600 meters. The pilot and navigator returned from getting the weather update and informed the crew the weather was "good to go." The pilot briefed the VORTAC 15R approach and the ILS 33L approach to Al Jaber AB.

The aircrew should not have briefed the VORTAC 15R approach for two reasons in violation of Air Force and Department of Defense instructions. First, this approach required a visibility of 2000 meters, but the Al Jaber AB weatherman had just informed the crew the visibility was 1600 meters. Second, the VORTAC 15R approach plate had a note directing USAF crews flying this approach during night instrument conditions to obtain approval from their major command and/or Joint Task Force-South West Asia (JTF-SWA) Commander. The JTF-SWA Commander had not granted authority to the mishap crew's unit, the 9th Expeditionary Airlift Squadron, to fly this approach during night instrument conditions.

The second error in judgment occurred soon after takeoff. The first time into Al Jaber AB the crew flew directly to the Al Jaber AB navigation aid and then maneuvered the aircraft for a final approach to the runway. Compared to their second landing at Al Jaber AB, this

procedure takes longer and allows some extra time for the crew to set themselves for the landing. On the second flight into Al Jaber AB, the crew took off and immediately set up for final approach to runway 15R at Al Jaber AB. They did this by flying to a point northwest of the field versus flying directly to the navigation aid as they did the first time. Approximately five minutes after takeoff, the crew maneuvered the aircraft for the final approach. This caused the crew to rush through the checklists and possibly put them "behind the aircraft" (that is, events were occurring more quickly than the crew anticipated) for the final approach descent. As a result, the aircraft was too high and too close to the runway for a normal descent profile.

The aircrew visually acquired the Al Jaber airfield from five to six miles out from the terminal at an altitude of 2600 feet AGL. They now made their third error in judgment by electing to fly a visual approach, since they had five miles or better visibility at altitude, without canceling IFR with tower. The aircrew erred for the following reasons: (a) they disregarded all previous weather information and convinced themselves the visibility at Al Jaber AB had improved; (b) they assumed the horizontal visibility on the surface would be the same as the slant range visibility at altitude; (c) and they violated AFI 11-202V3 by not contacting tower first prior to canceling IFR and flying the visual approach.

The aircrew, now within five miles of the runway, had to descend 2600 feet in less than two minutes to land. The pilot had to decide to maneuver the aircraft in an arc to lose some altitude and better position the aircraft for the final approach or to select a high rate of descent. The pilot selected the high rate of descent profile. A higher rate of descent reduces the time available to recognize the runway picture to transition to a normal landing glide path. Given their experience, the pilot's decision did not afford the aircrew enough time to recognize the transition point to a normal glide path.

The fourth error in judgment is that the aircrew failed to request weather from the tower during the approach in violation of AFMAN 11-217. The aircrew knew the weather had been deteriorating throughout the evening. If they had asked the tower for weather conditions, the aircrew would have been informed visibility on the ground was below landing minimums. Al Jaber AB tower was calling visibility at approximately 500 meters and a runway visual range of 330 meters at the time of the mishap. The minimum amount of visibility required to land at Al Jaber AB was 1000 meters on the ILS 33L approach. This weather information would have forced the crew to execute a go around procedure and abort the landing at Al Jaber AB.

The fifth error in judgment was when the crew failed to monitor their instruments during the approach. Any pilot who does not continually monitor their flight instruments at night or during periods of reduced visibility runs the risk of becoming spatially disoriented. A night approach into Al Jaber AB creates considerable difficulty for the pilot, by requiring focal vision alone to accomplish what is normally accomplished with both focal and ambient vision. This condition is known as the "black-hole" approach. A black-hole approach creates an illusion to the pilot that the aircraft is stable and situated appropriately but that the runway itself is malpositioned. Such illusions make the black-

hole approach difficult and dangerous, and often result in a landing far short of the runway. It is extremely important the crew continually monitor the flight instruments to keep up with their situational awareness with reference to the aircraft's position relative to the runway and the aircraft's altitude with reference to terrain below.

The final error in judgement was never acquiring the correct runway picture to transition to a normal glide path for the landing. The aircraft was descending at 28 feet per second The pilots had about five seconds (450 to 300 feet AGL) to acquire the runway picture and transition their rate of descent to a normal landing one. They had about another five seconds (300 to 150 feet AGL) to pull the aircraft out of a dangerous, but recoverable, situation. Failing to make the decision to transition from a high rate of descent to a normal landing glide path in the available 10 seconds put the aircraft too close to the ground to recover before impact.

The decision to "go around" in this case was solely predicated on the entry into the fog bank. At no time prior to impacting the ground was the crew aware of their relationship to the ground.

3. Summary. The pilot must take full responsibility for the safety of his crew, passengers, and his aircraft. In this case, violations of flying directives and pilot errors in airmanship and judgement resulted in three lost lives, multiple injuries to others, and damage to his aircraft. The facts also point out the pilot, a new aircraft commander, lacked leadership and discipline. The aircraft commander sets the tone for the crew and is responsible for regulation compliance. Prior to the actual mishap, this crew violated a series of regulations, which placed them in a situation they did not have the expertise to overcome.

Twenty seconds prior to impact the aircraft was above 500 feet AGL, the runway was in sight, the checklists were complete, and the aircraft was in position to transition for a normal landing. However, from that point on the entire flight deck became complacent and failed to monitor their flying instruments as the aircraft continued to fly towards the ground at 1700 fpm. The atmosphere on the flight deck was quiet and calm. When the aircraft entered the fog at 125 AGL, it broke the relaxed mood on the flight deck and jump-started the crew to initiate go around procedures. However, by then the aircraft was barely 50 feet AGL, and the aircrew could not halt the sink rate quickly enough to avoid impact. The crew's total lack of awareness of their proximity to the ground did not give them time to react to and correct the situation.

FRANK LARAS, Colonel, USAF
President, Accident Investigation Board