National Transportation Safety Board

Office of Aviation Safety
Washington, D.C. 20594-2000
March 24, 2009

METEOROLOGICAL FACTUAL REPORT

DCA09MA026

A. **ACCIDENT**

Location:	Hudson River, New York City, New York
Date / Time:	January 15, 2009 at 1527 Eastern Standard Time (EST) January 15, 2009 at 2027 Coordinated Universal Time (UTC)
Aircraft:	Airbus A-320, N106US, US Airways Flight 1549

B. **WEATHER GROUP**

Chairman:	Gregory D. Salottolo National Resource Specialist, Meteorology National Transportation Safety Board Washington D.C.
Member:	None

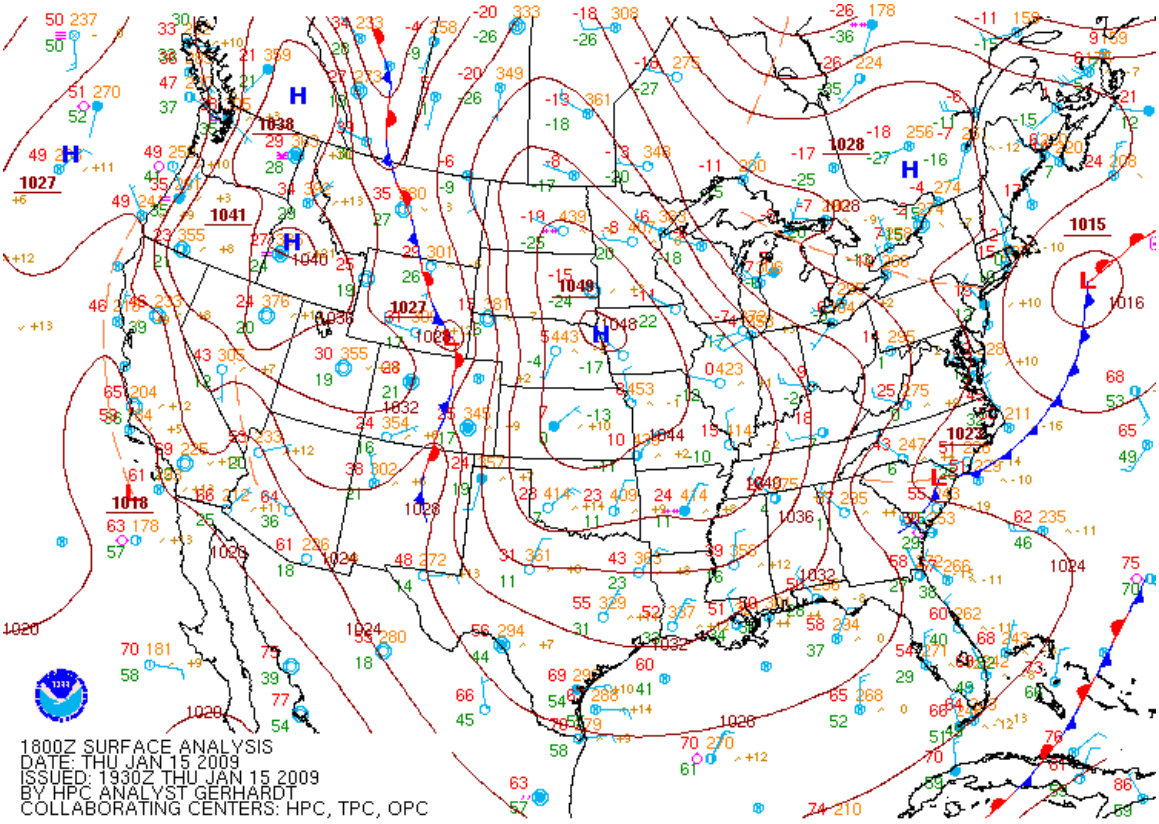
C. **SUMMARY**

On January 15, 2009, about 1527 Eastern Standard Time, US Airways flight 1549, an Airbus A320-214, registration N106US, suffered bird ingestion into both engines, lost engine thrust, and landed in the Hudson River, following take off from New York City's La Guardia Airport (LGA). The scheduled, domestic passenger flight, operated under the provisions of Title 14 CFR Part 121, was en route to Charlotte Douglas International Airport (CLT) in Charlotte, North Carolina. The 150 passengers and 5 crewmembers evacuated the aircraft successfully. One flight attendant and four passengers were seriously injured.

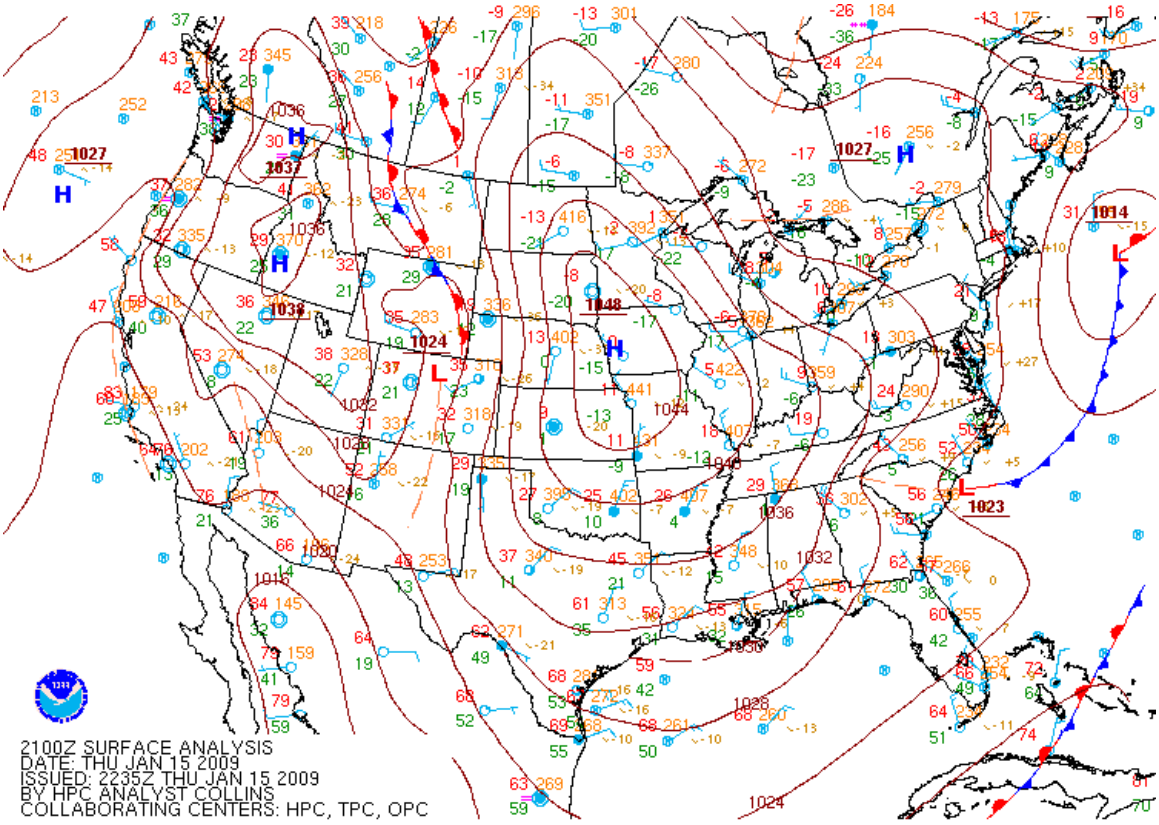
D. **DETAILS OF INVESTIGATION**

Note: All times are stated as EST based on the 24-hour clock unless otherwise noted. All heights above mean sea level (MSL) unless otherwise noted. Heights in surface weather observations above ground level (AGL). All directions are referenced to true north unless otherwise noted. Z = UTC. EST = Z – 5 hours.

1) Synoptic Weather Situation



National Weather Service (NWS) Surface Analysis for January 15, 2009 at 1300 EST (1800Z).



NWS Surface Analysis for January 15, 2009 at 1600 EST (2100Z).

2) Surface Weather Observations for January 15, 2009[1]

La Guardia Airport, New York (KLGA)

KLGA is located about 5.9 nautical miles east of the accident site at an elevation of 21 feet.

1451 EST: Ceiling 3,500 feet broken, visibility 10 miles, temperature –6.1 degrees C, dew point –13.9 degrees C, winds 340 degrees at 13.0 knots, altimeter setting 30.22 inches of Hg.

Calculated density altitude –2,908 feet and calculated pressure altitude –262 feet.

1551 EST: 4,400 feet scattered, visibility 10 miles, temperature –6.1 degrees C, dew point –15.0 degrees C, winds 360 degrees at 7.8 knots, altimeter setting 30.25 inches of Hg.

[1] Surface weather observations are from NWS Automated Surface Observing Systems (ASOS).

Calculated density altitude –2,945 feet and calculated pressure altitude –290 feet.

KLGA surface weather observations showed light snow from about 0507 EST to 1230 EST.

Central Park, New York City, New York (KNYC)

KNYC is located about 1.6 nautical miles east of the accident site at an elevation of 156 feet.

1451 EST: Ceiling 3,700 feet broken, visibility 10 miles, temperature –6.1 degrees C, dew point –15.0 degrees C, winds 290 degrees at 7.8 knots, altimeter setting 30.24 inches of Hg.

1551 EST: Few clouds at 4,200 feet, visibility 10 miles, temperature –6.7 degrees C, dew point –16.1 degrees C, winds 310 degrees at 8.7 knots, altimeter setting 30.28 inches of Hg.

Newark Liberty International Airport, Newark, New Jersey (KEWR)

KEWR is located about 9.7 nautical miles southwest of the accident site at an elevation of 18 feet.

1451 EST: 4,000 feet scattered, visibility 10 miles, temperature –5.6 degrees C, dew point –15.0 degrees C, winds 360 degrees at 13.0 knots, altimeter setting 30.23 inches of Hg., virga[2] northwest.

1551 EST: Ceiling 4,500 feet broken, 5,500 feet broken, visibility 10 miles, temperature –6.1 degrees C, dew point –14.4 degrees C, winds 290 degrees at 8.7 knots, altimeter setting 30.26 inches of Hg., showers in the vicinity southwest to northwest.

Teterboro Airport, Teterboro, New Jersey (KTEB)

KTEB is located about 5.4 nautical miles north-northwest of the accident site at an elevation of 9 feet.

1451 EST: Clear (at or below 12,000 feet), visibility 10 miles, temperature –6.1 degrees C, dew point –15.0 degrees C, winds 330 degrees at 6.1 knots, altimeter setting 30.23 inches of Hg.

1551 EST: Few clouds at 6,000 feet, visibility 10 miles, temperature –6.7 degrees C, dew point –15.6 degrees C, winds 330 degrees at 6.1 knots, altimeter setting 30.25 inches of Hg.

Surface weather observations are from the National Climatic Data Center (NCDC).

[2] Streaks or wisps of precipitation falling from a cloud but evaporating before reaching the ground.

See the link: NCDC

3) Weather and River Data from the 79th Street Boat Basin

Data from the Stevens Institute of Technology, Hoboken, New Jersey.

For information on these data see: http://hudson.dl.stevens-tech.edu/maritimeforecast/

Location: 79th Street Boat Basin on the Hudson River.
Latitude 40.7857 North and Longitude 73.98663 West.
Date: January 15, 2009.
The 79th Boat Basin is located about 1.1 nautical miles northeast of the accident site.

1516 EST: water temperature: 35.71 degrees F, air temperature 21.69 degrees F, wind direction 009.8 degrees at 10.64 knots.
1531 EST: water temperature: 35.44 degrees F, air temperature 21.9 degrees F, wind direction 323.6 degrees at 6.57 knots.

Surface water currents at the 79th Street Boat Basin between about 1500 EST and 1600 EST were about 1.5 knots to 2.5 knots moving from the north to south.

4) Automated Weather Reports from Commercial Aircraft

Data from: http://acweb.fsl.noaa.gov/

AC#5625 descent into KLGA January 15, 2009.

PA: Pressure Altitude
WD: Wind Direction
WS: Wind Speed
T: Temperature

Time EST	PA (feet)	WD (degrees true)	WS (knots)	T(degrees C)
1544	5,710	316	20	-21.5
1545	5,220	314	15	-20.8
1546	4,230	311	12	-18.3
1547	3,250	319	13	-15.8
1548	2,260	323	14	-13.3
1550	2,200	329	18	-12.8
1551	1,410	326	15	-10.9
1551	560	330	13	-8.9

AC#9410 descent into KLGA January 15, 2009.

Time (EST)	PA (feet)	WD (degrees true)	WS (knots)	T(degrees C)
1537	3,710	321	18	-17.3

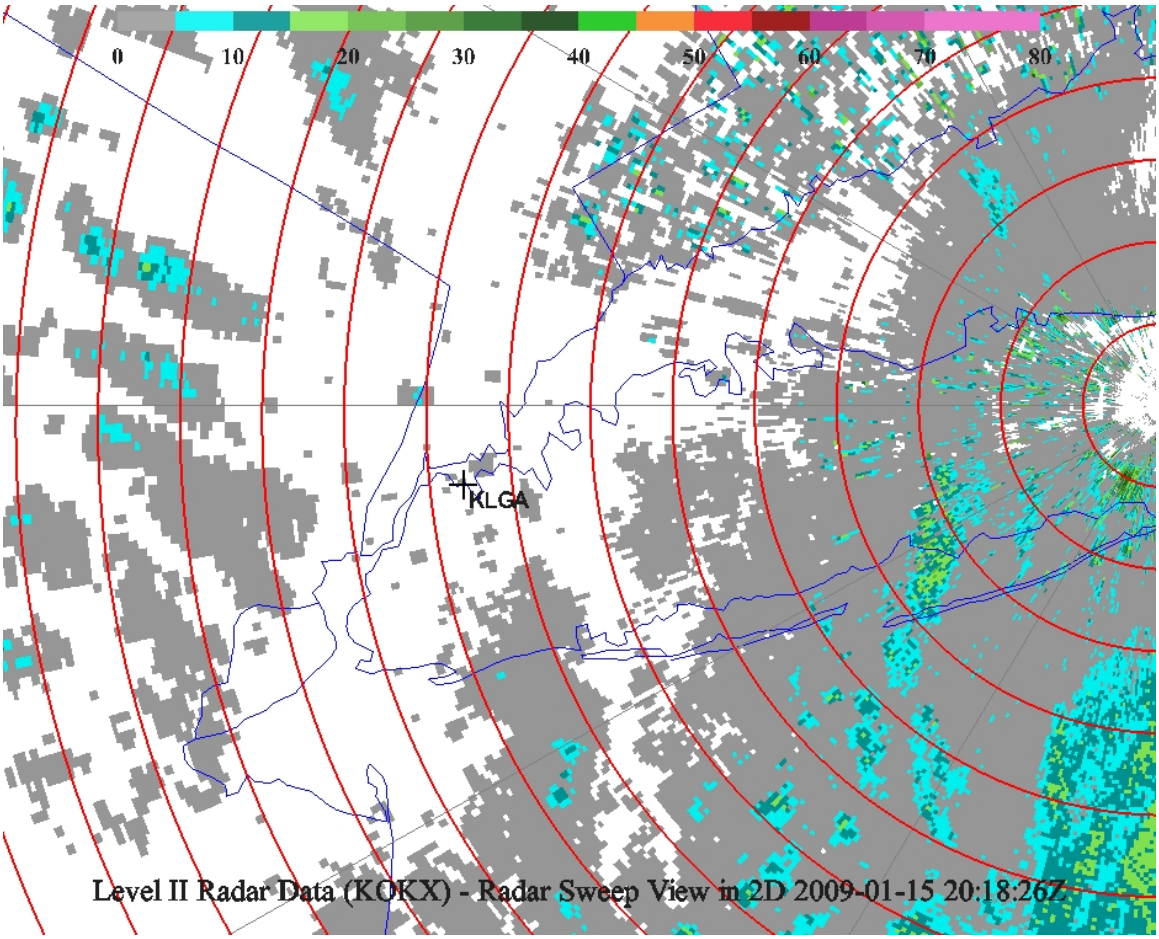
1543	2,000	327	17	-13.5
1543	1,740	329	16	-12.5
1543	1,440	---	---	-11.9
1543	1,150	---	---	-10.9
1544	920	---	---	-10.4
1544	590	---	---	-9.5
1544	300	---	---	-8.5
1544	100	---	---	-8.0
1545	-120	335	13	-7.5

5) Weather Radar Data

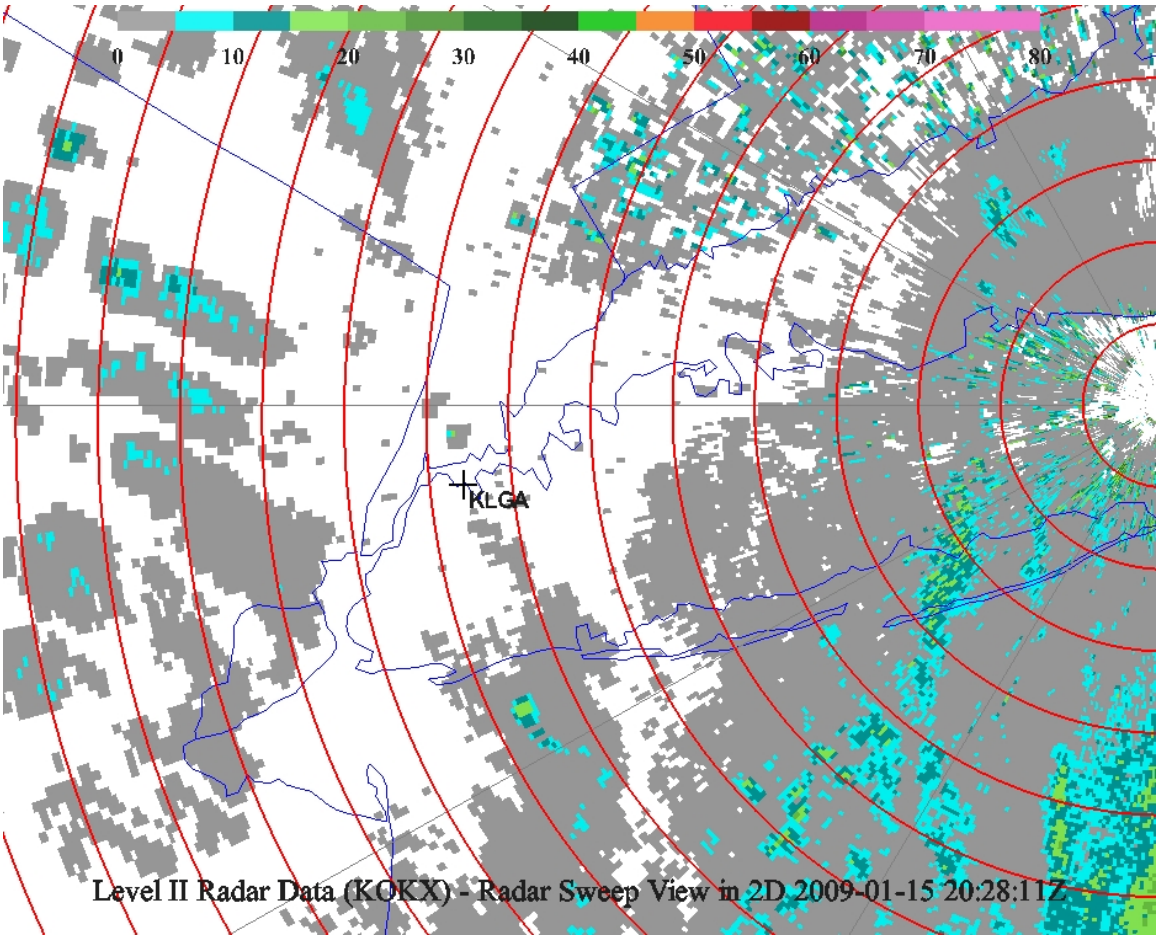
Level II Doppler weather radar data for New York City, New York (KOBX) was reviewed using McIDAS-V.

For information on McIDAS-V see: McIDAS-V

KLGA is located at 264 degrees at 45.9 nautical miles (85 kilometers) from KOKX. At a KOKX elevation angle of 0.5 degree the KOKX weather radar beam center at KLGA is at 4,030 feet and the beam width is 4,625 feet. The height of the KOKX weather radar antenna is 198 feet. The accident site is located about 265 degrees at 51.8 nautical miles (96 kilometers) from KOKX.



KOKX Base Reflectivity image for January 15, 2009 at 1518:26 EST (2018:26Z) at a 0.5 degree elevation angle. Weather radar echo intensities are in dBZ (see the color bar at the top of the image). Range rings are every 10 kilometers. Weak weather radar echoes are seen in the KLGA area.

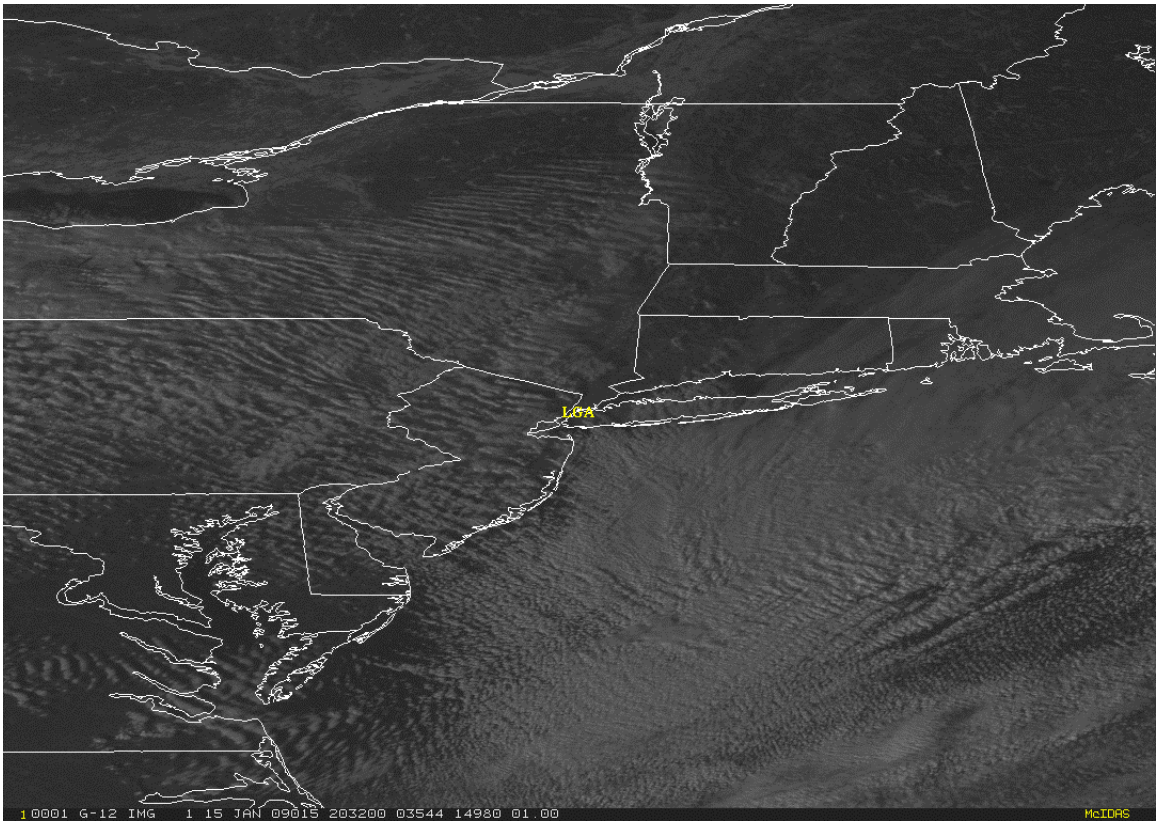


KOKX Base Reflectivity image for January 15, 2009 at 1528:11 EST (2028:11Z) at a 0.5 degree elevation angle. Weather radar echo intensities are in dBZ (see the color bar at the top of the image). Range rings are every 10 kilometers. Weak weather radar echoes are seen in the KLGA area.

6) Satellite Data

Geostationary Operational Environmental Satellite (GOES)-12 data for January 15, 2009, were reviewed using McIDAS.

For Information on McIDAS see: McIDAS



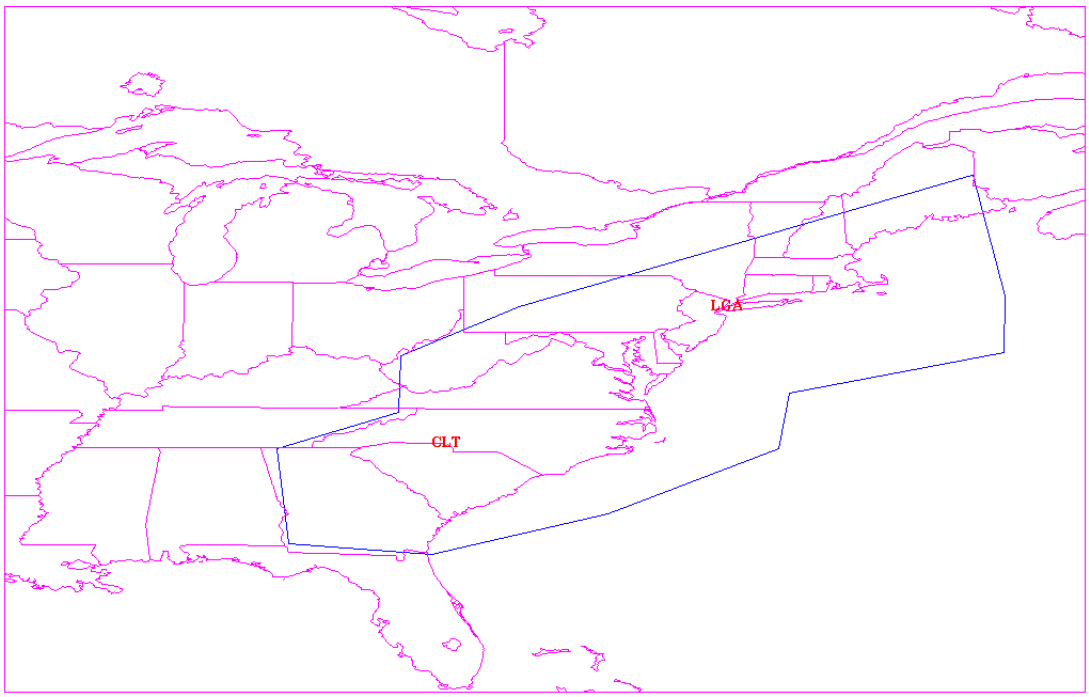
GOES-12 visible image for 1532 EST (2032Z) at a 1 kilometer resolution. The location of LGA is plotted on the image.

7) In-Flight Weather Advisories

The following AIRMETs[3] were issued by the NWS Aviation Weather Center in Kansas City, Missouri.

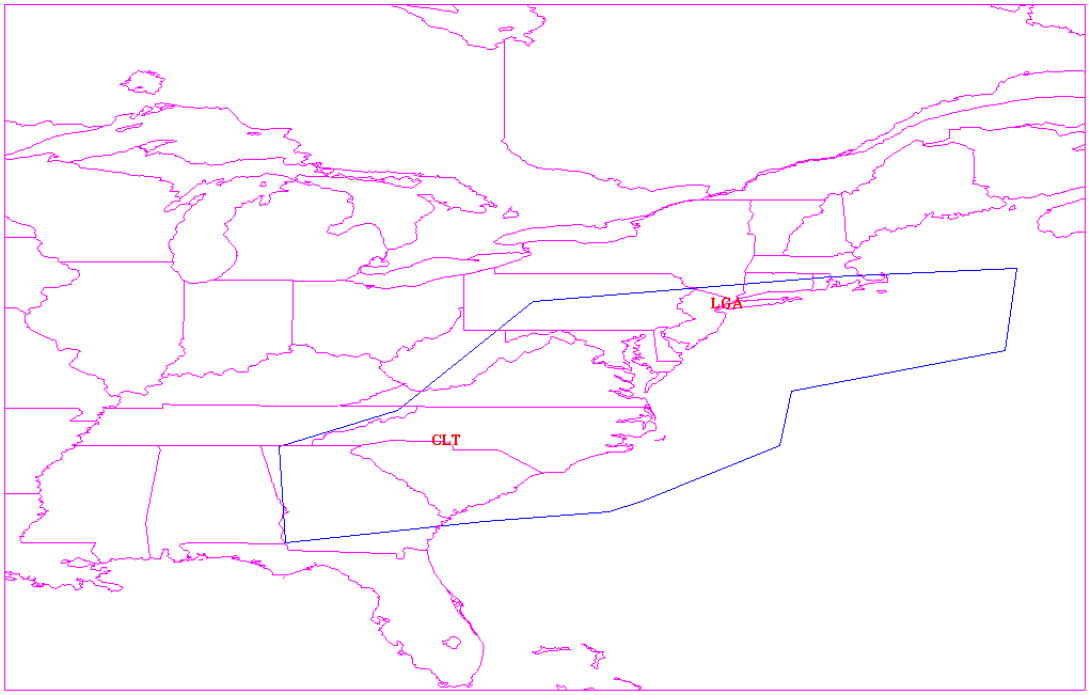
AIRMET Tango Update 2 for turbulence issued January 15, 2009 at 0945 EST (1445Z) and valid until 1600 EST (2100Z) called for moderate turbulence between flight level 21,000 feet and flight level 39,000 feet. See the plot below[4].

[3] Airmen's Meteorological Information.
[4] The location of LGA and CLT (Charlotte, North Carolina) are noted on the plots



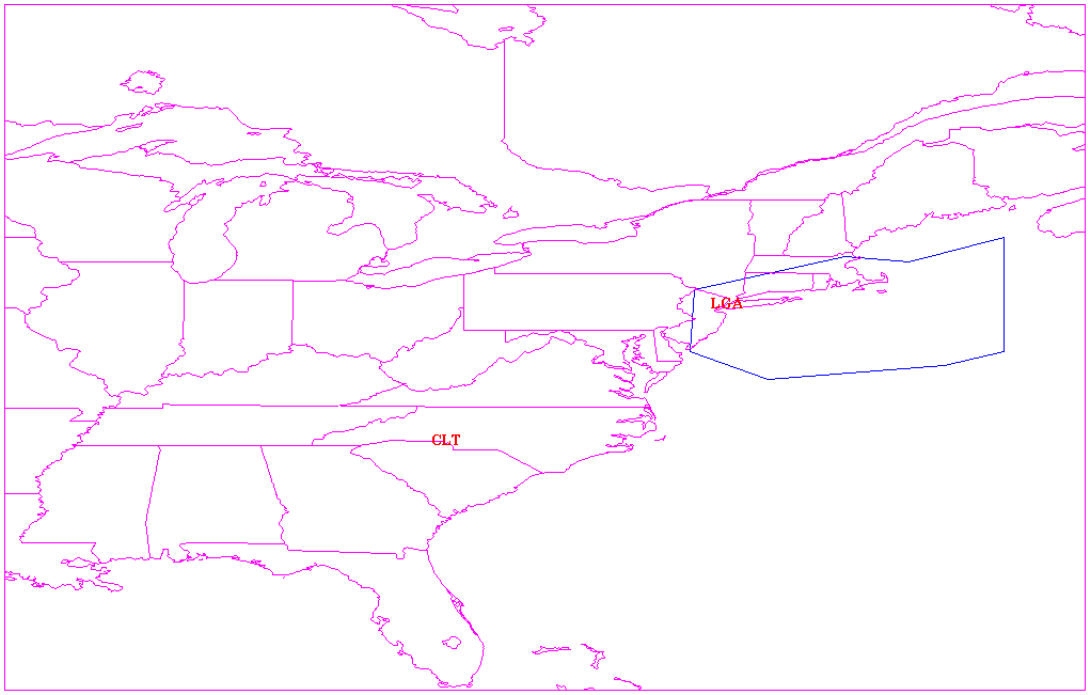
AIRMET MODERATE TURBULENCE BTN FL210 AND FL390 1445Z TO 2100Z

AIRMET Tango Update 2 for turbulence issued January 15, 2009 at 0945 EST (1445Z) and valid until 1600 EST (2100Z) called for moderate turbulence below 10,000 feet. See the plot below.



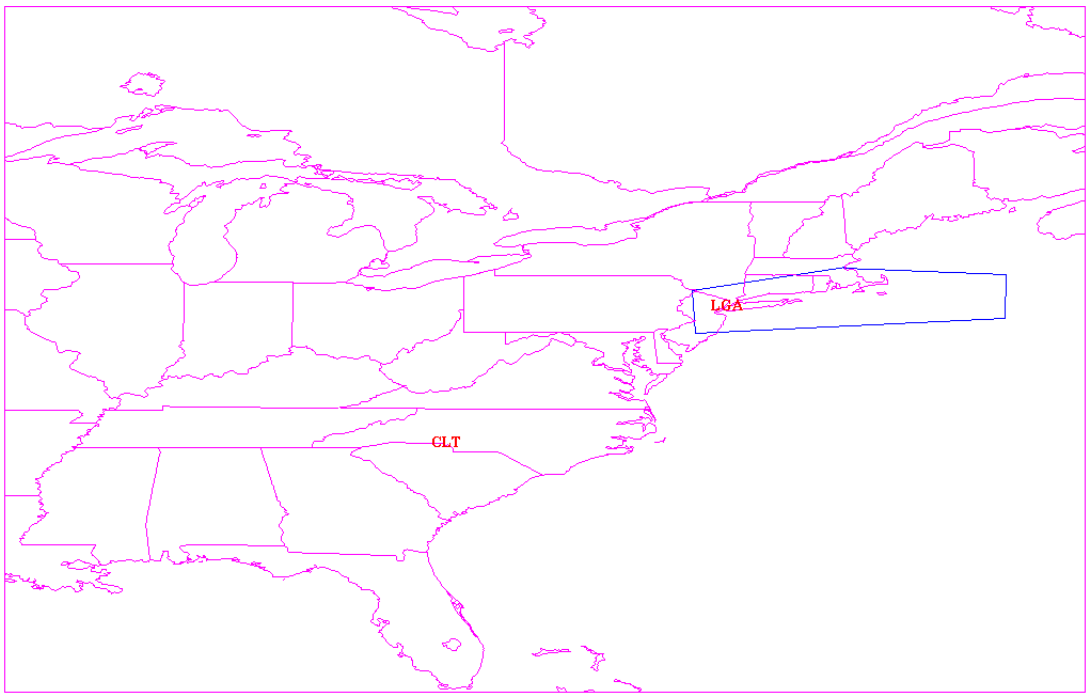
AIRMET MODERATE TURBULENCE BELOW 10,000 FEET 1445Z TO 2100Z

AIRMET Zulu update 2 for icing issued January 15, 2009 at 0945 EST (1445Z) and valid until 1600 EST (2100Z) called for moderate icing between the freezing level and 12,000 feet. See the plot below.



AIRMET MODERATE ICE BTN FRZLVL AND 12,000 FEET 1445Z TO 2100Z

AIRMET Sierra Update 2 for IFR issued January 15, 2009 at 0945 EST (1445Z) and valid until 1600 EST (2100Z) called for ceiling below 1,000 feet / visibility below 3 miles in precipitation / mist. Conditions ending 1300 EST (1800Z) to 1600 EST (2100Z). See the plot below.



AIRMET IFR 1445Z TO 2100Z

8) Astronomical Data

On January 15, 2009 at 1527 EST at the accident location the sun was at an altitude of 12.6 degrees and at an azimuth of 227.5 degrees. Sunset was at 1653 EST.

Data from: U.S. Naval Observatory

Gregory D. Salottolo
National Resource Specialist
Meteorology