NTSB Identification: LAX94FA383A

On September 27, 1994, at 2043 hours mountain standard time, a McDonnell Douglas MD520N (NOTAR), N520NT, collided with a McDonnell Douglas AH-64D (Longbow), R00324, while on final approach to the McDonnell Douglas Heliport, Mesa, Arizona. Both helicopters were operated by McDonnell Douglas Helicopter Systems, in conjunction with a flight test/evaluation by foreign military officials under 14 CFR Part 91. The Longbow was owned by the U.S. Army and leased to McDonnell Douglas Helicopter Systems.

The NOTAR was destroyed and the certificated airline transport pilot was fatally injured. A foreign military observer in the NOTAR was seriously injured. The Longbow sustained substantial damage. The Longbow crew, a certificated commercial pilot and a foreign military pilot were not injured. The flight departed the Williams Gateway Airport, Chandler, Arizona about 2035 hours. Night visual meteorological conditions prevailed at the time, and both helicopters were operating on a company VFR flight plan filed at the McDonnell Douglas Heliport.

The Longbow was conducting a night evaluation of the pilot's night vision system (PNVS). Use of the PNVS restricts the pilot's peripheral vision and the nature of the evaluation directed the attention of the Longbow pilots inside the cockpit.

The NOTAR was assigned the task of "chase aircraft", whose duties in part were surveillance of and monitoring the Longbow, and provide traffic advisories concerning other aircraft in the area.

Voice communications between the two helicopters was made via VHF radio frequencies.

All three pilots had flown the route from the Gateway Airport to the McDonnell Douglas Helicopter facility in the past, or before the accident flight. The return flight of the AH-64 departed Williams AFB to the north to a point northeast of the McDonnell Douglas facility and east of Granite Reef Dam, a VFR reporting point for Falcon Field, Mesa, Arizona.

The route of the NOTAR is not exactly known. There were no radar services requested by the pilots, and the test aircraft was not squawking a discreet transponder code. Radar data provided by the Federal Aviation Administration depicted unidentified aircraft departing the Gateway Airport at the approximate time of the AH-64 and NOTAR. The data revealed aircraft tracking north along a route described by the AH-64 pilots. The data did not distinguish the flight path of two aircraft. The track of the aircraft was lost in ground clutter and radar returns from vehicles traveling on east-west roads near Falcon Field. The radar data also revealed aircraft in the Falcon Field traffic pattern throughout the period of the return flight.

During the flight from Williams Gateway Airport, the NOTAR pilot asked the Longbow pilots to slow their airspeed. The Longbow slowed from 130 knots to 105 knots. The AH-64 pilots contacted the NOTAR pilot(Chase) as they approached the Granite Reef Dam VFR reporting point. The AH-64 pilots informed the NOTAR they were going to change VHF radio frequency from the mission control frequency to the Falcon Field air traffic control tower (ATCT) frequency. The NOTAR pilot acknowledged the AH-64 pilots transmission. There were no other recorded communications from the NOTAR pilot. There was no evidence found indicating the NOTAR pilot had lost visual contact with the Longbow helicopter.

At 2040 hours, the AH-64 crew contacted the Falcon Field ATCT via the VHF radio and reported over Granite Reef Dam with a chase aircraft. The ATCT local controller cleared the flight for a north arrival.

The AH-64 crew then changed VHF radio frequencies from Falcon ATCT to McDonnell Douglas Company's "Apache Ramp Control" frequency. The ground control radio operator (GIRO) monitoring the frequency cleared the AH-64 to land runway 22, and informed the AH-64 crew of the current wind conditions and altimeter setting.

The GIRO observed the AH-64 final approach and observed flashing lights approaching the AH-64 from its left side at an approximate angle of 90 degrees. The GIRO indicated that the events he witnessed happened rapidly and there was insufficient time to warn the pilots. The GIRO told the Safety Board by the time he recognized the flashing lights as another aircraft it was too late. The GIRO indicated the collision occurred about 30 feet above the ground. After the collision the NOTAR appeared to flip and the AH-64 landed on Pad #3. The GIRO further indicated that there were no communications with the chase aircraft (NOTAR) after he cleared the AH-64 to land.

The AH-64 crew reported they did not see the NOTAR during the final approach phase of the flight. The rear seat pilot was recorded stating, "I just caught sight of something coming on the left hand side as it hit." The AH-64 crew indicated they were performing the final tasks of the test flight/evaluation using the PNVS at the time of the collision, and that their anti-collision lights were on.

CREW INFORMATION

McDonnell Douglas MD520N

First Pilot (NOTAR)

The NOTAR pilot was formerly employed by McDonnell Douglas Helicopter Systems, and had accepted an early retirement. At the time of the accident, the NOTAR pilot was employed by a personnel company under contract with McDonnell Douglas Helicopter Systems, to provide pilots. The NOTAR pilot was seated in the left front seat of the helicopter at the time of the collision.

The NOTAR pilot held an Airline Transport Pilot certificate with single and multiengine airplane ratings and a helicopter rating. The most recent second-class medical certificate was issued to the pilot on December 1, 1993, and contained the limitation that correcting lenses be worn while exercising the privileges of his airman certificate.

No personal flight records were located for the pilot and the aeronautical experience listed on this report was obtained from the accident report submitted by McDonnell Douglas Helicopter Systems.

According to the operator's accident report, the pilot's total aeronautical experience consists of about 17,795 hours, of which about 1,550 hours were accrued in the MD500 series helicopters, of which the MD520N is a derivative. In the preceding 24 hours before the accident, the pilot flew 4.3 hours, of which 2.8 hours were in the accident helicopter.

Flight Test Engineer

A British Army Flight Test Engineer was seated in the right front seat of the NOTAR for the purpose of observing the flight evaluations. He had no crew responsibility for the operation of the NOTAR. After the accident, the Flight Test Engineer indicated he saw the AH-64 in the right window the instant before the collision, but was not sure whether it was a dream or actual memory.

McDonnell Douglas AH-64D (Longbow)

First Pilot (AH-64)

The first pilot was employed by McDonnell Douglas Helicopter Systems, as an engineering test pilot. The first pilot held a commercial pilot certificate with a multiengine airplane rating and a helicopter rating. The first pilot also held a flight instructors certificate for helicopters. The most recent second-class medical certificate was issued to the pilot on January 20, 1994, and contained no limitations.

The first pilot's total aeronautical experience consists of about 8,239 hours, of which about 3,066 hours were accrued in the AH-64. The first pilot had flown about 1.5 hours in the 24 hours preceding the accident, all in the accident AH-64. The first pilot was seated in the front seat of the AH-64 and was performing instructor pilot duties at the time of the collision. The first pilot indicated he did not see the NOTAR in the moment before the collision.

Second Pilot (AH-64)

The second pilot held a foreign military aeronautical designation for helicopters issued by the United Kingdom. The second pilot's total aeronautical experience was about 3,700 hours, of which about 3,590 hours were in helicopters. The second pilot indicated he had flown attack helicopter's in the British Army and had logged several thousand hours in the Westland Lynx. The second pilot had flown the AH-64 previously on two occasions accruing about 14 hours, of which about 5 hours were at night. The second pilot had flown in the accident helicopter about 2.5 hours in the 24-hour period preceding the accident. The second pilot was seated in the rear seat of the AH-64 and was evaluating the capabilities of the helicopter for purposes of acquisition by the British Army.

AIRCRAFT INFORMATION

McDonnell Douglas MD520N (NOTAR)

The McDonnell Douglas MD520N is owned and operated by McDonnell Douglas Helicopter Systems. The helicopter was originally certified as an experimental helicopter. The experimental airworthiness certificate found on the helicopter had expired.

The helicopter was not equipped with any night vision devices for use by the crew. The NOTAR pilot was required to survey the AH-64 through the cockpit windows.

According to McDonnell Douglas Helicopter Systems, the visibility from the pilot's position is good. Representatives from the company's Product Flight Safety Department provided the Safety Board a Transportation Safety Board (TSB) of Canada report concerning a midair collision involving a McDonnell Douglas MD369E. According to McDonnell Douglas Helicopter Systems, the visibility from the MD369E is similar to that of the NOTAR.

The TSB Canada report states "The pilot of the MD369E was sitting in the left front seat of the helicopter. From this position, although the field of view to the front of the helicopter is good, there are some obstructions to the left. In the horizontal plane, the pilot view aft of the nine o'clock position is masked by the aft left door frame assembly; the forward frame assembly; which angles downwards roughly 45 degrees, obstructs about 10 degrees of view at the pilot's ten-thirty position. In the vertical plane, the 6-inch portion of the door frame on the topside of the left door masks about 40 degrees of the pilot's field of vision. From the nine o'clock position to the ten-thirty positions, this upper door frame masks the pilot's view from about the horizon to approximately 40 degrees above the horizon."

The construction of the NOTAR cockpit windows is symmetrical from right to left. The Canadian TSB report is based on the collision geometry of that particular accident, and does not take into account obstructions on the pilot's right side, such as a person occupying the right seat and the right upper door frame, which would also obstruct the pilot's vision.

The helicopter was equipped with two VHF radios with digital displays. The radios incorporated a preselect feature which allows the pilot to store a frequency in an active and standby digital numeric display. Displayed frequencies are held in non-volatile memory circuits when the radios are not powered. When power is restored, the same frequencies will be displayed that were selected before shutdown.

After the accident, both radios were removed and power was applied to read the displayed frequencies. The frequency readings were the same for both VHF communication radios. The Falcon ATCT frequency, 124.6 MHZ, was selected in the active display window of both radios, and McDonnell Douglas Helicopter Systems, ramp operations frequency, 123.35 MHZ, was selected in the standby display window.

The McDonnell Douglas AH-64D (Longbow)

The Longbow is owned by the U.S. Army, and at the time of the accident, it was leased to McDonnell Douglas Helicopter Systems, for purposes of "handling characteristic/demonstration flights" for the United Kingdom. The AH-64 is a twin-engine military attack helicopter primarily designed as a day-night weapons platform. The helicopter is not certified in any airworthiness categories by the Federal Aviation Administration. The helicopter seats a crew of two in tandem with the pilot's position in the rear seat and the copilot-gunner's seat in the front.

The Pilot's Night Vision System (PNVS) is used by the pilot for externally aided night vision, or during adverse weather. The PNVS consists of a stabilized Forward Looking Infra Red (FLIR) contained in a rotating turret mounted in the nose of the helicopter. The turret rotates 90 degrees right and left, and 20 degrees up and 45 degrees down. The PNVS is slaved to the crew's flight helmets, which present a FLIR image on helmet-mounted displays. The field of view on the display is 30 degrees vertical and 40 degrees horizontal. The all-around aided night vision is restricted during forward flight by the limits of the helmet displays field of view combined with the rotation limits of the turret.

The helicopter's exterior lighting equipment consists of two high intensity red and white anti-collision strobe lights located on each engine nacelle; three navigation lights located on each engine nacelle and the top of the vertical stabilizer; and the retractable landing light/search light.

The helicopter was equipped with UHF, VHF, and FM voice communication radios. The VHF radio was the only radio installed in the Longbow that was compatible with voice communications with the NOTAR helicopter. The Longbow VHF radio is capable of storing preselected radio frequencies, but only one frequency can be used at a time. The Longbow pilots did not report any problems with the helicopter VHF voice communications.

COMMUNICATIONS

THE AH-64 was equipped with a video recorder that recorded all communications transmissions both internal and external. Review of the radio communications revealed that the AH-64 successively and successfully communicated with the chase helicopter, Apache Ramp Control, and Falcon ATCT. No unusual communications were noted between any of the participating entities and the AH-64 during a review of the tape. A transcript of the communications between the aircraft and the above mentioned is attached to this report.

Additionally, the communications with the Falcon Field ATCT were recorded. Review of the transcripts did not reveal any information not consistent with other statements. In addition, at 2043:24 hours a transmission of unknown source was recorded on the tower tapes. The unknown source stated, "oh (expletive)." A copy of the ATCT tapes is also attached to this report.

AERODROME AND GROUND FACILITIES

The McDonnell Douglas Helicopter Systems, facility is equipped with four concrete helipads aligned on a 220- to 040-degree magnetic orientation. The pads are VFR only, and are perimeter lighted for night operations.

The helipads are monitored by Apache Ramp Control. The ground control radio operator is located in a elevated tower cab attached to one of the hangars. The tower cab is equipped with radio communications equipment and telephones. The ground control radio operator is able to survey the helipads and approach paths from the tower location.

There were no reports of equipment outages at the facility that would have precluded the pilots from identifying the facility and landing on the helipads.

WRECKAGE AND IMPACT INFORMATION

Both aircraft came to rest within the confines of the McDonnell Douglas Systems, facility. The AH-64 landed and shutdown on helipad 3 without incident after the collision. The anti-collision lights were tested after the collision and were found operational.

Examination of the wreckage revealed four of the NOTAR's five main rotor blades contacted the Longbow's left wing and wing stores. The 2.75-inch empty rocket launcher, mounted on the outboard hard point, was struck from behind and was sliced horizontally about half its length. The Hellfire missile launcher was also struck from behind in the same place as the rocket launcher. The upper surface of the Longbow's left wing had evidence of three rotor strikes from the NOTAR main rotor system. Shrapnel from the collision damaged the AH-64 main rotor blades and fuselage. A small portion of the left wing had entered the rear cockpit through the left canopy and was found lying on the floor.

After the impact the NOTAR descended uncontrolled and came to rest on its left side about 50 feet northeast of the helipad threshold. The main rotor hub was separated from the fuselage at the mast. Three of the five main rotor blades were found separated from the main rotor hub.

ADDITIONAL INFORMATION

The wreckage was released to the owner's representatives on September 29, 1994.

Aviation Accident & Synopsis Query Page