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16. Abstract About 2023 eastern daylight time on October 11, 1974, a New Jersey Air National Guard F106 and a Piper PA 24-250, N6876P, collided in midair near Saxis, Virginia. The Piper aircraft crashed into a marshland near Saxis, and the F106 returned to the National Aviation Facilities Experimental Center at Atlantic City, New Jersey, without further difficulty. The Piper aircraft was destroyed in the crash, and its four occupants were killed. The National Transportation Safety Board determines that the probable cause of the accident was the failure of the interceptor pilot to see and avoid a civil aircraft during a high-speed, low-altitude, intercept training flight conducted in an area which included major north-south airways. Also contributing to this accident was the system which permitted an incompatible mix of traffic in controller's airspace which resulted in the probability of an inadvertent radar lock-on to a civil aircraft. As a result of this accident, the Safety Board has made a recommendation to the Administrator of the Federal Aviation Administration (FAA).			
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AIRCRAFT ACCIDENT REPORT

NEW JERSEY AIR NATIONAL GUARD

CONVAIR F106, 59-0044,

PIPER PA 24-250, N6876P,

MIDAIR COLLISION,

NEAR SAXIS, VIRGINIA

OCTOBER 11, 1974

ADOPTED: JANUARY 29, 1975

NATIONAL TRANSPORTATION SAFETY BOARD

Washington, D.C. 20591

REPORT NUMBER: NTSB-AAR-75-6

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NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D. C. 20591

AIRCRAFT ACCIDENT REPORT

Adopted: January 29, 1975

New Jersey Air National Guard Convair F106
Serial Number 59-0044
Piper PA 24-250, N6876P
Near Saxis, Virginia
October 11, 1974

SYNOPSIS

About 2023 e. d. t. on October 11, 1974, a New Jersey Air National Guard F106 and a Piper PA 24-250, N6876P, collided in midair near Saxis, Virginia. The Piper aircraft crashed into a marshland near Saxis, and the F106 returned to the National Aviation Facilities Experimental Center at Atlantic City, New Jersey, without further difficulty. The Piper aircraft was destroyed in the crash, and its four occupants were killed.

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the interceptor pilot to see and avoid a civil aircraft during a high-speed, low-altitude, intercept training flight conducted in an area which included major north-south airways. Also contributing to this accident was the system which permitted an incompatible mix of traffic in controlled airspace which resulted in the probability of an inadvertent radar lock-on to a civil aircraft.

As a result of this accident, the Safety Board has made a recommendation to the Administrator of the Federal Aviation Administration (FAA).

1. INVESTIGATION

1.1 History of the Flight

A privately-owned Piper PA-250, N6876P, was on a visual flight rules (VFR) flight plan from White Plains, New York, to Georgetown,

South Carolina. The pilot had requested, and was receiving, radar following from the en route FAA Air Traffic Control Centers (ARTCC). N6876P contacted Washington Center over Salisbury, Maryland, at 2010:29 e. d. t. 1/ and stated that he was "at 8,500 feet". 2/ (See Appendix B for all pertinent radio communications.) At 2022:12, Washington Center advised N6876P that "... you have traffic in your six o'clock position and five to seven miles southeast bound; indicate VFR below ten; he's slowly overtaking you." N6876P replied, "Seven six papa, we'll be looking over our shoulder here." At 2023:07, Washington Center transmitted, "Seven six papa, he's in your eight o'clock position now and about five miles; he looks like he's gonna be off your left wing." There was no reply from, or further contact with, N6876P and the squawk of N6876P disappeared from the radarscope.

The two New Jersey Air National Guard F106 aircraft, Echo Lima 08 (EL08) and Echo Lima 10 (EL10), which were both from the 177th Fighter Interceptor Group based at the National Aviation Facilities Experimental Center (NAFEC) were conducting low-level intercepts under the control of the North American Air Defense Command (NORAD) facility at Fort Lee, Virginia. EL08 was being vectored for a stern attack on the target aircraft, EL10. EL10 was at 3,000 feet on a heading of 190°. EL08 had planned to make his stern attack at 6,500 feet. At 2019:42 NORAD advised, "One zero you have traffic one nine zero at eight miles, heading south you should be clear of it". At 2020:27, NORAD advised, "Zero eight, target now one seven five at two, minimum range." (The minimum allowable range astern without radar contact by the interceptor aircraft.) EL08 replied that the target had not been identified on the interceptor radar. At 2020:35, NORAD advised, "Roger, break port one three zero, maintain angels five thousand feet altitude set speed four eight." EL08 acknowledged, and at 2020:49 transmitted, "Zero eight has a Judy." 3/ NORAD cleared EL08 on target. At 2021:04 NORAD advised, "One zero, your traffic now one nine five at seven miles heading about one nine zero." EL10 replied, "No Joy." 4/

At 2022:48 NORAD advised, "Echo Lima one zero, and zero eight you have traffic paralleling you to port - to the starboard side bearing two five zero, four miles, heading one eight zero." EL10 replied, "One zero tally ho." 5/ EL08 replied, "Zero eight." At 2023.11, there was

1/ All time herein are eastern daylight, based on the 24-hr. clock.

2/ All altitudes herein are mean sea level, unless otherwise indicated.

3/ 'Judy' - a military term meaning "target."

4/ "No Joy" - a military term commonly understood to mean "no contact."

5/ "Tally Ho" - a military term meaning "I have visual contact."

a garbled transmission followed by several attempts to establish communication with EL08. At 2023:25, EL08 transmitted, "Echo Lima zero eight, like to be headed to an emergency field." At 2024:04, EL08 was directed to squawk Mode III, 7700 emergency. At 2024:14, EL08 transmitted "Zero eight, zero eight just hit something." The aircraft returned to NAFEC, Atlantic City, New Jersey, without further incident.

The pilot of EL08 was unable to recall accurately the events preceding or immediately following the midair collision. He remembered seeing a bright red light and tightening his right turn just before the collision. He could not recall exactly where in his visual scan the red light became visible.

The pilot of EL10 could not recall seeing any traffic in the area even though he transmitted a "tally ho" on the traffic called by NORAD at about the time of the midair collision.

The air traffic controller at the Washington Center was observing N6876P's radar target on his radar as it proceeded southbound on V-1 airway. He also observed the EL10 aircraft in the same general area. A Mode III, Code 7700 target appeared shortly after N6876P's Code 1100 disappeared. The Washington Center Controller did not recall seeing a primary radar return in the area except for five or six radar sweeps after the Code 1100 target disappeared and just before the Code 7700 target appeared. The controller stated that the targets he saw never merged.

A witness on the ground in Saxis, Virginia, saw the planes collide and notified authorities. He saw the jet aircraft approach and strike the small aircraft from the rear. After the collision, he saw N6876P fall straight down with its light on. The jet aircraft then proceeded south-southeast while rolling and descending.

Examination of the wreckage confirmed that N6876P was struck from the rear. A section of N6876P's right wing, from 14 inches inboard of the wingtip to 49 inches inboard of the wingtip, was recovered from the intake of EL08. The adjacent 5-foot section of N6876P's right wing, the outboard 14 inches of the right wing, the

rudder, and the upper half of the vertical stabilizer were recovered several hundred yards from the main point of ground impact. Only the left side of the F106 was damaged.

1.2 Other Information

NORAD is required to train interceptor pilots in radar acquisition and interception of low flying aircraft over land. This training must be conducted in an area where the ground control has good radar and radio coverage and in an environment of their own "positive control." There are limited areas available for the training along the east coast. These F106 pilots were being trained in the Hog Island low-level area. The Hog Island control line is defined by a base line which extends from the 70° -10 nmi fix to the 10° -76 nmi fix of the Cape Charles VOR. Deviations to either side of the line are authorized for maneuvering purposes. Three airways, V-1, V-139, and V-194, cross this line within 20 nmi of the Cape Charles VOR. NORAD's selection of this area for their training flights was based primarily on the availability of NORAD radar and radio coverage. The Federal Aviation Administration (FAA) Special Military Operations Procedures Manual 7610.4B, dated November 1, 1972, does not require that the Air Defense Command coordinate such training flights with the ATC when they are conducted under VFR. At the time of the accident, Washington ARTCC was not aware that low level intercept training was being conducted in their area of responsibility. Immediately after the accident, NORAD voluntarily suspended all low-altitude intercept training flights in other than designated training areas.

2. ANALYSIS AND CONCLUSIONS

N6876P was on airway V-1 at 8,500 feet, as filed on his VFR flight plan, and Washington and ARTCC was providing radar following and traffic advisory information. Traffic references given to N6876P just before the collision were based on the secondary radar return of EL10. The ARTCC controller did not see a primary or a secondary radar return from EL08, probably because EL08's transponder was not set for Mode III, Code 1200. However, after the secondary return of N6876P disappeared, the controller saw a primary radar return for five to six sweeps of the radarscope, and subsequently noted two secondary returns in the area. One secondary return was Mode III, Code 1200 (presumably EL10) and the other was Mode III, Code 7700, the emergency code selected by EL08 after the collision.

The NORAD controller was aware of the conflicting traffic and advised EL08 and EL10 of its location three times. However, neither he nor the pilots suspended the intercept operation. In fact, the NORAD controller cleared EL08 for an attack with the conflicting traffic in the area. Finally, the controller called the conflicting traffic at 250° 4 miles from EL08 and EL10 when actually the F106's were 2 miles apart and EL08 was closing within 1 mile of the conflicting traffic. (See Appendix C.) EL10 acknowledged that he saw the traffic and apparently assessed it as no threat to him. However, EL08 either did not see N6876P or saw it, returned to his intracockpit duties, and in maneuvering to salvage the initially aborted run, inadvertently locked on the civil aircraft rather than EL10. This probability is substantiated by the fact that EL08 climbed from the initial intercept altitude of 6,000 feet, to the collision altitude of 8,500 feet--the cruising altitude of the Piper.

The plot of X-Y coordinates generated by the NORAD computer radar, which was tracking EL08 and EL10, correlated with the pertinent communications, tends to confirm the probability that EL08 inadvertently intercepted N6876P instead of EL10.

The conduct of low-altitude radar intercept training in areas other than those designated constitutes an unwarranted risk to aviation safety because:

1. Airways are used heavily by IFR and VFR traffic.
2. High-speed flight maneuvers are involved in intercept operations.
3. Interceptor pilots have a heavy cockpit workload when tracking a target.
4. Apparently NORAD is unable to identify all aircraft in the area sufficiently to insure that their interceptors are separated from them.

PROBABLE CAUSE

The National Transportation Safety Board determines that the probable cause of the accident was the failure of the interceptor pilot to see and avoid a civil aircraft during a high-speed, low-altitude, intercept training flight conducted in an area which included major north-south airways. Also contributing to this accident was the

system which permitted an incompatible mix of traffic in controlled airspace which resulted in the probability of an inadvertent radar lock-on to a civil aircraft.

3. RECOMMENDATIONS

As a result of the accident, the National Transportation Safety Board, on November 14, 1974, submitted Safety Recommendation A-74-97 to the Administrator, FAA, concerning low-level military intercept training operations. (See Appendix D.)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JOHN H. REED
Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ LOUIS M. THAYER
Member

/s/ ISABEL A. BURGESS
Member

/s/ WILLIAM R. HALEY
Member

January 29, 1975

APPENDIX A

CREW INFORMATION

Robert Anthony Axley - PA 24-250

Mr. Axley, 39, held private pilot certificate No. 1483359, with airplane single engine land and instrument privileges. He had accumulated 1,606 flight-hours of which 421 were in the PA-24-250 aircraft. He had accumulated 198 flight-hours of nighttime, 85 flight-hours of actual instrument time, and 61 flight-hours of simulated instrument time. He held a current second-class medical certificated, dated August 21, 1973, with the limitation that he must wear corrective lenses while exercising his airman's privileges.

Captain Michael Jerome Kelly - F106A

Captain Kelly, 33, had accumulated 1,422 flight-hours of military flight time, of which 315 flight-hours were in the F106 aircraft. He holds commercial pilot certificate No. 1877667, with single engine land, multi-engine land, and instrument privileges. He holds a current first-class medical certificate dated May 31, 1974, with no limitations.

APPENDIX B

CHRONOLOGY OF PERTINENT COMMUNICATIONS

- 2010:29 (N6876P) Washington Center good evening Commanche six eight seven six papa with you, eight thousand five hundred over Salisbury.
- 2017:23 (Controller) And zero eight, short range commit, tight port turn one five zero, target is one target, stern attack, VID, target's bearing is one three one at seven miles, heading one nine zero, three thousand feet, mach point four three, crossing left to right, two thousand low.
(Interceptor) Zero eight.
- 2017:53 (Controller) Zero eight, target one three five at six.
(Interceptor) Zero eight.
- 2018:43 (Controller) Zero eight, target now one six two at four miles.
(Interceptor) Zero eight.
- 2018:53 (Controller) Zero eight, target one seven three at four miles, starboard one seven five.
(Interceptor) Zero eight
- 2019:33 (Controller) Zero eight, target now one eight zero at four miles, starboard one eight, correction, starboard to one eight zero.
(Interceptor) Zero eight.
- 2019:42 (Controller) One zero, you have traffic one nine zero at eight miles, heading south, you should be clear of it.
- 2019:52 (Controller) Zero eight, target now one seven five at three. Come back port to one seven five.
(Interceptor) Right.
- 2020:37 (Controller) Zero eight, target now one seven five at two minimum range.

APPENDIX B

(Interceptor) Zero eight, no Judy.

2020:32 (Controller) Zero eight, understand no Judy.
(Interceptor) Affirmative

2020:35 (Controller) Roger, break port one three zero, maintain
angels five, set speed four eight.

(Interceptor) Zero eight.

2020:49 (Interceptor) Zero eight has a Judy.

2020:53 (Controller) Roger, you're cleared in on target.

2021:04 (Controller) One zero, your traffic now one nine five at
seven miles, heading about one nine zero.

2021:13 (Target) One zero, no joy.

2021:15 (Controller) There appears to be two craft there.

2022:12 (Washington Center) Seven six papa you have traffic in
your six o'clock position and, five to seven miles south-
east bound indicating VFR below ten he's slowly overtaking
you.
(N6876P)Seven six papa, we'll be looking over our shoulder
here.

2022:48 (Controller) Echo Lima one zero, and zero eight you have
traffic paralleling you to port - to the starboard side
bearing two five zero, four miles, heading one eight zero.

2022:57 (Target) One zero, Tally ho.

2022:59 (Interceptor) Zero eight.

2023:07 (Washington Center) Seven six papa, he's in your eight
o'clock position now and about five miles and he looks like
he's gonna be off your left wing.

APPENDIX B

(N6876P) No response was heard from the aircraft.

2023:11 (Garbled)

2023:13 (Controller) Zero eight, say again.

2023:15 (Interceptor) Zero eight.

2023:17 (Controller) Go ahead zero eight, what did you say again?

2023:18 (Interceptor) Echo Lima zero eight.

2023:22 (Controller) Echo Lima zero eight, this is Fertile, say again your first transmission.

2023:25 (Interceptor) Echo Lima zero eight, like to be headed to an emergency field.

2024:04 (Controller) Roger, squawk Mode Three, Seventy Seven Hundred emergency.

2024:09 (Controller) Zero eight, what's your problem?

2024:14 (EL08) Zero eight, zero eight just hit something.

APPENDIX C

PLOT OF X Y COORDINATES FROM 20TH AIR DEFENSE COMMAND COMPUTER DATA AND RELATIVE COMMUNICATIONS

201722 (Controller) And zero eight, short range comm. Light port one one five zero target is one target, start attack. VFR target's bearing is one three one at seven miles, heading one zero zero, three thousand feet, track point four three, crossing L/R to right, two thousand low

201753 (Controller) Zero eight, target one three five at six

201843 (Controller) Zero eight, target now one six five at four miles

201853 (Controller) Zero eight, target one seven three at four miles starboard one seven five

201933 (Controller) Zero eight, target now one eight zero at four miles, starboard one eight, correction, starboard to one eight zero

201952 (Controller) Zero eight, target now one seven five at three miles, Come back port to one seven five

202027 (Controller) Zero eight, target now one seven five at two, min range

202038 (Controller) Roger, break port one three zero, maintain altitude five, air speed four eight

201942 (Controller) One zero, you have traffic one nine zero at eight miles, heading south, you should be clear of it

202049 (interceptor) Zero eight has a July

202104 (Controller) One zero, your traffic now one nine five at seven miles, heading about one nine zero

201942 Radar position of unknown traffic

202104 Radar position of unknown traffic

202212 (Washington Center) Seven six zero you have traffic at your six o'clock position and, oh, oh, five to seven miles low, first heard indicating VFR below ten he's slowly overtaking you

202248 Radar position of unknown traffic

202307 (Washington Center) Seven six zero, he's in your eight o'clock position low and about five miles and he looks like he's gonna be off your left wing

202304 Area of Radar Collision

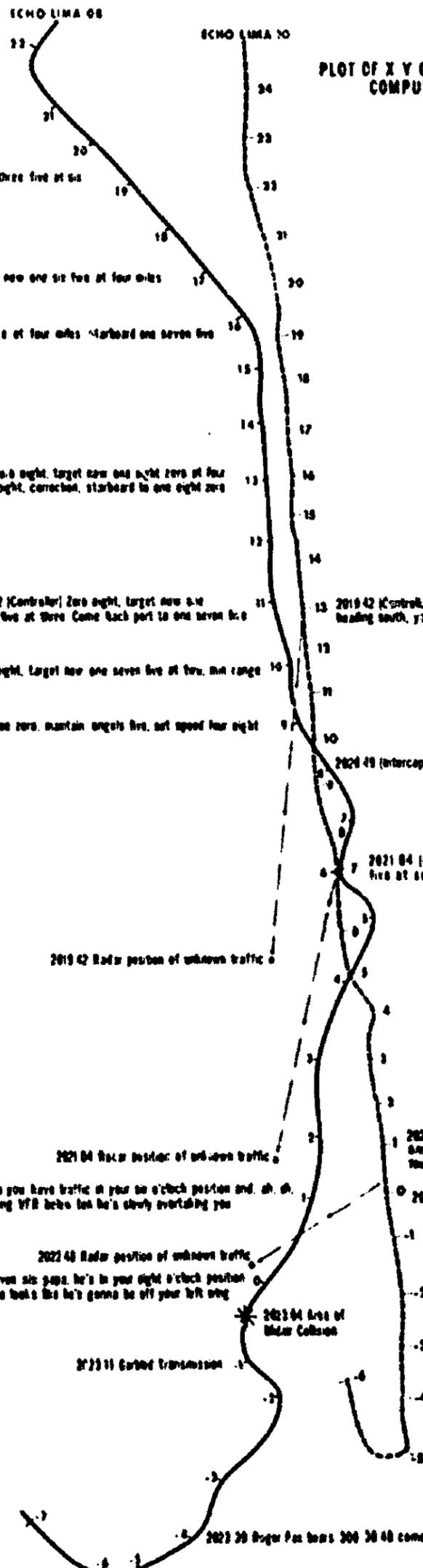
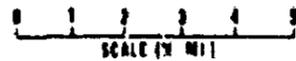
202311 Corbid transmission

202248 (Controller) Echo Lima one zero, and zero eight you have traffic overtopping you to port - in the starboard side bearing two five zero, four miles, heading one eight zero

202307 One zero tally ho

NOTE: The hatch mark's superimposed along the flight tracks of the F106 aircraft represent computer frame times spaced approximately 15 seconds apart and show the relative positions of the two aircraft at the corresponding mesh numbers.

202338 Roger for two 300 3048 come light starboard 300



NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

APPENDIX D

ISSUED: November 14, 1974

Forwarded to:

Honorable Alexander P. Butterfield
Administrator
Federal Aviation Administration
Washington, D. C. 20591

SAFETY RECOMMENDATION(S)

A-74-97

The National Transportation Safety Board's investigation of a fatal, midair collision between a New Jersey Air National Guard F 106 and a civil aircraft, N6876P, that occurred on October 11, 1974, near Saxis, Va., reveals a serious situation which warrants immediate corrective action.

Our investigation has revealed that military low-level VFR intercept training missions were being conducted at or below 10,000 feet by the Air Defense Command (ADC). These missions were being flown in an area that infringes upon and traverses Victor Airways 1 and 139 between Salisbury, Md., and Cape Charles, Va. Both of these airways are major north/south airways which lie between designated restricted and warning areas used by the military. Under the circumstances, traffic in these airways must remain within the controlled airspace and avoid restricted airspace.

The Safety Board is particularly concerned because no prior coordination was effected with your agency for the use of this airspace and that the procedures in Handbook 7610.4B "Special Military Operations" do not set forth any requirement for ADC to coordinate with FAA for the type of operation being conducted.

Although the Safety Board recognizes the complexity of the problems associated with accommodating both the civil and military requirements in the use of our national airspace, we firmly believe that controlled airspace should not be used for such military intercept training operations. We understand that the ADC has suspended all such operations pending further study of existing procedures.

In view of the facts and circumstances surrounding this accident, the National Transportation Safety Board recommends that the Federal Aviation Administration, in coordination with the Department of Defense:

Take positive action to assure that such low-level military intercept training operations are confined to designated restricted airspace.

Honorable Alexander P. Butterfield

REED, Chairman, McADAMS, THAYER, BURGESS, and HALEY, Members, concurred in the above recommendation.


By: John H. Reed
Chairman

APPENDIX D

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

WASHINGTON, D.C. 20590



OFFICE OF
THE ADMINISTRATOR

NOV 25 1974

Honorable John H. Reed, Chairman
National Transportation Safety Board
Department of Transportation
Washington, D.C. 20591

Notation 1407

Dear Mr. Chairman:

Along with your letter of November 4, you enclosed a copy of NTSB Safety Recommendation A-74-97 resulting from the F106 and civil aircraft midair collision near Saxis, Virginia, on October 11.

I have personally contacted General David Jones, Air Force Chief of Staff, and with his cooperation set up a series of meetings with military and FAA officials to work out the problems associated with better utilization of U.S. airspace. The joint study is exploring additional ways of confining military flight activities, reviewing utilization figures for warning areas and examining the ISJTA (intensive student jet training area) and alert area concepts as alternatives. (The study also is taking a hard look at the necessity for various types of military operational missions in the peace-time environment.)

Incidentally, it is true that the Air Defense Command has suspended all such operations under visual flight rules pending further study of existing procedures. The Command will not allow its aircraft to operate under flight level 240 unless they do so under instrument flight rules, in ATC assigned airspace or in warning or restricted areas.

We will keep you advised of any actions taken as a result of the high priority joint study.

Sincerely,

Alexander P. Butterfield
Alexander P. Butterfield
Administrator