

**THE MID-AIR COLLISION IN WASHINGTON, D.C. -- REFLECTIONS ON CAUSAL  
FACTORS OF AN AVIATION DISASTER**

**By: Alan Armstrong\***

**I.**

**INTRODUCTION**

Many of us in the aviation community have been shocked by the mid-air collision between an Army Blackhawk helicopter (UH-60) operated as PAT 25 and a Bombardier Regional Jet operated by American Eagle as BlueStreak 5342. Images of a collision at night with explosive effects in the sky have appeared repeatedly in the media. Questions have been asked over and over again, "How could this happen?" The National Transportation Safety Board (NTSB) and the United States Army have investigations underway that will be supported and informed by a massive quantity of evidence, including cockpit voice recorders, flight data recorders, radar plots, radio-telephone communications between Washington Tower and the aircraft and a whole host of other data that will assist the investigators in their arduous undertaking. The facts and circumstances giving rise to this aviation tragedy will be a source of sober reflection for all of us in the aviation community for months to come.

Recognizing that final answers and conclusions are months and perhaps years away, the author of this article cannot reach any final and definitive conclusions. However, there are certain glaring facts that cannot be ignored. This article is written with a view towards examining and

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commenting on certain immutable facts as they have been revealed in the days following the mid-air collision and the deaths of sixty-seven people.

## II.

### **THE FACTS AND CIRCUMSTANCES GIVING RISE TO THIS AMERICAN AVIATION TRAGEDY**

Pilots who have flown in and around Washington, D.C. and the Special Flight Rules Area (SFRA) have an appreciation for the complexity of the airspace surrounding Washington, D.C. Littered with prohibited areas and restricted areas, flight operations in Washington are not for the novice. Flight operations in Washington are intense and demanding. Washington National Airport (KDCA) is extremely busy and Prohibited Area P-56 is only 1.5 nautical miles north of the airport. The airspace is filled with helicopter traffic traveling up and down the Potomac River flying beneath aircraft on approach to Washington National. A Letter of Agreement has been in place between the United States military and the FAA to allow helicopter traffic to fly beneath transport aircraft flying in and out of Washington National. Unfortunately, in terms of aircraft separation, the margins for error have been extremely small. On the evening of January 29, 2025, the margins were exceeded with catastrophic and disastrous consequences.

Washington Tower was staffed by five air traffic personnel, a local controller, a local control assistant, a ground controller, an operations supervisor, and an operations supervisor trainee. Under normal circumstances, there would have been two local controllers, one for fixed-wing aircraft and one for rotary-wing (helicopter) aircraft. However, on the evening in question, one local controller was providing air traffic control services to both fixed-wing aircraft and rotary-wing aircraft.

PAT 25 was on a routine training flight from Northwest Washington down "Route 1" with a transition to "Route 4" with an altitude restriction of no more than 200 feet in the vicinity of

Washington National. The flight crew was reasonably experienced. The pilot-in-command was an Army Captain who had logged 450 hours. The instructor pilot was a Warrant Officer who had logged about 1,000 hours of flight time. They were accompanied by a Staff Sergeant serving as a crew chief and safety observer. The American Eagle flight was operated by both a Captain and First Officer appropriately trained and qualified with no events on the night in question raising any questions about their competence or proficiency.

At 20:39:10 E.S.T. Potomac Approach cleared BlueStreak 5342 for the Visual Approach to Runway 01 at the Washington National Airport. To orient the reader, appended to this article as Exhibit 1 is the Mount Vernon Visual Runway 01 Approach with the BADDN intersection 5.9 nautical miles to the south of the airport. A visual checkpoint is the Woodrow Wilson Bridge to the south of the airport. Note the weather minima for the approach require at least a 3,000-foot ceiling with at least 4 miles of visibility. The vertical guidance for descent is a 3-degree glideslope.

After BlueStreak 5342 was handed over to the Washington National Control Tower, the local controller asked if the flight crew could accept Runway 33. The local controller was anxious to depart an American Airlines flight on Runway 01. The flight crew of BlueStreak 5342 agreed to accept Runway 33 for landing. Exhibit 2 to this article is an airport diagram confirming that the Landing Distance Available for Runway 33 is only about 5,200 feet which is not a long runway on which to land a transport category jet aircraft. This meant that the flight crew of BlueStreak 5342 would be busy on their landing approach, since a right turn to the northeast would be followed by a left turn to the northwest. The pilot flying would be busy monitoring his airspeed, altitude, and rate of descent while the pilot not flying would be focused on visually acquiring the runway environment to ensure the aircraft got lined up with the runway. These factors made the prospects of the CRJ crew visually acquiring the Army helicopter approaching from the north unlikely.

Because of the complex nature of the approach which is effectively a circle-to-land maneuver at night over water with no natural horizon, there is every reason to expect that the flight crew of BlueSteak 5342 would have loaded the RNAV/GPS Runway 33 Instrument Approach Procedure [Exhibit 3] into the aircraft's navigation system. Doing so would have increased the precision with which the aircraft would have been flown during the approach. It would have ensured a stabilized approach was flown, placing the aircraft over the IDEK instrument approach waypoint at 490 feet above ground level on a magnetic heading of 334 degrees toward Runway 33.

At 20:46:01, the local controller in the tower broadcast: "PAT 25, traffic just south of the Woodrow Wilson Bridge, a CRJ, it's 1200 feet, setting up for Runway 33." Moments later, PAT 25 responded: "PAT 25 has the traffic in sight, request visual separation." When one listens to the voice intonation of the Army pilot responding to the local controller, the statement that the traffic was in sight and the request for visual separation sounded almost rote in nature, almost as though the response had been given many times before as a standard course of action. In any case, the local controller responded: "Visual separation approved."<sup>1</sup>

As mentioned earlier, the local controller was anxious to get an American Airlines flight launched from Runway 1 and issued the following clearance: "American 1630, Tower, Runway 1, line up and wait. Traffic's 2 out for Runway 33; there's traffic on 6-mile final." Moments later, American Airlines Flight 1630 responded: "Line up and wait Runway 1, American 1630." While American Flight 1630 was lining up and waiting for clearance to depart Runway 1, local control

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<sup>1</sup> Over the course of the days that followed the accident, one commentator suggested the local controller should have called on the position of BlueStreak 5342 with a description of the relative position from PAT25 with an "o'clock" orientation. The author believes this observation or criticism is without merit. The relative position of the Regional Jet to the Blackhawk was described by "just south of the Woodrow Wilson Bridge." This description was adequate to alert the crew of the Blackhawk to the relative position of the Regional Jet.

gave the following clearance to another aircraft: “BlueStreak 5307, keep rolling out to November, ground point 7. Good day.” Then, BlueStreak 5307 acknowledged the clearance. Thereafter, local control gave the following clearance to American Flight 1630: “American 1630, winds are 320 at 14 gusts 25, traffic’s 2-mile base for Runway 33 no delay, Runway 1, cleared for immediate takeoff.” Following that takeoff clearance, American Airlines Flight 1630 responded: “Number 1, cleared for takeoff, American 1630.”

Moments later, a conflict alert is heard in the cab of the control tower, and the local controller broadcast on a UHF frequency, “PAT 25, do you have the CRJ in sight?” Then, almost immediately, the local controller broadcast, “PAT 25, pass behind the CRJ.”<sup>2</sup> Once again, with almost a practiced and stoic tone of voice, the Army pilot in PAT 25 responded: “PAT 25 has the traffic in sight, request visual separation.” Immediately, the local controller responded: “Vis sep approved.” Moments later, American flight 472 checked in: “American 472 by BADDN on the visual.” The local controller responded: “American 472, Washington Tower, winds 320 at 17 --.” Then at 20:47:50, over the local control frequency, one could hear: “Oohh!! Oh my...” At this moment, PAT 25 collided with BlueStreak 5342 and all of the lives in the aircraft were lost.

At 20:47:40, the flight crew of BlueStreak 5342 had received an automated Traffic Advisory call out (“Traffic, Traffic”). Two seconds later, the local controller had directed PAT 25 to pass behind BlueStreak 5342. Sixteen seconds after the local controller directed PAT 25 to pass behind BlueStreak 5342, a pilot in BlueStreak 5342 increased the jet’s pitch after a verbal reaction from the flight crew, captured by the cockpit voice recorder. One second later the collision occurred.

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<sup>2</sup> Based on a review of the cockpit voice recorder (“CVR”) in the Blackhawk, it now appears the Blackhawk crew did not hear the ATC instruction, “...pass behind the CRJ.”

### III.

#### ITEMS WORTH NOTING

A number of things are noteworthy. First, the local controller was communicating with BlueStreak 5342 on a VHF frequency and with PAT 25 on a different VHF frequency. This means the flight crew of BlueStreak 5342 did not hear any radio transmissions by PAT 25. This likely had the effect of lowering the situational awareness of the Regional Jet flight crew to the presence of the Blackhawk. Second, when PAT 25 called traffic in sight at approximately 20:46:01, PAT 25 was at the tidal banks while BlueStreak 5342 was over the Woodrow Wilson Bridge, a distance of six miles. One is left to wonder whether the flight crew of PAT 25 actually saw BlueStreak 5342 when it called traffic in sight. Again, the two radio calls by PAT 25 stating “traffic in sight” and “request visual separation” seemed monotone and flat, as if it was a ritual that had been employed many times before. Perhaps the flight crew of PAT 25 saw an aircraft other than BlueStreak 5342.

Third, according to the NTSB, the collision altitude between the aircraft was 325 feet, +/- 25 feet. Appended as Exhibit 4 to this article is a Washington, D.C. VFR Flight Route Map for helicopters confirming the maximum altitude at which PAT 25 was to have been flown was 200 feet. Operating a helicopter at 300 feet approximately one mile from the runway put the helicopter in the “kill zone.” This is true because the jet was flying a 3-degree glideslope, and one mile from the runway places the jet at an altitude of 300 feet above ground level. Some appreciation for the relative flight path of BlueStreak 5342 can also be found in Exhibit 3 attached, the Instrument Approach Procedure for the RNAV/GPS Runway 33 Approach. The approach confirms that the visual guidance system approach angle is a 3-degree glideslope. It further indicates that at 1.4 nautical miles from the threshold of Runway 33, BlueStreak 5342 would be at 490 feet above

ground level and would descend as it approached the runway. Additionally, as noted earlier, although this is speculation, it would have been a good practice and procedure to load the RNAV/GPS Runway 33 Instrument Approach Procedure into the navigation system of the Regional Jet. This would have assisted the flight crew in positioning the aircraft for landing and provided precise vertical and lateral guidance to Runway 33.

Fourth, we have the issue of night vision goggles. It has been reported that PAT 25 was equipped with night vision goggles. If employed by the helicopter crew, these would render the pilots with no peripheral vision and with monocular forward vision. The forward vision would be monocular because the eyes cannot triangulate when looking through two tubes. This would diminish depth perception and could account for the helicopter flight crew failing to visually acquire the correct aircraft.

Fifth, there is the question of any letter of agreement that allowed a helicopter to operate at 200 feet while a jet overhead was operating at 300 feet on its approach to Runway 33. Altimeters can be off 75 feet and still be within limits. Variations in altimeter settings could affect indicated altitude of either aircraft. A 100-foot margin of error is simply too small a margin of safety, especially when the local controller relied on two occasions with the report of the Army pilot that he had the traffic in sight and would maintain visual separation.<sup>3</sup> Appended as Exhibit 5 is §2-1-1 of FAA Order JO7110.65AA (April 20, 2023), the Air Traffic Control Handbook, which provides in subparagraph a, “The primary purpose of the ATC system is to prevent a collision involving aircraft operating in the system.” Clearly, the air traffic control *system* failed to accomplish its

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<sup>3</sup> Based on the CVR transcript from the Blackhawk, it now appears there was a 100 foot discrepancy in the altimeter readings of the two barometric altimeters in the Blackhawk.

primary purpose. It failed to prevent a collision between aircraft operating in the air traffic control system.<sup>4</sup>

#### IV.

### CONCLUSIONS AND OPINIONS

The following things are to be noted in relation to the collision between PAT 25 and BlueStreak 5342:

1. Putting in place a letter of agreement where helicopters could operate under visual flight rules and maintain visual separation from jet aircraft with only 100 feet of vertical separation between them was dangerous. The margin for error was too small and was unacceptable. The danger was accentuated by a discrepancy of 100 feet in the two barometric altimeter readings in the Blackhawk.
2. Operating a helicopter at 325 feet approximately one mile from a runway placed the helicopter in the "kill zone." Basic geometry indicates that if a transport category aircraft is one mile from the runway and following a 3-degree glideslope, the aircraft will be at an altitude of 300 feet above ground level. One would have expected that the Army flight crew was aware of this.
3. The decision of ATC to delegate separation to PAT 25 has to be questioned in retrospect. This is especially true after the conflict alert was heard in the cabin approximately 16 seconds before impact. Rather than asking the helicopter pilot if it still had traffic in sight, an argument can be made that the local controller should have immediately given the helicopter a vector to a heading of 090 degrees.
4. The absence of a second controller whose only job would have been to provide separation and traffic advisory services to helicopters left the remaining local controller task saturated. This may have contributed to his decision to delegate visual separation to the helicopter pilot and to rely on the declaration of the helicopter pilot on two separate occasions that he had traffic in sight and would maintain visual separation.

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<sup>4</sup> The fact that the air traffic control *system* failed may or may not be a failure by the local controller who operated under the limitations of a letter of agreement with very small margins for error. The local controller did not formulate the letter of agreement.



5. The use of split frequencies whereby local control was talking to PAT 25 on a separate VHF frequency from the VHF frequency used to communicate with BlueStreak 5342 is significant. This split frequency arrangement left the Regional Jet flight crew out of the loop in terms of the presence of the helicopter. It diminished their situational awareness, which was already challenged by flying a circle-to-land approach at night.

6. The practice of employing night vision goggles in an urban environment with significant areas of ambient light must be questioned. The elimination of depth perception and loss of peripheral vision certainly contributed to the failure of the helicopter pilots to see and avoid the Regional Jet.

7. The flight crew of BlueStreak 5342 was justifiably task saturated on a circling approach at night to a short runway demanding their full concentration and attention to flying a stabilized approach and landing in the touch down zone to ensure there was ample distance available to bring the Regional Jet to a stop.<sup>5</sup>

The air transportation system in the United States is extraordinarily safe and efficient to such an extent that we take it for granted. We take for granted the talent and dedication exhibited every hour of every day by pilots, air traffic controllers, mechanics, and dispatchers who all work in unison to provide America with a remarkably safe and reliable air transportation system. It all seems so easy, so effortless. However, the ease with which air transportation is accomplished is an illusion. It requires highly trained and skilled personnel to make the system work. It requires intense focus and attention to minute detail. It requires prompt and immediate action in response to hazards and danger. Sometimes we crowd the margins. We set high standards and expectations that cannot be met in every instance. We did that on the evening of January 29, 2025. Corrective action will be taken. The deaths of sixty-seven people deserve no less. The reasons for this tragedy

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<sup>5</sup> It is difficult to criticize the crew of BlueStreak 5342 for failing to see and avoid the Blackhawk as required by C.F.R. §91.113(b). The crew of the Regional Jet was task saturated executing two turns and two descents at low altitude. With such small margins for error on a difficult approach at night, it is difficult to fault them for failing to see and avoid. The flight crew of the Blackhawk is an entirely different matter. They were in cruise flight, looking ahead and had the Regional Jet called out to them and even announced, not once, but twice, "traffic in sight."

will be illuminated and exposed. In time, the causes of this disaster will come to light. Perhaps this article will in some small measure shed light on the path forward.

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21112

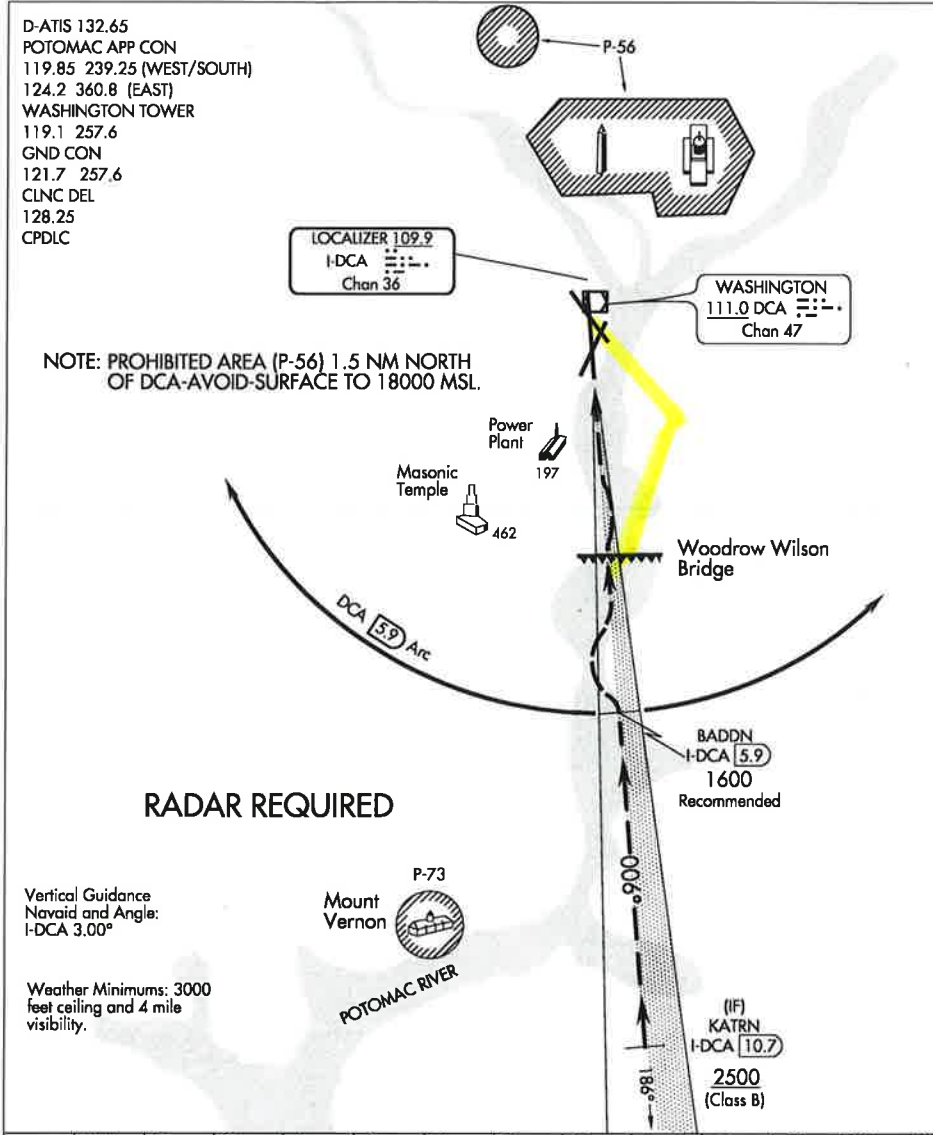
RONALD REAGAN WASHINGTON NTL (DCA)

# MOUNT VERNON VISUAL RUNWAY 1

AL-443 (FAA)

WASHINGTON, DC

D-ATIS 132.65  
 POTOMAC APP CON  
 119.85 239.25 (WEST/SOUTH)  
 124.2 360.8 (EAST)  
 WASHINGTON TOWER  
 119.1 257.6  
 GND CON  
 121.7 257.6  
 CLNC DEL  
 128.25  
 CPDLC



NOTE: PROHIBITED AREA (P-56) 1.5 NM NORTH OF DCA-AVOID-SURFACE TO 18000 MSL.

**RADAR REQUIRED**

Vertical Guidance  
 Navaid and Angle:  
 I-DCA 3.00°

Weather Minimums: 3000  
 feet ceiling and 4 mile  
 visibility.

1 NM 2 3 4 5 6 7 8 9 10 11 12 13

Aircraft may proceed via DCA VOR/DME R-185 (inbound 005°), or via the ILS or LOC/DME RWY 1 approach to 5.9 DME, then follow the Potomac River to the airport.

# MOUNT VERNON VISUAL RUNWAY 1

38°51'N-77°02'W

WASHINGTON, DC

Amdt 4 22AUG13

RONALD REAGAN WASHINGTON NTL (DCA)



23 JAN 2025 to 20 FEB 2025

23 JAN 2025 to 20 FEB 2025

24361

# AIRPORT DIAGRAM

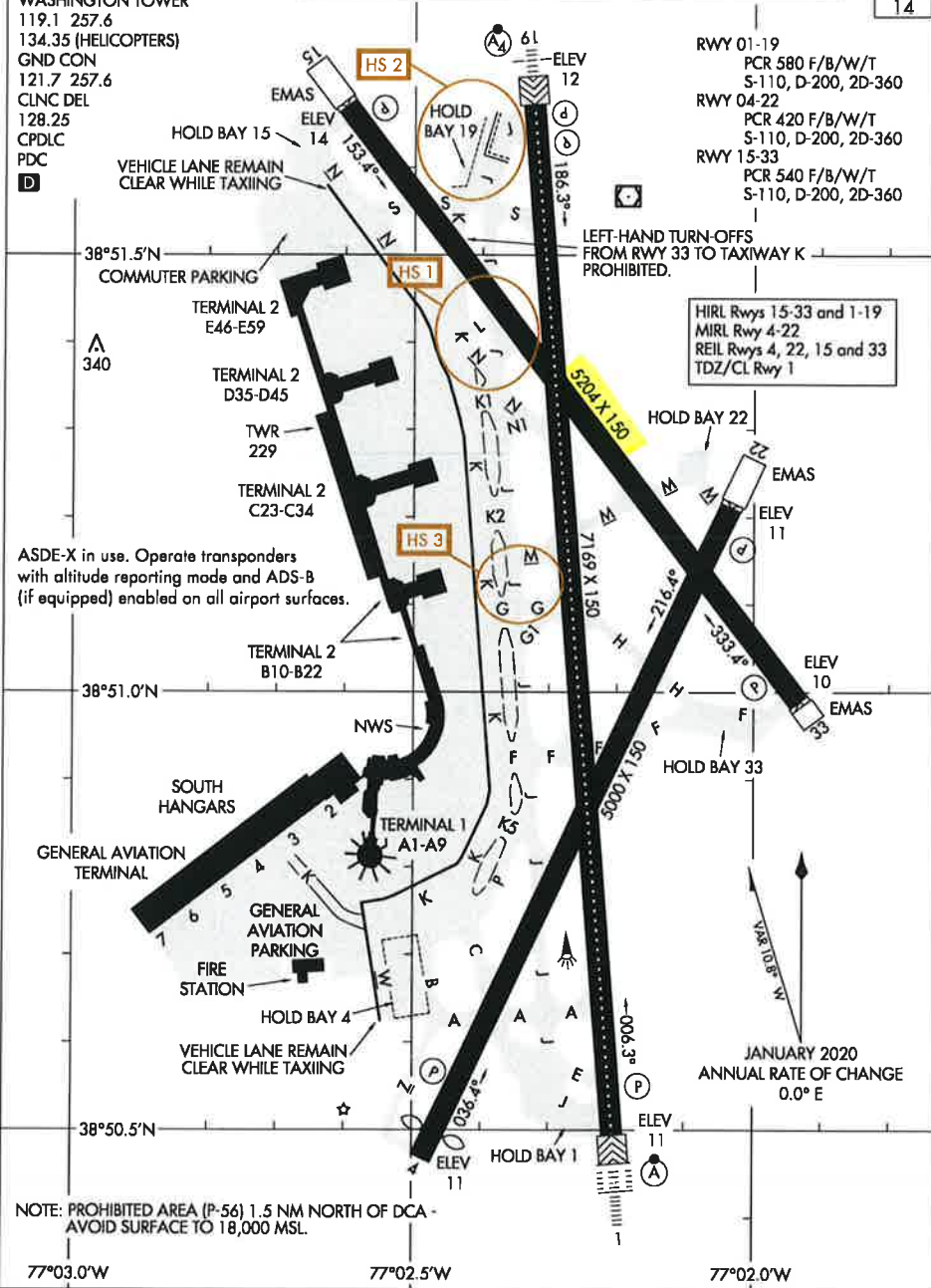
AL-443 (FAA)

## RONALD REAGAN WASHINGTON NTL (DCA) WASHINGTON, DC

D-ATIS  
132.65  
WASHINGTON TOWER  
119.1 257.6  
134.35 (HELICOPTERS)  
GND CON  
121.7 257.6  
CLNC DEL  
128.25  
CPDLC  
PDC  
**D**

CAUTION: BE ALERT TO RUNWAY CROSSING CLEARANCES.  
READBACK OF ALL RUNWAY HOLDING INSTRUCTIONS IS REQUIRED.

FIELD  
ELEV  
14



RWY 01-19  
PCR 580 F/B/W/T  
S-110, D-200, 2D-360  
RWY 04-22  
PCR 420 F/B/W/T  
S-110, D-200, 2D-360  
RWY 15-33  
PCR 540 F/B/W/T  
S-110, D-200, 2D-360

HIRL Rwy 15-33 and 1-19  
MIRL Rwy 4-22  
REIL Rwy 4, 22, 15 and 33  
TDZ/CL Rwy 1

LEFT-HAND TURN-OFFS  
FROM RWY 33 TO TAXIWAY K  
PROHIBITED.

ASDE-X in use. Operate transponders  
with altitude reporting mode and ADS-B  
(if equipped) enabled on all airport surfaces.

23 JAN 2025 to 20 FEB 2025

23 JAN 2025 to 20 FEB 2025

# AIRPORT DIAGRAM

24361

## WASHINGTON, DC RONALD REAGAN WASHINGTON NTL (DCA)

Blumberg No. 5208

**EXHIBIT**

**2**

WASHINGTON, DC

AL-443 (FAA)

24361

APP CRS	Rwy ldg	5204
334°	TDZE	13
	Apt Elev	14

# RNAV (GPS) RWY 33

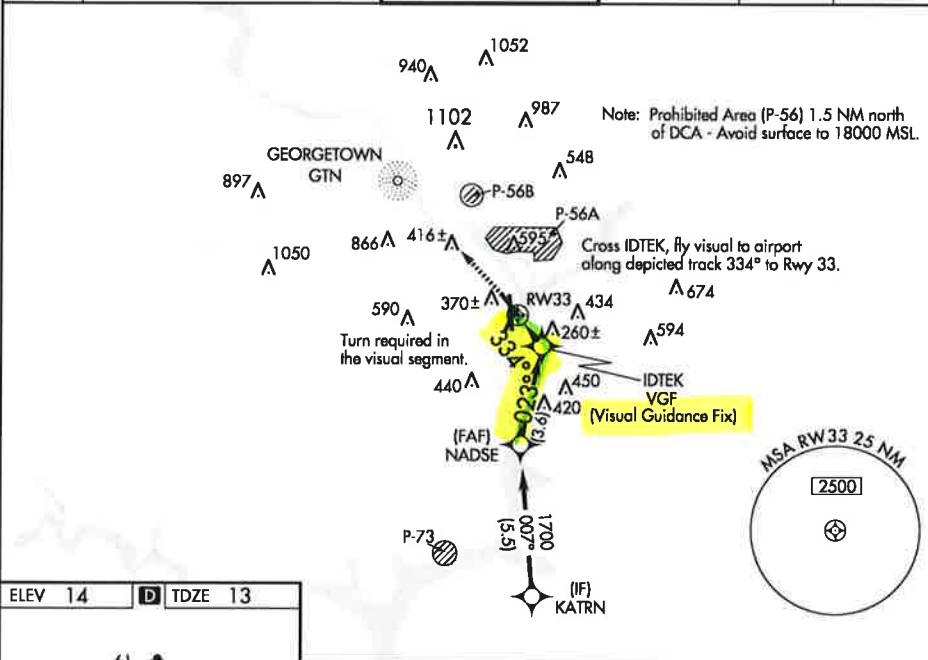
RONALD REAGAN WASHINGTON NTL (DCA)

RNP APCH - GPS.

RADAR required.

**MISSED APPROACH:** (Do not exceed 210K until Rwy 33)  
 Climb to 2200 on the FMS lateral path to Rwy 33 and direct to GTN NDB and hold, continue climb-in-hold to 2200.

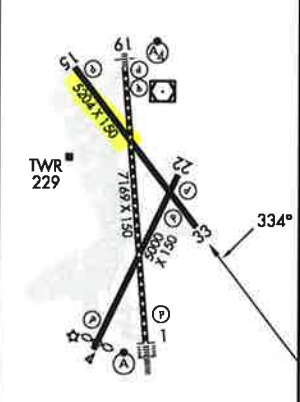
D-ATIS	POTOMAC APP CON	WASHINGTON TOWER	GND CON	CLNC DEL	CPDLC
132.65	119.85 239.25 (WEST/SOUTH) 124.2 360.8 (EAST)	119.1 257.6	121.7 257.6	128.25	



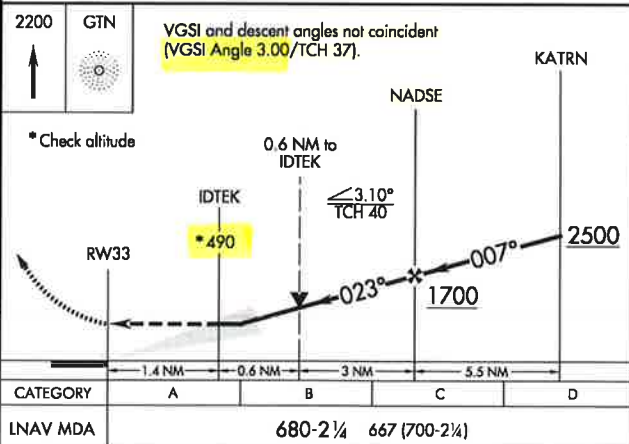
23 JAN 2025 to 20 FEB 2025

23 JAN 2025 to 20 FEB 2025

ELEV 14	D	TDZE 13
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TDZ/CL Rwy 1  
 MIRL Rwy 4-22  
 REIL Rwy 4, 15, 22 and 33  
 HIRL Rwy 1-19 and 15-33



WASHINGTON, DC  
 Orig 20APR23

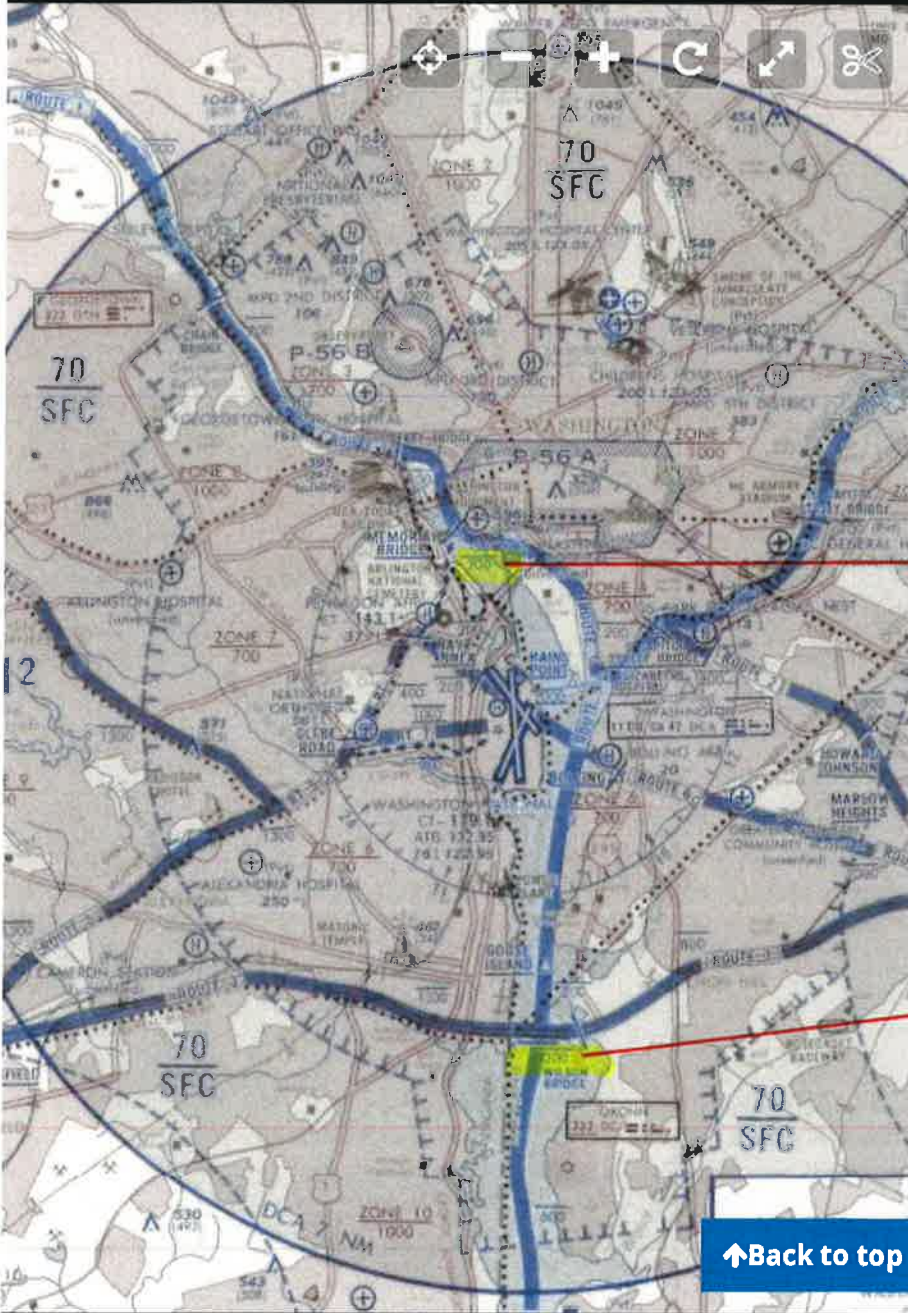
RONALD REAGAN WASHINGTON NTL (DCA)  
 38°51'N-77°02'W  
**RNAV (GPS) RWY 33**



# washington, D.C.

« About this Item

Image



200

300

Blumberg, Inc. 5208  
**EXHIBIT**  
**4**

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loc.gov



# Chapter 2. General Control

## Section 1. General

### 2-1-1. ATC SERVICE

- a. The primary purpose of the ATC system is to prevent a collision involving aircraft operating in the system.
- b. In addition to its primary purpose, the ATC system also:
  - 1. Provides a safe, orderly, and expeditious flow of air traffic.
  - 2. Supports National Security and Homeland Defense missions.
- c. The ATC system must provide certain additional services to the extent permitted. The provision of additional services is not optional on the part of the controller, but rather required when the work situation permits. It is recognized that the provision of these services may be precluded by various factors, including, but not limited to:

- 1. Volume of traffic.
- 2. Frequency congestion.
- 3. Quality of surveillance.
- 4. Controller workload.
- 5. Higher priority duties.
- 6. The physical inability to scan and detect situations falling in this category.

d. Controllers must provide air traffic control service in accordance with the procedures and minima in this order, except when one or more of the following conditions exists:

- 1. A deviation is necessary to conform with ICAO Documents, National Rules of the Air, or special agreements where the U.S. provides air traffic control service in airspace outside the U.S. and its possessions or:

**NOTE-**

*Pilots are required to abide by CFRs or other applicable regulations regardless of the application of any procedure or minima in this order.*

- 2. Other procedures/minima are prescribed in a letter of agreement, FAA directive, or a military document, or:

**NOTE-**

*These procedures may include altitude reservations, air refueling, fighter interceptor operations, law enforcement, etc.*

**REFERENCE-**

*FAA Order JO 7110.65, Para 1-1-10, Procedural Letters of Agreement (LOA).*

- 3. A deviation is necessary to assist an aircraft when an emergency has been declared.

**REFERENCE-**

*FAA Order JO 7110.65, Para 2-1-6, Safety Alert.*

*FAA Order JO 7110.65, Chapter 10, Emergencies.*

*FAA Order JO 7110.65, Para 5-1-4, Merging Target Procedures.*

e. Air Traffic Control services are not provided for model aircraft operating in the NAS or to any UAS operating in the NAS at or below 400ft AGL.

**NOTE-**

- 1. This does not prohibit ATC from providing services to civil and public UAS.

General

2-1-1

JO 7110.65AA

4/20/23

2. The provisions of this paragraph apply to model aircraft operating at any altitude. For all other UAS, this paragraph applies only to those UAS operating entirely at or below 400ft AGL.

**REFERENCE-**

*PCCG Item - Model Aircraft*

### 2-1-2. DUTY PRIORITY

a. Give first priority to separating aircraft and issuing safety alerts as required in this order. Good judgment must be used in prioritizing all other provisions of this order based on the requirements of the situation at hand.

**REFERENCE-**

*FAA Order JO 7110.65, Para 2-1-6, Safety Alert*

**NOTE-**

*Because there are many variables involved, it is virtually impossible to develop a standard list of duty priorities that would apply uniformly to every conceivable situation. Each set of circumstances must be evaluated on its own merit, and when more than one action is required, controllers must exercise their best judgment based on the facts and circumstances known to them. That action which is most critical from a safety standpoint is performed first.*

b. Provide support to national security and homeland defense activities to include, but not be limited to, reporting of suspicious and/or unusual aircraft/pilot activities.

**REFERENCE-**

*FAA Order JO 7610.4 Special Operations.*

c. Provide and/or solicit weather information in accordance with procedures and requirements outlined in this order.

**NOTE-**

*Controllers are responsible to become familiar with and stay aware of current weather information needed to perform ATC duties.*

d. Provide additional services to the extent possible, contingent only upon higher priority duties and other factors including limitations of radar, volume of traffic, frequency congestion, and workload.

### 2-1-3. PROCEDURAL PREFERENCE



<b>TIME</b>	<b>SPEAKER</b>	<b>EVENT</b>
20:46:01	Local Control:	PAT 25, traffic just south of the Woodrow Wilson Bridge, a CRJ, it's 1200 feet SETTING up for Runway 33.
	PAT 25:	PAT 25 has the traffic in sight, request visual separation.
	Local Control:	Visual separation approved.
	Local Control:	American 1630, tower, Runway 1, line up and wait. Traffic's 2 out for Runway 33, there's traffic on 6 mile final.
	AAL 1630:	Line up and wait Runway 1, American 1630.
	Local Control:	Blue Streak 5307, keep rolling out to November, Ground point 7. Good day.
	Blue Streak 5207:	Blue Streak 5307.
	Local Control:	American 1630, winds are 320 at 14 gusts 25. Traffic's 2-mile base for Runway 33 no delay, Runway 1, cleared for immediate takeoff.
	AAL 1630:	Number 1, cleared for takeoff, American 1630.
	Local Control:	<i>Conflict alert sounding</i>
20:47:39	Local Control:	PAT 25, do you have the CRJ in sight?
20:47:47	Local Control:	PAT 25, pass behind the CRJ.
	PAT 25:	PAT 25 has the traffic in sight, request visual separation. <sup>1</sup>
	Local Control:	Vis sep approved. <sup>2</sup>
	AAL 472:	American 472 by BADDN on the visual.
	Local Control:	American 472, Washington tower, winds 320 at 17...
20:47:59	Local Control:	Oohh!! Oh my ....

<sup>1</sup> The pilot's voice routine. Suggests normalization of deviancy.

<sup>2</sup> 16 seconds before impact.