



National Transportation Safety Board

Washington, D. C. 20594

Safety Recommendation

Date: November 15, 1988

In reply refer to: A-88-157

Honorable T. Allan McArtor
Administrator
Federal Aviation Administration
Washington, D.C. 20591

The National Transportation Safety Board is investigating an air traffic control (ATC) operational error¹ at the New York Air Route Traffic Control Center (ARTCC) on October 12, 1988, at 1435 eastern daylight time. The operational error resulted in the loss of standard separation between two airplanes which had been issued descent clearances for landing at Newark, New Jersey. The incident involved the Presidential airplane, Air Force One,² a Boeing 707, which was descending to 9,000 feet msl³ and Bar Harbor Airlines flight 494, an Aerospatiale ATR-42, which was descending to 7,000 feet.

Air Force One, operated by the 89th Military Airlift Wing, was en route from Philadelphia, Pennsylvania, to Newark. Bar Harbor flight 494 was en route from Baltimore, Maryland, to Newark. Both flights were operating on an instrument flight rules (IFR) flight plan and in accordance with specific ATC clearances. The initial loss of separation occurred approximately 5 miles west of the Yardley VORTAC⁴ and continued to a point 3 miles northeast of the Yardley VORTAC when the required separation was restored by ATC controller actions. The minimum distance between the two airplanes was 500 feet vertically and 1.58 miles horizontally.

The Safety Board's investigation of this error identified numerous managerial, operational, and training deficiencies in four different ATC facilities that contributed, directly or indirectly, to this incident. The Safety Board believes that these deficiencies represent a serious lack of effective management and quality assurance of these facilities and, if not corrected, could lead to an erosion of safety in

¹An error which results in less than the applicable separation minima between two or more aircraft, or between an aircraft and terrain or obstacles and obstructions prescribed by FAA Handbook 7110.65E and supplemental instructions.

²Identification and airborne call sign when transporting the President of the United States.

³All altitudes are expressed in terms of mean sea level (msl) unless otherwise indicated.

⁴Very High Frequency Omnidirectional Range/Tactical Air Navigation (VORTAC)--A ground station navigational aid which provides pilots with azimuth and distance-to-station information.

the high traffic density northeast ATC system. The Federal Aviation Administration (FAA) should conduct an independent evaluation of these facilities and implement appropriate corrective actions immediately.

History of the Flights

Before departing Philadelphia, the flightcrew of Air Force One requested and filed a flight plan to carry the flight west of Philadelphia on a nonstandard routing over Pottstown, Pennsylvania. The routing would delay Air Force One en route so that an airplane carrying the press corps could precede Air Force One to Newark on a standard arrival routing over Robbinsville, New Jersey, at 7,000 feet. An air traffic assistant issued the clearance. The tower cab supervisor at Philadelphia called the traffic management coordinator at the New York ARTCC, who in turn called the area supervisor for the sector that would eventually work the flight to coordinate approval for the nonstandard route. The area supervisor approved the routing. This information was given to the tower cab supervisor and Air Force One was cleared as originally filed.

Air Force One departed runway 27R at Philadelphia and initially proceeded southwestbound toward the Dupont VORTAC while climbing to 10,000 feet. The flight then proceeded northwestbound toward Pottstown and was manually handed off to the New York ARTCC controller by the Philadelphia departure controller. The flight was subsequently issued a clearance to climb to 11,000 feet by the New York ARTCC controller.

After receiving approval from the New York ARTCC area supervisor, the traffic management coordinator at the New York ARTCC called the area manager at the New York Terminal Radar Approach Control (TRACON) to advise him of the nonstandard routing for Air Force One. When the TRACON area manager received this information, he called the TRACON area supervisor to coordinate the revised routing for the sector that would be receiving the flight from the New York ARTCC and would ultimately provide arrival sequencing into the Newark airport.

The New York ARTCC controller initiated a manual handoff to the New York TRACON when Air Force One was approximately 15 miles west of the Yardley VORTAC at 11,000 feet. The New York TRACON area supervisor, anticipating the arrival of Air Force One, took the call. Although not observing the position of the airplane on radar, the area supervisor advised the controller to have the airplane enter New York TRACON airspace at 9,000 feet. While this coordination and handoff was taking place, the New York TRACON controller advised adjacent facilities and the sector at the Washington ARTCC to "stop the Newark arrivals only." The controller at the Washington ARTCC repeated the instructions and gave his operating initials indicating acknowledgment. Meanwhile, the New York ARTCC controller was issuing a descent clearance to 9,000 feet to Air Force One in conjunction with a vector to the northeast to remain clear of an unknown target he was observing on his radarscope southwest of the Yardley VORTAC and moving northeastbound. An automation program which had recently become operational indicated to the New York ARTCC controller that the unknown target was an "intruder," although the Mode C indicated the unknown target was at 11,000 feet and on a discrete beacon code. The controller, believing the unknown target to be an aircraft operating under visual flight rules (VFR), wanted to make sure that Air Force One remained clear of the unknown target. The controller then advised the flightcrew of Air Force One to contact the New York TRACON controller.

Bar Harbor flight 494 was under the control of the Washington ARTCC controller while proceeding northeastbound on air route V433 toward the Yardley VORTAC at 11,000 feet. The flight's data block was indicating the flight was in automatic handoff status to the New York TRACON controller. The Washington ARTCC controller, noting that the handoff to the New York TRACON had been accepted, issued a clearance to Bar Harbor flight 494 to descend to 7,000 feet and then advised the flightcrew to contact the New York TRACON. He was not aware of any limited data blocks proceeding eastbound toward the Yardley VORTAC indicating the target at 11,000 feet (which in reality was Air Force One).

The New York TRACON controller, although concerned with the impending conflict situation he was observing, did not consider it necessary to take any action because he believed that the Washington ARTCC controller would apply some type of separation standard between Air Force One and Bar Harbor flight 494 before the Yardley VORTAC. In any event, because he had requested that the Washington ARTCC hold the Newark arrivals, he did not expect to work Bar Harbor flight 494 and believed that the Washington ARTCC controller would retain the airplane in Washington ARTCC airspace at an altitude above that of Air Force One. Air Force One came on the frequency descending to 9,000 feet. Air Force One's initial call was followed by that of the flightcrew of Bar Harbor flight 494 who stated they were descending to 7,000 feet. The New York TRACON controller advised the flightcrew of Bar Harbor flight 494 to arrest their descent at 10,000 feet and issued a turn to the right to take the airplane away from Air Force One. He then called the Washington ARTCC controller to ask what had happened and learned that the Washington ARTCC controller had no knowledge of Air Force One. The New York TRACON controller then advised his supervisor of the incident.

Investigation

Safety Board investigators interviewed area supervisors, area managers, traffic management coordinators, controllers, and staff specialists who were either directly involved or had knowledge of the incident at the Philadelphia ATC facility, the New York ARTCC, the New York TRACON, and the Washington ARTCC.

Philadelphia ATC facility.--Safety Board investigators learned that the assistant manager for plans and procedures and the TRACON area manager at the Philadelphia ATC facility were briefed on October 11, 1988, by members of the Presidential liaison staff regarding the President's arrival and departure at Philadelphia on the following day. The briefing focused primarily on the arrival of Air Force One. During this briefing ATC representatives asked if the departure of Air Force One from Philadelphia would be routine. They were advised to expect a normal departure from Philadelphia to Newark. The facility did not produce a memorandum to the controllers or other supervisors regarding the arrival of Air Force One. It was decided that the TRACON area manager would brief the other supervisors at the beginning of the shift and this information would, in turn, be passed on to the controllers. The TRACON area manager had a proposed schedule of the arrival and departure of Air Force One at Philadelphia.

The air traffic assistant who issued the clearance to the flightcrew of Air Force One for the nonstandard routing stated that the flight progress strip for Air Force One contained two routes: a filed route of flight over Pottstown and a Preferential Departure and Preferential Arrival Route (PDAR) over the Robbinsville VORTAC. She noticed the requested altitude was 11,000 feet. She amended the requested altitude to 7,000 feet, which was the correct altitude for jet aircraft proceeding over

Robbinsville to Newark. She then issued the preferred routing to Air Force One. The flightcrew advised her they wished to fly their filed routing at the requested altitude of 11,000 feet. She coordinated with the area supervisor who told her to advise the flightcrew that the routing over Robbinsville was standard and quicker. The flightcrew again requested the filed routing at 11,000 feet. With the area supervisor's concurrence, the air traffic assistant issued the clearance for the nonstandard routing and changed the requested altitude back to 11,000 feet. She did not "suppress" the preferred routing even though she was aware the automation system would process the flight over Robbinsville.

The air traffic assistant also put a single line through the preferred routing to denote that the requested route had been given. Although she was aware that after departure, subsequent flight progress strips would be processed over Robbinsville, she stated that she was not supposed to suppress preferred routings on aircraft that would eventually go to the New York or Washington ARTCC environment. When asked if this guidance was contained in facility directives, she said that preferred routings were not suppressed within the facility. She stated that preferred routings are covered "in general" during classroom training.

The tower cab supervisor stated that when he was made aware that Air Force One wished to fly on the requested routing, he called the traffic management coordinator at the New York ARTCC to advise him. He did not advise anyone else of the routing the flight would be on. He stated he then checked the flight progress strip of Air Force One to make sure the requested altitude of 11,000 feet had been entered into the computer. He stated that the line through the preferred routing did not signify anything except that the requested routing had been issued. He also stated that the Philadelphia ATC facility was not responsible for suppressing preferred routings that would be handed off to the New York or Washington ARTCCs. He initially stated this procedure was not written; however, he later stated it was covered in a letter of agreement with the New York ARTCC. After reviewing the letter of agreement, Safety Board investigators concluded that it did not specifically address this issue and that the specific paragraph the supervisor believed was pertinent to this situation was vague.

New York ARTCC.--The traffic management coordinator (TMC), the area supervisor on duty, and the Pottstown Low sector controller at the New York ARTCC were interviewed regarding their role in the incident. Safety Board investigators learned that the TMC had been appointed to his position recently. Nobody else was on duty in the traffic management unit on the day of the incident. The TMC had neither been through any formal certification for his job nor did he believe that it was required. He stated that being new on the job he was only aware of what his general duties were as a TMC. He also stated that he was not familiar with the traffic flow over the Yardley VORTAC but that he would have to be familiar with the whole New York ARTCC airspace eventually. He did not know when he would be expected to become familiar with all New York ARTCC airspace. He stated that when he received the call from the Philadelphia tower cab supervisor, he called the area supervisor to obtain approval from the area which would work Air Force One over Pottstown. Although he did not discuss with the Philadelphia tower cab supervisor whether the Philadelphia tower staff would be responsible for ensuring that the correct route of flight was entered into the computer, the TMC said he assumed the Philadelphia tower staff would do so since they had initiated the request. The TMC said he assumed that the Pottstown Low sector controller would receive flight progress strips indicating the correct routing. When he asked the area supervisor if Air Force One would be handed off directly to the New York TRACON,

the supervisor responded "yes." The TMC was aware that the area supervisor was new to that particular area. Also, he was aware that Air Force One would traverse Washington ARTCC airspace over the Yardley VORTAC at 11,000 feet, but he believed that the Pottstown Low sector controller would control the airplane's descent and initiate a handoff directly to the New York TRACON before the airplane entered that airspace. The TMC called the New York TRACON to advise it of the revised routing and that Air Force One would be handed off over the Yardley VORTAC.

There were two supervisors on duty for the Pottstown area on the day of the incident. The area supervisor who had coordinated the routing of Air Force One with the TMC was not certified on any of the positions for which he was responsible, and he was not being monitored by the other area supervisor. He stated that he was not that familiar operationally with the area. He only recently had begun certification on his first sector in the area. He stated that he advised the Pottstown Low sector controller that Air Force One would be routed over Pottstown and then over Yardley. He stated that he did not know whose responsibility it would have been to coordinate with the Washington ARTCC regarding the nonstandard routing.

The Pottstown Low sector controller who was responsible for providing ATC services to Air Force One was a rehired annuitant with 32 years of controller experience with the FAA. He stated that he received a position relief briefing before assuming the duties of the sector. He was advised that Air Force One would be on a nonstandard routing which had been approved, but there was no conversation about handling or coordination that would need to be accomplished regarding the flight. He recalled there was an inactive printed flight strip on the flight at the sector. He did not know who had requested the strip. He could not recall if the strip indicated preferred routing. He stated that he received a manual handoff from the Philadelphia departure controller when the airplane was south of the Modena VORTAC. He initiated a track on the airplane which generated a full data block.

The Pottstown Low sector controller said that while working Air Force One he was moderately busy but did not require any assistance. He stated that the Washington ARTCC boundary was depicted on his video map but that he did not initiate a handoff or pointout to the Washington ARTCC because he assumed that the coordination already had been accomplished. He said the precoordination would normally be accomplished by the area manager. When asked to whom the airspace over the Yardley VORTAC belonged, he replied, "I'm not positive, you go out on the floor (control room) and you'll get ten different answers." When asked to respond to the question again he replied, "I'm not sure."

The Pottstown Low sector controller tried to initiate an automated handoff to the New York TRACON controller. This attempt failed, and he decided to make the handoff manually while Air Force One was west of the Yardley VORTAC. He said the TRACON controller advised him to descend Air Force One to 9,000 feet. When asked if the TRACON controller had stated, "radar contact," he responded, "let me listen to the tape and I'll tell you." After issuing the descent clearance to Air Force One, he observed a limited data block with a primary target which had the letter "T" over it indicating an "intruder" status. The limited data block showed the target to be at 11,000 feet. Across the top of the limited data block "VFR" was displayed. He requested a flight plan readout of the displayed discrete beacon code. When the flight plan information was displayed; he observed the altitude data indicating 10,400 feet, but there was no other data to indicate the target was indeed VFR. (In reality, the observed target was Bar Harbor flight 494.)

When Safety Board investigators visited the sector, several airplane targets with an "I" symbology were displayed on the radarscope. The controllers on duty stated this was a "common occurrence" that happened every day. When asked if these targets were intruders, these controllers replied that the targets were "IFR inbounds" to the New York metropolitan area. They requested a readout on one of the targets to confirm this. The altitude data was shown as 10,400 feet although the Mode C readout of the targets did not indicate either an actual or interim altitude as such. The controller said the altitude of 10,400 feet was shown because of computer processing.

The Pottstown Low sector controller issued the traffic to Air Force One in conjunction with a turn to a heading of 080° to make sure the targets remained clear of each other. He then instructed the flightcrew that after leaving 10,000 feet to proceed direct to the Yardley VORTAC, and he also instructed them to contact the New York TRACON. When asked about the Mode C Intruder Program he stated that it had been in operation about 2 months at his facility. He stated that he had received a briefing on this program. It was his understanding that any aircraft which was intruding into another controller's airspace would be displayed on the controller's radarscope. If the target was VFR, this would be displayed on the limited data block. If the target were IFR, then just the altitude information would be shown. The investigation determined that the controller's understanding of the program was incorrect.

The Pottstown Low sector controller said he had no conversations with the Washington ARTCC or New York TRACON controllers regarding Air Force One or the intruder target. He learned about the incident about 20 minutes after it occurred. He said he was then relieved from the position.

New York TRACON.--The New York TRACON area manager stated that he received a call from the New York ARTCC advising him that Air Force One would be on a nonstandard routing over Pottstown to Yardley. He could not recall if the full routing of the flight had been given to him. He was aware that the New York ARTCC would be working the flight. The area manager left his desk and went out to the area supervisor on the floor to advise him of this information. The area supervisor advised him that he was going to call Philadelphia to confirm the routing. After making this call, the area supervisor advised the area manager that the flight would be handled normally over the COBUS intersection at 7,000 feet and the handoff would be from the Philadelphia departure controller. The area manager stated that this "made more sense," so there was no further discussion. The area manager was standing at the area manager's desk watching the sector when the incident occurred. He became aware of the incident when he heard a commotion and comments that sounded like, "Where's Air Force One" and "Who's got the airplane." He then became involved in trying to determine how the incident occurred.

The area supervisor on duty stated that before assuming duties in the area he had received a position relief briefing. He read a facility memorandum stating that Air Force One was due into the Newark area between 1430 and 1500 that afternoon. The memorandum also stated that the flight would arrive from Philadelphia over the Robbinsville VORTAC which was a normal arrival routing.

The area supervisor stated that the area manager later advised him that Air Force One would be arriving over the Yardley VORTAC. When asked if the area manager had advised him from which facility he could expect to receive the handoff,

he responded, "I don't remember that." And when asked if the area manager had advised him of Air Force One's routing before the Yardley VORTAC, he responded, "No." He then called the Philadelphia TRACON area supervisor to "get it straight from the horse's mouth." He was advised that Air Force One would be coming to him at 7,000 feet. He expected to receive a handoff on Air Force One at the COBUS intersection from the Philadelphia TRACON.

Sometime later, the area supervisor responded to the New York ARTCC controller who was calling his facility in reference to Air Force One. The caller was trying to make a manual handoff on Air Force One stating that the target was approximately 15 miles west of the Yardley VORTAC. The area supervisor said he looked in the general area where reference to Air Force One was being made, but he did not observe a target. When asked if he ever identified the target of Air Force One by stating "radar contact," he stated, "not with me." He further stated that he did not observe the target when the discussion to have Air Force One descend to 9,000 feet took place. He did not observe the target of Air Force One until the airplane was about 8 miles west of the Yardley VORTAC. The area supervisor contended that "come in at 9,000" and "descend to 9,000" meant two different things. He also contended that he was not issuing instructions to the New York ARTCC controller to descend Air Force One to 9,000 feet. The area supervisor stated that the New York ARTCC controller would have to coordinate the descent to 9,000 feet with the Washington ARTCC controller because the airplane would penetrate the Washington ARTCC airspace before entering the New York TRACON airspace.

The area supervisor stated that the radar controller made him aware of the two targets that were converging toward the Yardley VORTAC at 11,000 feet. He advised the controller that Air Force One was descending to 9,000 feet, but he did not tell him the flight was being worked by the New York ARTCC controller. He said he was not concerned about the two airplanes because it was "understood that Bar Harbor 494 would be holding at Yardley at 11,000." He said that before the incident there was a full data block on the radarscope for both Air Force One and Bar Harbor flight 494. He said that it "never occurred to him" to discuss the conflict between Bar Harbor flight 494 and Air Force One with the Washington ARTCC controller because it would have been the responsibility of the New York ARTCC controller to coordinate with that facility. There was an arrival strip at the sector on Bar Harbor flight 494. The area supervisor said he did not observe anyone take a handoff on the target of Bar Harbor flight 494. He believed that if he had advised the radar controller that Air Force One was being worked by the New York ARTCC, it would not have changed the outcome of the incident.

The radar controller had been on a 20-minute break before assuming the duties at the Metro position. He received a position relief briefing. The briefing was routine. He had been briefed earlier about the arrival of Air Force One into the Newark area. After he assumed the position, he was advised by the area supervisor that Air Force One would be a "normal Yardley arrival." However, he also stated that it was not normal for a turbojet aircraft landing at Newark to be routed over Yardley. He said he was not informed until after the incident that Air Force One would be handed off to his sector from the New York ARTCC.

The radar controller stated that while he was at his position he heard the New York ARTCC calling on the handoff line. He was aware the area supervisor took the call. He could only hear one side of the conversation in which he heard, "fifteen west of Yardley," but he did not know the handoff was to be on Air Force One. There was no target on Air Force One displayed at that time. He stated that a "radar contact"

was not given to the New York ARTCC controller because "we didn't see the target." In trying to determine where the target of Air Force One might be, the area supervisor interrogated several other targets, which finally revealed a target about 8 miles west of Yardley that generated a full data block for Air Force One. The controller stated that the target of Air Force One was in a handoff status to an adjacent TRACON sector. By using the keyboard he accepted the handoff and then modified the data block of Air Force One to his position. He then made a handwritten arrival strip on the flight. He stated that the area supervisor advised him that Air Force One would be descending to 9,000 feet.

The radar controller stated that before the handoff of Air Force One he had called the Washington ARTCC controller to advise him to "hold the Newark arrival traffic." He stated that he did not take an automated handoff on Bar Harbor flight 494, but he also stated that when the area supervisor was randomly interrogating targets while looking for Air Force One, the target of Bar Harbor flight 494 was "read out" and the position symbol of the target had changed to his position (indicating handoff acceptance).

The flightcrew of Air Force One made initial contact on the radar controller's frequency advising that the flight was descending to 9,000 feet. This call was followed by that of the flightcrew of Bar Harbor flight 494 stating they were descending to an assigned altitude of 7,000 feet. The radar controller advised the flightcrew of Bar Harbor flight 494 to arrest their descent at 10,000 feet and issued a right turn to a heading of 120°. He then called the controller at the Washington ARTCC and learned that the controller was not aware of Air Force One. He stated that the conflict alert did not activate because the target of Bar Harbor flight 494 had gone into COAST.⁵

Washington ARTCC.--Two radar controllers at the Washington ARTCC were involved in the incident. The first radar controller was working the Robbinsville and Dupont sectors combined. He did not have an associate controller. While he was at the sector, he answered a call from the New York TRACON controller to his position. The caller identified himself as the Newark sector controller and advised the radar controller, "to stop the Newarks." The radar controller believed that this instruction meant for him to hold all Newark arrival traffic over the Robbinsville VORTAC. The radar controller said that had the caller identified himself as the Metro sector controller, the instruction would have meant for him to hold the arrivals over the Yardley VORTAC. He did not believe the instruction meant to hold all arrivals into the Newark airport. Following this communication, the radar controller was routinely relieved by another radar controller, who he briefed. He did not use a checklist, and said he was not sure the sector had a checklist. He was aware that there was some type of facility documentation regarding the use of checklists. He stated that during the briefing he advised the new radar controller to "hold the Newarks," but there was no discussion regarding traffic inbound to Newark over the Yardley VORTAC.

⁵When the computer is unable to ascertain that the target is where it should be or is not displayed, the data block will indicate CST in the data block to advise the controller it cannot locate the target.

The first radar controller had not received a briefing regarding Air Force One's flight to Newark, but he was aware that the flight between Philadelphia and Newark would take place sometime during the day. He stated that a radar target about 15 miles west of Yardley should be depicted on radar. He further stated that if he were aware of a situation where two targets were converging at the same altitude he would become concerned and take some type of action when the targets were about 10 to 15 miles apart. He did not have any radio communications with Bar Harbor flight 494 while he was at the sector.

The second radar controller had initially been working another sector, was relieved, and reassigned himself to the Robbinsville/Dupont sectors. He explained that reliefs are not determined by supervisors, but by "strip management." That is, each controller's name is written on a strip and when that controller's name goes to the top of the list, he or she is next to be relieved. Since the controller's name at the Robbinsville/Dupont sectors was at the top of the list, he went to relieve him.

The second radar controller stated that during the position relief briefing, he was advised that traffic inbound to Newark was being held at the Robbinsville VORTAC. He observed that one airplane was about to enter holding and there was another airplane about 25 miles away which would need to be issued holding instructions. He said the controller that he relieved was specific about jet traffic holding, so there was no discussion regarding Bar Harbor flight 494, which would proceed over the Yardley VORTAC.

The second radar controller then checked the configuration of the radarscope and confirmed that he was receiving limited data blocks and primary targets. The filter limits were set to cover his altitude strata in the sectors. He stated that the data block for Bar Harbor flight 494 was offset to the northwest as the airplane proceeded northeastbound. He stated that his radar coverage to the west was about 40 miles west of the Yardley VORTAC. The target of Bar Harbor flight 494 was in automatic handoff to the New York TRACON. He noticed that the handoff was accepted and when he was able, he issued a descent clearance to the flightcrew of Bar Harbor flight 494. He stated that his focus was on this aircraft because he had to make sure it was established within airspace in which the descent could be initiated. He also stated that he did not observe a limited data block proceeding toward his airspace during this time. He then advised the flightcrew of Bar Harbor flight 494 to contact the controller at the New York TRACON.

The second radar controller stated that he was not aware of any target on a converging course with Bar Harbor flight 494 until the New York TRACON controller advised him of Air Force One. At that time he estimated the targets to be about 2 miles apart. The New York TRACON controller then took action to separate the airplanes. The second radar controller subsequently was relieved from the position. When Safety Board investigators pointed out that the Washington ARTCC had produced a track plot which showed Air Force One, he responded, "I was advised that this data is recorded on a magnetic tape and just because there is a track it does not mean it was displayed on my radarscope." He said a quality assurance specialist had given him that information.

The traffic manager in charge (TMIC) decided that although his facility would not work Air Force One, he wanted to be ready to go into a holding situation when it became necessary. Although it was not necessary for him to monitor Air Force One, he called the Philadelphia ATC facility and obtained the discrete beacon code that would be assigned to the flight. He then advised the TMC on duty to enter the

beacon code into the computer so that when the airplane did depart, they could monitor the flight's progress. He then received a call from the military wanting to know if Air Force One had departed Philadelphia. He made another call to Philadelphia to confirm the expected departure time. While he was waiting for the facility to answer, he observed a limited data block on the discrete beacon code assigned to Air Force One climbing through 6,000 feet and proceeding southwestbound. The Philadelphia ATC facility answered and confirmed that the flight was off. He then asked why the flight was not turning toward Newark and was advised that the flight was going to wait for the press plane, but the route of flight was not discussed. He assumed the airplane was going to proceed to the Dupont VORTAC to hold. He then advised the TMC to monitor the progress of the flight and keep him informed.

The TMC did not continuously monitor the progress of Air Force One. He stated that he was busy with other duties, "getting traffic lined up for LaGuardia and Newark." He said he eventually noticed Air Force One at 11,000 feet and within the confines of the New York ARTCC airspace. His next observation of Air Force One was when the aircraft was 10 to 15 miles west of the Yardley VORTAC. He then "quick looked" the traffic at the Dupont sector to see what other aircraft were en route to Newark. He observed the full data block of Bar Harbor flight 494. He continued to observe the converging targets. He then called another TMC who was in the area to come to the position. They both realized there was a potential conflict when the targets were about 10 miles apart and still at the same altitude (11,000 feet).

The TMC specialists did not initiate a call to the Dupont sector because they believed that some type of separation standard was going to be achieved. They were not aware that the Washington ARTCC was not working Air Force One. One of the TMCs stated that he assumed that at least a "pointout" to the sector had taken place. The area manager was called to the traffic management unit (TMU) position to observe the conflict. By that time the aircraft were within 3 to 4 miles of each other. The area manager then went out to the sector.

Discussion

The Safety Board's investigations of past accidents and incidents have repeatedly been critical of the FAA's quality assurance of the ATC system. These criticisms have been directed at deficiencies in the quality assurance oversight at the national, regional, and facility levels. The Safety Board continues to be concerned that there is no standard surveillance of the quality of controller performance and, as such, the program is inadequate. Many times managerial, operational, and training problems, which were identified during previous quality assurance evaluations, remain uncorrected a year or two later and are found to be contributing factors to operational errors.

As a result of its special investigation of the Chicago O'Hare TRACON, the Safety Board, on August 8, 1988, issued Safety Recommendations A-88-81 through -91 to the FAA. One of these recommendations addressed quality assurance and stated the Safety Board's belief that the reduced effectiveness of the FAA's national quality assurance program resulted in part because it was organizationally located within the FAA's air traffic service. The Safety Board stated that it "believes that the quality assurance function would be more effective and objective if it was located, organizationally, outside the air traffic service and reported directly to the FAA

Administrator." Specifically, Safety Recommendation A-88-90 recommended that the FAA:

Establish an independent national division that would be responsible for the quality assurance of the air traffic control system and that would report directly to the Administrator of the Federal Aviation Administration.

The FAA Administrator's response, dated November 4, 1988, stated in part:

The FAA has established the Office of Air Traffic Evaluations and Analysis under the Associate Administrator for Air Traffic to perform the overall quality assurance function of the air traffic control system. This office is, by design, separate from other elements of the air traffic organization to ensure the creation of an independent body to ensure an unbiased evaluation and quality assurance function.

The Safety Board is disappointed with the FAA's response. The letter implies that the Office of Air Traffic Evaluations and Analysis was established recently and that it is independent of the parent air traffic organization. In fact, this office has existed, with the same title, for at least 2 years and has been located organizationally under the Associate Administrator for Air Traffic, who is responsible for the operation and safety of the total ATC system. Apparently, the FAA failed to understand the intent and objective of this recommendation. Currently, the FAA's national quality assurance of the ATC system is, in effect, "evaluating itself" because of its organizational relationship. The Safety Board continues to believe that this important responsibility would be better discharged by a unit that had no allegiance to the air traffic service and reported its findings, corrective actions, and followup reports directly to the FAA Administrator.

The Safety Board's investigation of this operational error further exemplifies the reduced effectiveness of the FAA's national quality assurance program. Safety Board investigators reviewed FAA evaluations that were completed at the four ATC facilities during the past 2 years. These evaluation reports listed numerous problems which, in itself, is a positive indication that deficiencies were identified and documented. However, the Safety Board is concerned that many of these same problems remained uncorrected a year or two later and contributed, directly or indirectly, to the operational error on October 12, 1988. For example, the FAA's national quality assurance staff conducted a full facility evaluation at the New York ARTCC from November 3 to 7, 1986. This report listed 22 operational and training problems which included: interfacility coordination, pointout procedures, transfer of control, effectiveness of the traffic management unit, proficiency training, and semiannual tape talks. Of particular note were problems which stated: "pointouts were not accomplished," "area supervision was passive," "overall effectiveness of the facility traffic management system is questionable," and "semiannual tape talks are not being accomplished." These specific deficiencies were evident in the performance of the New York ARTCC radar controller, area supervisor, and traffic management coordinator and were contributing factors to the operational error.

Similarly, national quality assurance staff conducted a full facility evaluation at the Washington ARTCC from January-27 through February 3, 1987. Fourteen operational problems were identified including: position relief checklists, interphone communications, pointout procedures, traffic advisories, and supervision.

The report, referring to the operational problems stated: "these were widespread and pervasive during the evaluation" and "some of these problems have been identified by the facility quality assurance staff as causal factors associated with operational errors." On April 8, 1988, national quality assurance staff conducted a followup evaluation to determine the status of items identified as problems during the previous full facility evaluation. Eight of the 14 operational problems remained uncorrected over a year later after they had been initially identified.

Full facility evaluation reports for the New York TRACON and Philadelphia tower and TRACON were also reviewed. Similar operational and training problems were noted at both facilities; however, the number were not as numerous and the specific deficiencies were not the same as those that were evident at these facilities at the time of the operational error on October 12, 1988.

The facts revealed during the investigation of this operational error are yet another example where the quality of controller and supervisor performance is substandard. Of particular concern is the fact that these performance deficiencies were identified in more than one major facility and, although the national quality assurance program repeatedly had documented the very same problems that were causal to the incident, the program was unsuccessful in eliminating them. It appears that facility managers are not held accountable to implement remedial actions and that the quality assurance program lacks effective followup to ensure this accountability.

The Safety Board is concerned about the seriousness and magnitude of the problems that were identified by its investigation of this operational error. The investigation at four major facilities identified multiple managerial, supervisory, and controller performance deficiencies which were indicated in part by the following actions:

- a lack of proactive and accountable facility management. (At one facility when asked about the effectiveness of their facility management, controllers responded, "I don't know, the manager is never here.")
- little or no communications between the facility management and the controller workforce.
- an area supervisor assigned to a position on which he was untrained and uncertified (he had been assigned to that area for just 3 days).
- a coordinator working in the traffic management unit without receiving formal on-the-job training or a briefing on his responsibilities and who did not know the area airspace and structure.
- a senior radar controller who did not know the adjacent ATC facility's boundary and airspace structure and who allowed Air Force One to penetrate the Washington ARTCC airspace without first providing a pointout or handoff.

- traffic management staff who observed Air Force One converging with Bar Harbor flight 494 at the same altitude but did not question the sector about the potential conflict.
- an area manager and supervisor who were aware that Air Force One was being controlled by the New York ARTCC yet failed to advise the sector controller who would receive the flight.
- a controller who failed to correctly identify the sector he was working (Newark instead of Metro) during interfacility communications.
- a controller who acknowledged "stop the Newark arrivals only," yet failed to fully comply with the instructions.
- letters of agreement that are vague and lack specificity, especially concerning interfacility coordination.
- a facility that had instructed its controllers not to suppress the preferential departure and arrival route for a flight that was given a nonstandard route of flight, hence the National Airspace System (NAS) computers were not updated to reflect the actual route of flight for Air Force One.
- a supervisor who was attempting to identify the radar target of Air Force One using the "slew ball" function, and inadvertently took an automated handoff on Bar Harbor flight 494 without the sector controller's knowledge and approval.
- misuse of the Mode C Intruder Program computer software which resulted in IFR radar targets under Washington ARTCC control appearing as VFR intruder targets on the New York ARTCC radar displays.
- an apathetic attitude and failure to accept accountability for actions on the part of controllers and supervisors. This attitude is characterized by interview statements that include: "it's not my job," "it was not my problem," "I thought he would separate the airplanes," and "I assumed it had been coordinated."

The Safety Board believes that the FAA must take prompt actions to correct the problems and deficiencies noted in these ATC facilities. Because the Safety Board is not confident that the present quality assurance program will resolve these discrepancies quickly, it believes the FAA should immediately evaluate these ATC facilities with an independent team of investigators. The Safety Board is aware that the FAA recently completed a System Safety and Efficiency Review of the Chicago O'Hare International Airport. The study was an interdisciplinary review with multiple teams of investigators under the overall supervision of the Office of Aviation Safety. The review is reported in three volumes of facts, analysis, and support for needed improvements at O'Hare. It also includes an action plan, with accountable organizational units and completion dates, to implement the 101 recommendations that were generated from the review. The Safety Board believes that this effort was thorough, comprehensive, objective, and independent.

The Safety Board believes that the FAA should require its Office of Aviation Safety to conduct a System Safety and Efficiency Review of the high traffic density northeast corridor including comprehensive evaluations of the New York ARTCC and TRACON, the Washington ARTCC, and the Philadelphia air traffic control tower and TRACON. These evaluations should focus on the adequacy of facility management, supervision, operational procedures, training, staffing, and human resource programs.

Other Issues

During the onscene investigation, the Safety Board learned that the FAA issued a General Notice (GENOT) to all ATC facilities which outlined immediate changes to be implemented regarding the handling and monitoring of Presidential aircraft. The Board also learned that this change would be incorporated into the FAA's Facility Operation and Administration Handbook, 7210.3H, as a permanent procedure. This change directs "each facility through which a Presidential aircraft transits will designate a supervisory specialist/s/ to physically oversee all control and coordination of the flight at each sector/position." Many supervisory personnel were involved in the coordination of Air Force One from Philadelphia to Newark. Each supervisor had some or all of the information regarding the route of flight which would be flown, but this information was shared, only in part, with those persons who had a need to know. The Safety Board is encouraged by this effort and believes the response is appropriate given the circumstances of this operational error.

Another issue concerns the National Automation Program (NAP). On October 15, 1988, the FAA ordered that the Mode C Intruder Program be withdrawn from operational use. Safety Board investigators received a briefing on October 28, 1988, concerning the Mode C Intruder Program and other automation problems from the acting manager for automation of the Washington ARTCC. He stated that he had been recently detailed to the facility because the automation staff had been unable to make necessary software program changes resulting from the East Coast Plan. He also stated that although the Mode C Intruder Program is a national endeavor, the Washington ARTCC had inadvertently implemented the program to a base altitude of 12,500 feet (the New York ARTCC base altitude was programmed to 10,500 feet). Therefore, the Mode C Intruder Program did not alert the Washington ARTCC controller who was working Bar Harbor flight 494 to the presence of the converging target of Air Force One into Washington ARTCC airspace. He stated that the program was to become operational again on November 17, 1988, and that the facility would be in compliance with national policy.

The acting manager for automation also stated that he had recently become aware that strip distribution to the New York TRACON was established by altitude and not by fix. Although he is not directly responsible for New York ARTCC programming, a meeting between the automation staff of both facilities has been scheduled to discuss and to make necessary software changes which will allow strip distribution based on fix rather than altitude. The Safety Board believes that these changes will correct the automation deficiencies identified as a result of this investigation; however, the Safety Board intends to monitor the progress and impact of these efforts.

On November 8, 1988, Safety Board and FAA staff met to discuss the problems identified during the investigation and to be briefed by the FAA on actions it has taken since the incident. The FAA advised that the Pottstown radar controller was

decertified following the operational error. He received 3 weeks of training on operational procedures, intra- and interfacility coordination, airspace structure, and facility boundaries. He was tested on these issues and returned to duty. Also, since the incident the FAA's national quality assurance staff has conducted facility evaluations at the New York ARTCC and TRACON. These evaluations were scheduled in advance and were not initiated as a direct result of the incident. Reports of these evaluations were not available at the time of this meeting. The Safety Board remains concerned that previous national quality assurance evaluations of these facilities were not effective in correcting the managerial, operational, and training deficiencies that were evident during the operational error on October 12, 1988. Therefore, the Safety Board believes that the FAA should conduct an independent evaluation of these facilities. The Safety Board believes that the seriousness and magnitude of the problems noted justifies the highest level of FAA attention and action.

Therefore, as a result of its investigation, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Conduct a System Safety and Efficiency Review, under the direction of the Office of Aviation Safety, of the high traffic density northeast corridor. The review should include comprehensive evaluations of the New York Air Route Traffic Control Center (ARTCC) and Terminal Radar Approach Control (TRACON), the Washington ARTCC, and the Philadelphia air traffic control tower (ATCT) and TRACON. These evaluations should focus on the adequacy of facility management, supervision, operational procedures, training, staffing, and human resource programs. (Class I, Urgent Action) (A-88-157)

KOLSTAD, Acting Chairman, and BURNETT, LAUBER, NALL and DICKINSON, Members, concurred in this recommendation.

James E. Kolstad
By: James E. Kolstad
Acting Chairman