

NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Washington, D.C. 20594
November 15, 1994

**AIR TRAFFIC CONTROL GROUP CHAIRMAN'S
FACTUAL REPORT**

A. ACCIDENT

NTSB No:	DCA-94-MA-076
Aircraft:	Boeing 737-300, N513AU
Date:	September 8, 1994
Time:	2304 UTC, 1904 EDT
Location:	Aliquippa, PA
Facility:	Pittsburgh Tower

B. AIR TRAFFIC CONTROL GROUP

Chairman:	Allen E. Lebo National Transportation Safety Board
Member:	Jeffrey C. Diercksmeier Air Line Pilots's Association
Member:	James Musone, USAir
Member:	Robert D'Addario National Air Traffic Controller's Association
Member:	Brian K. Sadler Federal Aviation Administration

C. SUMMARY

On September 8, 1994, at 1903:30 EDT, USAir flight 427, a Boeing 737-300, N513AU, crashed while maneuvering to land at Pittsburgh International Airport, Pittsburgh, Pennsylvania. The airplane was being operated on an instrument flight rules (IFR) flight plan under the provisions of Title 14, Code of Federal Regulation (CFR), Part 121, on a regularly scheduled flight from Chicago O'Hare International Airport, Chicago, Illinois to Pittsburgh. The airplane was destroyed by impact forces and fire near Aliquippa, Pennsylvania. All 132 persons on board the airplane were fatally injured.

D. DETAILS OF INVESTIGATION

1. History of Flight

Beginning with its initial taxi at Chicago, USAir Flight 427, communicated with air traffic controllers at the Chicago Tower, Chicago Terminal Radar Approach Control (TRACON), Chicago Air Route Traffic Control Center (ARTCC), Cleveland ARTCC, and Pittsburgh TRACON. USAir Flight 427 made initial contact with the Pittsburgh TRACON at 22:56:50 UTC, descending to 10,000 feet in the vicinity of the CUTTA intersection, which is located about 30 nautical miles northwest of the Pittsburgh International Airport, and is an arrival fix for traffic landing at Pittsburgh International Airport. The flight was assigned a 160-degree heading for the ILS approach to runway 28R and was reduced to a speed of 210 knots. Two minutes later USAir Flight 427 was instructed to descend and maintain 6,000 feet. At 23:00:14 UTC the flight was told to turn left to a heading of 140 degrees and was assigned a speed of 190 knots. At 23:03:22 UTC USAir Flight 427 was instructed to turn left heading 100 degrees and was advised of traffic at 1 to 2 o'clock and six miles northbound, which was a Jetstream climbing out of 3300 feet to 5000 feet. USAir Flight 427 acknowledged this transmission. About 50 seconds later, at 2303:10 UTC, their next transmission indicated that the accident sequence had already started.

The aircraft immediately behind the accident aircraft was N285LM, an L329 inbound to the Allegheny County Airport. The four aircraft immediately preceding the accident aircraft over the CUTTA arrival fix were USA179/DC9, USA1499/B73F, USA1674/MD80, and DAL1083/B727. DAL1083 was 4.12 NM ahead of the accident aircraft and had descended on a profile similar to that of the accident aircraft.

2. Interview Summary:

Mr. Richard M. Fuga was working the Feeder Radar North (FDRN) position combined with the Feeder Radar South (FDRS) position at the time of and immediately prior to the accident. In response to questions from the Air Traffic Control Group, Mr. Fuga provided the following information:

His EOD with the FAA was on 11/22/82. His initial training was received at the FAA Academy in Oklahoma City, Oklahoma, and then he was subsequently assigned to Wheeling (HLG) Tower, Wheeling, West Virginia, until April 1985. After this he went to Charleston (CRW) Tower, Charleston, West Virginia, until July 1987, and then transferred to Pittsburgh (PIT) Tower, Pittsburgh, PA. He has remained at Pittsburgh Tower since that time.

On the day of the accident, it was the second day of a two-day work week. Prior to that, he had a two-day weekend. In the past 12 months, he could recall having worked only one day of overtime.

On the day of the accident, he reported to work at about 2:40 pm for the 3pm to 11pm shift. The first position he worked was Departure Radar South (DRS). He took a break, then worked the Departure Radar Coordinator (DRC) position, took another break, and worked the Feeder Radar North (FDRN) position.

He was working Feeder Radar North from approximately 6:15pm until shortly after the accident. When he initially started working the sector, the traffic was light, increased to moderate, and was decreasing at the time of the accident. USAir Flight 427 was the last aircraft from the northwest in that arrival "push." He turned USAir Flight 427 to a 100-degree heading and issued the Jetstream traffic. When he observed the altitude readout indicating 5300 feet, he reassigned the aircraft 6000 feet, telling him to "maintain 6000."

He heard the word emergency, followed by some other sounds, and observed triple-X's (XXX) on the aircraft's altitude readout and observed CST (coast) in the data block. After this he said there was "no target at all".

He remembered calling the aircraft three to four times with no response. When he heard the word emergency, he "thought that they were going down." He "immediately thought of LA, -the aircraft went straight down."

He notified his supervisor and attempted to call the aircraft again. His first concern was to take care of his other traffic. He moved his position symbol on the radar display to the last observed position of USAir Flight 427's target in order to mark the area. He made manual hand-offs with his remaining traffic to the arrival controllers so that his position symbol would continue to mark USAir Flight 427's last-known position. He told his supervisor, while pointing to his position symbol, "...last radar and radio on 427, right here."

He asked the Departure Radar North (DRN) controller to transfer both communications and control of a parachute jump aircraft (N03B) approximately ten miles northeast of USAir Flight 427's last known position. (ATC Group Note: the Departure Radar North controller kept the aircraft on his frequency and vectored it to the last known position of USAir Flight 427.)

He observed no primary targets in the vicinity of the accident site. If any primary targets had been there, he felt confident that he would have seen them. He has rarely seen birds depicted on radar, and could not recall seeing any on the ASR-9. He has never seen weather balloons on radar, however he has seen hot air balloons. He also stated there are no routine non-radar operations in the Feeder Radar North airspace.

His radar display was set so that the data-blocks were displayed to the north. The radar range was set one click beyond 40 NM, the beacon gain was "about half," and

the primary gain was at "full."

Historically the airspace in which the accident occurred does not have very many primary-only targets operating in that area.

No Letter of Agreement or other unique procedure existed between Pittsburgh Tower and the parachute jump operator at Kindelberger Airport (ATC Group Note: N03B was operating from this airport). The highest release altitude he could recall for parachute operations was 10,700 feet.

The accident was confirmed within a few minutes of losing radar contact.

Historically, VFR activity in the airspace where the accident occurred was characterized as "almost non-existent." In respect to Pittsburgh Class B Airspace, there are very few intruders.

Mr. Kenneth Erb, an Area Supervisor, was the acting Area Manager In Charge the night the accident occurred. In response to questions, Mr. Erb provided the following information:

His EOD date in the FAA was 01/26/62. After completing initial training, he spent 11 1/2 years at Philadelphia (PHL) Tower, Philadelphia, Pennsylvania. He then spent 18 months at the FAA Academy, in Oklahoma City, Oklahoma as an instructor, and came to Pittsburgh Tower in January, 1974, as an area supervisor.

The day the accident occurred was the second day of his work week. His scheduled shift was 3pm to 11pm.

He estimated that their ASR-9 had been operational for "about a year."

The Feeder Radar North (FDRN) controller's workload at the time of the accident was "a little less than moderate." Prior to that, his workload was a little heavier.

He characterized the area of the accident as having no gliders. Also, Class B intruders would be "not likely." Historically there are no skydiving activities except for occasional special events.

He felt that birds can be depicted on the ASR-9. Bird activity in the Pittsburgh area is more prevalent in the spring and fall. He felt the birds were depicted better on the ASR-9 than the ASR-8. The targets on the ASR-9 are digitized and will present a stronger target. The target would appear with the same strength as that of an aircraft. "Yes, I have seen birds on the ASR-9." (ATC Group Note: This is usually accomplished through pilot confirmation.)

He recalled seeing geese on the field "last year, not this year."

Pittsburgh Tower airspace contains no areas where bird activity is more prevalent than others.

Returning to the control room from a break, he became aware of the accident when an air traffic assistant said to him, "we have a bad emergency, target has disappeared." He went directly to the position with the emergency, and the Traffic Management Coordinator advised him that a target had disappeared. All Pittsburgh arrivals and departures were stopped. He instructed all positions, including the tower, to attempt to contact the flight on all frequencies including guard. He called the tower cab asking them to look to the northwest for the aircraft. He then called the Communications Center, then the acting Air Traffic Manager at home to inform them of a possible emergency. He instructed the controllers and the Traffic Management Coordinator (TMC) to stop all traffic. About 5 minutes later, the tower cab called him and reported that a crash had occurred in Hopewell Township. He called the Regional Command Center, the acting Air Traffic Manager, and the Allegheny County Police (airport police) notifying them that there had been an accident. After having stopped arrivals for 5 to 7 minutes and departures for 10 minutes, he began to accept arrivals from the close fixes, but continued to hold departures to allow rescue vehicles to depart the field unrestricted. He then had the Feeder Radar North controller relieved, and briefed the new controller to keep the accident area clear. He then resumed a normal arrival and departure flow.

He told the Departure Radar North controller to vector the skydiving aircraft from Kindelberger airport, located 7 to 12 miles from the accident site, to the vicinity of USAir Flight 427's last known position. Angel 3 was also "up" and enroute to the site. (ATC Group Note: Angel 3 is a local call sign for a Stat Medevac helicopter.)

About 7:12 pm local time, he received absolute verification of the accident.

The Traffic Management Coordinator was placed in charge of the shift and he continued to make notification calls.

The Feeder Radar North controller was described "as good a controller as you're going to find, one of the top three or four in building."

One of his first thoughts regarding the accident was that it was "a bomb."

There are no routine non-radar operations in the area where the crash occurred.

RADAR performance that night was described as "working fine," there were no problems whatsoever. Routine maintenance work had been performed earlier in the

week. Additionally, there were no problems noted in the logs.

Normal facility operation is to have one Area Supervisor in the tower cab and one Area Supervisor in the TRACON. He described staffing that night as "adequate," saying "he was able to open all positions he felt he needed."

He additionally commented that the controller did well, acted appropriately and used good common sense. The facility as a whole used a "common-sense approach." There was no overreaction and no excessive traffic restrictions. The notification was good and the overall performance of everyone was outstanding.

Edward A. Zidow was a radar technician employed at the Pittsburgh Air Traffic Control Tower. In response to questions he issued the following information:

He began his career as a radar technician in 1965 with the U. S. Air Force, and started with the FAA in 1969 at Pittsburgh Tower. He has been a technician at Pittsburgh tower since that time.

Birds can best be displayed on the ASR-9 Radar provided the flock is big enough and fast enough, and if the radar display is set to display both correlated and uncorrelated targets. The ASR-9 radar is designed not to display birds and other non-aircraft type anomalies.

Unlike the ASR-7 and ASR-8 which will display anything it sees, the ASR-9 will filter its returns through both firmware and software to ensure a reliable display. Additionally the ASR-9 looks at a target to make sure it is moving and has a history. A minimum of 18 pulse returns is required for a target to be displayed. Unlike earlier ASR radar systems, the ASR-9 is designed to eliminate any tangential effect. Both weather and hot air balloons would probably be displayed by the system. Gliders and other non-metallic aircraft would also be displayed. The designer of the ASR-9 radar system was the Lincoln Laboratories at The Massachusetts Institute of Technology.

George Sardineer was working the Departure Radar North (DRN) position at the time of the accident. In response to questions, he issued the following information:

His EOD date with the FAA was 3/31/87. He received his initial training at the FAA Academy in Oklahoma City, Oklahoma. After completing training, he worked at Philadelphia Tower until 4/91. He reported to Pittsburgh Tower in 4/91 and has worked there since. He became a full performance level (FPL) controller at Pittsburgh Tower on 9/92.

He started working the Departure Radar North (DRN) position about one minute

before communicating with Blue Ridge (BLR425). He thought BLR425 departed Runway 28R. On Departure he issued BLR425 a right turn to a heading of 010 degrees and a climb to 5000 feet. He noticed a tag in coast status coming down the feeder corridor and he began to call traffic to BLR425. However, as he was speaking, the "tag disappeared." He observed no target, concluded there was no traffic for BLR425, and told the pilot to disregard the traffic call.

The other side of the room where the Feeder Radar North position is located "got loud. I wasn't sure what was going on." When BLR425 crossed the feeder line, he climbed the aircraft and turned it eastbound. (ATC Group Note: Feeder line refers to a sector boundary line depicted on the radar scope.)

When questioned if he received a conflict alert between BLR425 and USAir Flight 427, he said "I don't believe so, but I don't remember."

Regarding other traffic, he remembered another aircraft descending to Allegheny County Airport, but couldn't recall the call sign. (ATC Group Note: N285LM) BLR425 passed behind that aircraft which was heading eastbound. Prior to this, he exchanged traffic because it was "such a nice day," and he does not remember any conflict alerts. (ATC Group Note: The exchange of traffic between aircraft is more frequent on clear days because aircraft will see each other at greater distances.)

He then began "catching up" with what was going on in the TRACON. At the request of his supervisor he attempted radio contact with USA427. He normally monitors arrival traffic inbound from the northwest over the CUTTA fix. It is an area of concern for him especially as the traffic gets closer to the airport. He had no specific knowledge of USA427. Prior to the traffic call, he was looking for a target and an altitude. When the tag dropped there was no target. He asked BLR425 to expedite its climb through 6000 feet because he was concerned about the missing aircraft which he thought was still at 6000 feet. His next concern was to look "all over" for primary targets.

In the area of the accident, he had no recollection of Class B airspace intruders, routine non-radar operations, gliders, or hot-air balloons.

He never remembered any instances of birds being displayed on the ASR-9.

He turned N285LM eastbound and descended it to 4000 feet just south of the CUTTA intersection. N285LM crossed about 10-15 miles north of the accident site.

His radar was "working fine." He observed no problem at all and he did not see a target associated with USA427. Regarding the configuration of his radar display, the data blocks size were set on size two and displayed offset to the north of the target. His beacon gain setting was set low and his primary gain setting was set high. He

was viewing both correlated and uncorrelated targets. (ATC Group Note: Viewing both correlated and uncorrelated targets maximizes the display of primary targets.) His range was set at 40 nautical miles.

3. Pittsburgh Tower Information:

Pittsburgh Tower is a Level V radar facility with a TRACON and associated tower cab. Full performance level controllers are certified in both the tower and TRACON. The facility staffing consisted of the following:

Full Performance Level Controllers	60
Developmentals	10
Area Supervisors	9
Area Managers	2
Traffic Management Coordinators	4
Air Traffic Assistants	6
Assistant Managers	3
Staff Specialists	7
Facility Manager and Assistant Manager	2

4. Airspace Description:

Pittsburgh Tower Airspace is a 30 NM radius of the airport with an extension in the vicinity of the Whiskey Intersection extending to the south west. The vertical limits of the airspace are 14,000 MSL to surface except in the area of the south west extension. In that area, the vertical limits of the airspace are 4,000 MSL to surface. A portion of the airspace is comprised of Class B Airspace. Pittsburgh Tower Airspace is entirely delegated from Cleveland Air Route Traffic Control Center airspace.

5. Radar Data

The ATC Group received and reviewed NTAP data from Cleveland Air Route Traffic Control Center. There were no primary radar returns in the vicinity of the accident aircraft.

6. Radar Equipment:

Pittsburgh Tower radar system is an ASR-9 System, Type FA-10064 with Type FA-10065 Transmitter, Type FA-1068 Receiver, and Type FA-10067 Processor.

7. ARTS Automation:

Pittsburgh Tower is equipped with ARTS IIIA automation. The ATC Group requested hard copies of the USA427 associated BT, RB, TD extractions, and turned them over to the NTSB laboratory. The ATC Group also received a CDTSO tape from the ARTS III Diskpak from 20 minutes before until 5 minutes after the accident. It was also turned over to the NTSB laboratory for processing.

8. Information from Facility:

Facility personnel told the ATC Group that they did an extraction looking for unidentified traffic in the vicinity of USA427. They said "there was nothing around, nothing was found."

9. Emergency Response:

The Daily Record of Facility operation indicates that at 23:06 UTC the FAA Regional Communication Center was notified of a possible crash. At 23:14 UTC it states "verified that USA427 is down by County Police, via Hopewell Township Police." (ATC Group Note: The County Police called the tower cab, who in turn advised the TRACON. The tower cab told the TRACON that Hopewell Township Police had notified the County Police of the Accident. At Pittsburgh International Airport, the Allegheny County Police provide all Airport police services). The Facility Accident/Incident Log indicates that at 23:15 UTC the Tower Area Supervisor notified Airport Emergency equipment via the crash phone in the tower cab, 472-5600 SD #96. In addition search and rescue operations were initiated immediately following the loss of radio and Radar contact with USA427. TRACON personnel vectored an aircraft working in the area, N5703B a C182, over the last known position of USA427. Following his report of smoke and debris, a helicopter, identified as STAT MEDIVAC ANGEL3 an HK17, was vectored to the crash scene, where he reported medical teams were already on site.

10. ATIS

Pittsburgh Tower, Arrival ATIS information Zulu. 2250 Weather, Clear, visibility 15, temperature 73, dew point 51. Wind 260 at 7, altimeter 3009. Multiple approaches in use. ILS Runway 32, ILS runway 28 Right. Notice to Airman, South entrance of the Air Force Reserve ramp closed. Taxiway charlie lights are out of service. Taxiway juliet lights out of service south of runway 28 left. Advise on initial contact you have ATIS Zulu.

11. Additional On-Scene Activities:

The ATC Group determined that the parachute jump aircraft that was vectored by the Departure Radar North controller to the accident site was N5703B/C182 based at the Kindelberger Airport.

The ATC Group contacted the head of the air traffic control program at Beaver County Community College to ascertain if there were any reports from controllers, pilots, students, or other personnel that would be beneficial to the investigation. They were unable to provide any information. Beaver County Community College operated the air traffic control tower at the Beaver County Airport.

13. Closest Heavy Aircraft

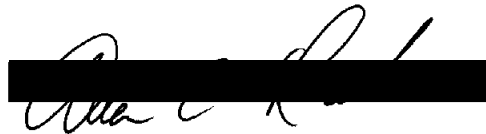
During the field phase of the investigation it was determined that the closest heavy aircraft to USAir flight 427 was British Airways flight 198, a Boeing 767. The closest distance occurred at 22:56:54 UTC, which was 38 miles and increasing. British Airways Flight 198 was a departure from Pittsburgh International Airport.

14. Departure Radar North (DRN) Position Summary

At the time of the accident, the Departure Radar North (DRN) controller was working several aircraft in the vicinity of USA427. Listed below is an abbreviated summary of the transmissions between air traffic control and these aircraft:

N5LM "checks in" descending to 10,000 feet.
N5LM is given a 110 heading & descended to 4000 feet.
BLR425 calls on the departure frequency, out of 2500 feet for 4000 feet.
BLR425 is given a right turn heading 010, and "climbed" to 5000 feet.
N5LM is given heading 140.
ATC issues false traffic call to BLR425.
BLR425 is turned right to heading 100.
N5LM is turned left to heading 100.
N5LM is given Jetstream traffic, three o'clock 5 miles turning east out of 5200 feet, climbing.
BLR425 is told to expedite through 6000 feet & given traffic at 10 o'clock, 5 miles, eastbound, descending out of 5600 feet.
BLR425 advises he had not received any climb clearance.
BLR425 is cleared to 11000.
BLR425 is turned to a heading of 130.
BLR425 is advised traffic no factor.
BLR425 is cleared direct JST.
ATC asks if USA427 is on frequency.

N03B is radar vectored to last know position of USA427.
BLR425 is cleared direct JST and frequency changed.
BLR425 is asked if he observed anything different during the false target call.
BLR425 advises he saw nothing.
N03B is given a heading for the last known position.
N03B sees smoke and advises descending.
N5LM was told to turn right heading 220, and to change frequency.
ATC asks N03B if anything else to report.
N03B advises of debris, fire and smoke.
ATC releases N03B.
ANGEL3 offers assistance.
ATC gives the location of accident site to ANGEL3.
ANGEL3 advises "in route."



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