Aviation Investigation Final Report

Location:	Las Vegas, Nevada	**Incident Number:**	DCA12IA096
Date & Time:	June 17, 2012, 16:08 Local	**Registration:**	N552JB
Aircraft:	Airbus A320	**Aircraft Damage:**	None
Defining Event:	Sys/Comp malf/fail (non-power)	**Injuries:**	154 None
Flight Conducted Under:	Part 121: Air carrier - Scheduled		

Analysis

Before the Airbus A320-232 departed on the incident flight, one flap control computer channel was inoperative and deferred for maintenance, which was in accordance with the Federal Aviation Administration (FAA)-approved minimum equipment list. During landing gear retraction after takeoff, the Green hydraulic system on the airplane lost pressure, and the flight warning computer detected a flight control flaps system fault followed by a reservoir overheat condition for the Yellow hydraulic system 2 minutes later. Normal inhibition of alerts and warnings from the flight warning computer prevented notification of the faults to the flight crew until the airplane was climbing out of 1,500 above ground level. The crew subsequently experienced a period of high workload as they received multiple aural and visual warnings on the flight deck.

The captain, who was the pilot flying, transferred airplane control to the first officer and began to accomplish the abnormal procedures that were displayed on the electronic centralized aircraft monitor. Accomplishing the manufacturer-recommended procedures included turning off the Green and the Yellow hydraulic systems' engine-driven pumps and the power transfer unit (PTU), resulting in low pressure in the Yellow hydraulic system (in addition to the existing low pressure in the Green hydraulic system), the airplane's reversion to alternate law in which flight envelope protections are reduced (most critically, stall protection), and autopilot and autothrust disconnection. The crew attempted to raise the flaps from position 1 (the takeoff position) to 0, but the flaps remained at position 1 because the loss of the Green hydraulic system and subsequent loss of the remaining flap control computer channel resulted in the flaps being inoperable.

At this point, of the airplane's three hydraulic systems, only the Blue hydraulic system was providing useable pressure. The flight crew coordinated with air traffic control to enter a holding pattern at 12,000 feet to accomplish checklists, communicate with company maintenance and dispatch, and calculate landing distance performance using the procedures in the quick reference handbook. During this time, the captain recognized that the Yellow hydraulic system reservoir was no longer in an overheat

condition and followed the appropriate procedures to restore the Yellow hydraulic system. It was restored about 36 minutes after takeoff and remained operative for the rest of the flight.

To calculate landing distance performance with two inoperative hydraulic systems, the captain initially calculated a required landing distance of over 11,000 feet. After recovery of the Yellow hydraulic system, the captain calculated a revised landing distance of about 8,500 feet.

The flight control flaps system fault required a higher-than-normal landing speed, and the Green hydraulic system malfunction resulted in loss of normal braking, loss of nosewheel steering on the ground, and loss of the ability to retract the landing gear once extended. Due to the system malfunctions and the inability to raise the landing gear in the event of a go-around, the flight crew decided to remain in the holding pattern to burn fuel and reduce aircraft weight below the maximum landing weight of 142,200 pounds. The airplane landed 3 hours 35 minutes after takeoff and was towed to the gate.

Postincident examination of the airplane found a leak in the Green hydraulic system, in the right main landing gear door retraction flexible hydraulic line due to a kink in the line and a collapsed sidewall. An article in the June 2007 issue of *Safety First*, Airbus' safety magazine published for use by operators' flight and ground crews, described a scenario in which a leak in the Green hydraulic system results in that system's loss of fluid, which can lead to the loss of the Yellow hydraulic system. As the hydraulic pressure decreases and reaches a 500 psi differential between the Green and Yellow system, the PTU, by design, automatically activates and operates at maximum speed in an effort to transfer pressure to the Green system. Due to low fluid levels in the Green system, the maximum speed of the PTU results in overheating and subsequent loss of the Yellow hydraulic system within about 2 minutes.

The loss of the Green hydraulic system would normally trigger a caution message that guides the flight crew to shut off the PTU. However, because the caution message was inhibited below 1,500 feet after takeoff, the PTU remained activated until the flight crew accomplished the abnormal procedures checklist.

In response to previous incidents in which a loss of pressure in the Green hydraulic system led to the overheating and subsequent loss of the Yellow hydraulic system, Airbus issued service bulletins (SB) over a period of 2 to 5 years before this incident that included wiring changes and new PTU inhibit logic. The modifications were designed to prevent dual Green and Yellow hydraulic system losses in flight (mainly after takeoff) due to a low fluid level in the Green (or Yellow) reservoir followed by overheating and loss of pressure in the other system. At the time of the event, the SBs had not been incorporated on the incident airplane. Jet Blue decided not to incorporate the SBs based on available information indicating a low probability of occurrence for this type of event.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this incident to be:

the failure of the right main landing gear door retraction flexible hydraulic line in the Green hydraulic system, which led to prolonged operation of the power transfer unit and subsequent overheating and loss

of pressure in the Yellow hydraulic system, resulting in the airplane's operation with only one hydraulic system. Contributing to the incident was the lack of incorporation of aircraft manufacturer service bulletins that describe procedures for aircraft modifications intended to prevent this occurrence.

Findings

Aircraft	Hydraulic, main system - Damaged/degraded
Aircraft	Hydraulic, main system - Capability exceeded
Aircraft	Hydraulic, main system - Inoperative
Aircraft	Unscheduled maint checks - Not installed/available

Factual Information

History of Flight

Initial climb	Sys/Comp malf/fail (non-power) (Defining event)

HISTORY OF FLIGHT

On June 17, 2012, about 1608 Pacific daylight time (PDT), JetBlue Airways flight 194, an Airbus A320-232, N552JB, experienced a loss of two of its three hydraulic systems after departure from Las Vegas McCarran International Airport (LAS), Las Vegas, Nevada. After restoring one of the lost hydraulic systems and flying a holding pattern to burn off fuel, the flight crew returned to land at LAS and the airplane was towed to the gate. The flight was operating under the provisions of Title 14 *Code of Federal Regulations* (CFR) Part 121 as a regularly scheduled passenger flight to John F. Kennedy International Airport (JFK), Jamaica, New York. Visual meteorological conditions prevailed at the time of the incident.

The incident flight was originally scheduled to depart LAS for JFK at 1500 PDT. Due to a delay on the inbound flight, which was operated by a different crew, the flight was rescheduled to depart LAS at 1545 PDT. The flight took off at 1606 PDT at a weight of 168,724 pounds, which was about 1,000 pounds below the maximum allowable takeoff weight.

During landing gear retraction after takeoff, the Green hydraulic system lost pressure and the flight warning computer detected a flight control flaps system fault followed by a reservoir overheat condition for the Yellow hydraulic system 2 minutes later. During the initial climb, a flight attendant called the cockpit and reported a loud screeching sound, which the captain perceived to be the hydraulic power transfer unit (PTU) working in "overdrive." Normal inhibition of alerts and warnings from the flight warning computer prevented notification to the flight crew until the airplane had climbed out of 1,500 above ground level; after which, the pilots experienced a period of high workload as they received multiple aural and visual warnings on the flight deck after climbing through about 1,760 feet above ground level.

The captain, who was the pilot flying, transferred airplane control to the first officer and began to accomplish the abnormal procedures that were displayed on the electronic centralized aircraft monitor (ECAM). Accomplishing the procedures included turning off the Green and Yellow hydraulic systems' engine-driven pumps and the PTU. This action resulted in Yellow hydraulic system low pressure (in addition to the already lost Green hydraulic pressure), the airplane's reversion to alternate law in which flight envelope protections are reduced, and autopilot and autothrust disconnection. The crew attempted to raise the flaps from position 1 (the takeoff position) to 0, but the flaps remained at position 1.

At this point, of the airplane's three hydraulic systems, only the Blue system was providing useable pressure. The crew coordinated with air traffic control to enter a holding pattern at 12,000 feet to accomplish checklists and communicate with company maintenance and dispatch. During this time, the Yellow hydraulic system was recovered and the flight operated with both the Blue and the Yellow

hydraulic systems for the remainder of the flight. The captain stated during post incident interviews that there was some uncertainty regarding the position of the flaps, as the flap position indicator on the flight deck appeared to be locked between 0 and 1.

The captain used the procedures in the quick reference handbook to calculate landing distance performance and initially calculated a required landing distance of over 11,000 feet considering two hydraulic systems to be inoperative. After the Yellow system was recovered, the captain calculated a revised landing distance of about 8,500 feet.

The flaps system fault required a higher-than-normal landing speed, and the Green hydraulic system malfunction resulted in loss of normal braking, loss of nosewheel steering on the ground, and loss of the ability to retract the landing gear once extended. Due to the system malfunctions and the inability to raise the landing gear in the event of a go-around, the flight crew decided to remain in the holding pattern to burn fuel and reduce aircraft weight below the maximum landing weight of 142,200 pounds. The flight landed at LAS at 1937 PDT at a weight of 140,640 pounds, and the airplane was towed to the gate where the passengers and crew deplaned via a jetway to the airport terminal.

INJURIES TO PERSONS

There were no injuries to the 149 passengers and 5 crewmembers (2 pilots and 3 flight attendants) on board.

DAMAGE TO AIRPLANE

The airplane sustained minor damage to the hydraulic system.

PERSONNEL INFORMATION

The captain, age 36, was hired by JetBlue in March 2006 and upgraded to captain on the A320 in July 2011. At the time of the incident, he was based in New York.

According to company records, the captain had logged 9,187 hours total flight time, including 4,687 hours in the A320 with 510 hours as pilot-in-command on the A320. FAA records indicated no history of previous accidents or incidents involving the captain.

The captain held a valid Federal Aviation Administration (FAA) airline transport pilot (ATP) certificate with type ratings for the A320, CL-65, ERJ-170, and ERJ-190 and a current FAA first-class medical certificate with a limitation that he must wear corrective lenses. Training and proficiency checks were current and there was no record of failures during company training events.

Company records indicated that the captain had logged 5 hours flight time in the 24 hours before the incident and had logged 16, 29, and 91 hours in the previous 7, 30, and 90 days, respectively.

The captain had been on duty during the 3 days preceding the incident. He reported for duty at 1410 PDT on the day of the incident and, although he could not recall at what time he had gone to sleep each of the three previous nights, stated in post incident interviews that he had not felt tired.

The first officer, age 54, was hired by JetBlue on the A320 in March 2006 and was based in New York.

Company records indicated the first officer had logged 13,700 hours total flight time, including 4,800 hours as second-in-command in the A320. He had also logged 2,500 hours as pilot-in-command. FAA records indicated no history of previous accidents or incidents involving the first officer.

The first officer held a valid ATP certificate with type ratings for the A320, B707, B720, CL-65, ERJ-170, and ERJ-190 and a current FAA first-class medical certificate with a limitation indicating he must wear corrective lenses. According to company records, the first officer had logged 5 hours flight time in the 24 hours before the incident and had logged 16, 85, and 240 hours in the previous 7, 30, and 90 days respectively.

The first officer had been on duty, flying with the incident captain, for the 2 days preceding the incident. He could not recall his sleep and wake times in the 3 days before the incident but stated that he usually slept for 7 to 8 hours each night.

The incident occurred on the first leg of the last day of a 3-day trip. The incident flight was the only flight leg planned for the pilots that day.

AIRCRAFT INFORMATION

The incident airplane, manufacturer serial number 1861, is an Airbus A320-232 equipped with two International Aero Engines V2500 turbofan engines. The airplane had logged about 38,705 hours total time on the airframe, and the most recent inspection was conducted on June 13, 2012, as part of the operator's continuous airworthiness maintenance program. Company records indicated that the airplane was operated on the incident flight with a deferred maintenance item. The slat/flap control system 2 flap channel was inoperative and deferred in accordance with the FAA-approved minimum equipment list.

Hydraulic System

The aircraft has three main hydraulic systems identified as the Green, Blue, and Yellow systems. The three systems are not hydraulically connected but together supply hydraulic power at 3,000 pounds per square in (psi) to the main power users; flight controls, thrust reversers, cargo doors, landing gear, brakes, and nosewheel steering. Reservoirs for each system are pressurized by bleed air from the pneumatic system to ensure a sufficient supply of hydraulic fluid to the pumps.

Each system is pressurized by one main pump: the Green system by an engine-driven pump connected to the left engine, the Yellow system by an engine-driven pump connected to the right engine, and the Blue system by an electric pump that operates when at least one engine is running.

Post incident examination of the airplane found a leak in the right main landing gear door retraction flexible hydraulic line in the Green hydraulic system.

Power Transfer Unit

The aircraft has a PTU to transfer power between the Green and Yellow hydraulic systems. The connection between the two systems is mechanical and no fluid is transferred between them. The PTU is armed when the hydraulic systems are pressurized and automatically operates when there is a pressure difference of 500 psi or more between the Green and Yellow systems.

Flap/Slat System

There are two flap and five slat surfaces on each wing. These surfaces are electrically controlled, hydraulically actuated, and receive control signals transmitted from two slat flap control computers (SFCC), which each contain one slat channel and one flap channel. The slats are powered by both the Green and Blue hydraulic systems while the flaps are powered by the Green and Yellow hydraulic systems.

In the event of a failure of both SFCC channels or failure of both the Green and the Yellow hydraulic systems, the flaps will be locked in the position attained at time of failure.

Flap system 1 was controlled by SFCC channel 1 and powered by the Green hydraulic system. Flap system 2 was controlled by SFCC channel 2 and powered by the Yellow hydraulic system. The incident flight was dispatched with the SFCC flap channel 2 inoperative in accordance with FAA-approved procedures and was therefore operating with flap control capability through only SFCC channel 1 powered by the Green hydraulic system.

Electronic Centralized Aircraft Monitor

The ECAM presents data on the engine/warning display and the systems display located on the flight deck instrument panel.

Flight warning computers generate alert messages, memos, aural alerts, and voice messages presented on the ECAM displays and annunciated through speakers on the flight deck. Some alerts are inhibited during high workload phases of flight such as during takeoff and initial climb up to 1,500 feet above ground level. Alerts inhibited during this phase of flight are then presented after the airplane has climbed above 1,500 feet.

METEOROLOGICAL INFORMATION

From the time of takeoff and during the time the airplane was holding, LAS surface observations reported wind from the southwest at about 11 to 13 knots with gusts about 22 to 24 knots. The LAS surface observation at 1856 PDT, the most recent observation at the time of landing, reported wind from

220 degrees at 14 knots, visibility 10 statute miles, clear skies, temperature 39 degrees Celsius, dew point temperature minus 11 degrees Celsius, and altimeter 29.74 inches mercury.

The flight crew stated that the flight encountered turbulence while holding and data obtained from the airplane's quick access recorder (QAR) indicated vertical accelerations varied between about 0.7 to about 1.5 G during the flight.

COMMUNICATIONS

No communications problems with air traffic control were noted during the incident.

The flight crew used both radio and aircraft communications addressing and reporting system (ACARS) to communicate with the company dispatcher. The communications via radio were conducted via a phone patch through Aeronautical Radio Incorporated. Interviews indicated the quality of the radio transmissions was poor and the captain had to keep repeating his transmissions to be heard.

AIRPORT INFORMATION

McCarran International Airport is located 5 miles south of Las Vegas, Nevada, at an elevation of 2,181 feet. The airport conducts operations using eight runways for commercial and general aviation. The landing runway, 25R, is asphalt, 150 feet wide and 14,510 feet long with a displaced threshold of 1,397 feet and has a declared available landing distance of 12,755 feet with a touchdown zone elevation of 2,033 feet. The runway is served by a 4-light precision approach path indicator system with a 3-degree glidepath on the left side of the runway, and a medium intensity approach light system with runway alignment indicator lights.

FLIGHT RECORDERS

The data from the cockpit voice recorder and the flight data recorder were overwritten by subsequent flights and no data were obtained for the incident flight.

Data from the QAR and the Airbus Maintenance Analysis (AIRMAN) report were obtained to assist in identifying the sequence of events. Events recorded by the AIRMAN system were transmitted via the ACARS to the company maintenance facility.

The landing gear was selected up after takeoff at 1605:51 local time. During the next minute, a flight control flaps fault, hydraulic Green system low pressure, hydraulic Green system engine pump low pressure, and flight control system flaps system 2 fault were recorded.

At 1606:43, a Green system low pressure fault was recorded followed by a flap fault message and at 1608:09, the autopilot and autothrust disengaged and a hydraulic Yellow system reservoir overheat was recorded.

At 1609:23 a hydraulic Yellow system low pressure was recorded. At 1641:53, the Yellow system pressure was recorded as not low and remained in that condition for the rest of the flight.

ORGANIZATIONAL AND MANAGEMENT INFORMATION

JetBlue Airways Corporation, doing business as JetBlue Airways, is certificated as a 14 CFR Part 121 air carrier and is headquartered in Long Island City, New York. As of December 31, 2011, the company employed almost 12,000 employees, operated about 700 flights a day, and served 70 cities in 22 states and international destinations. JetBlue has operated the Airbus A320 since beginning service in February 2000. As of June 30, 2012, the company's fleet consisted of 175 airplanes, including 123 Airbus A320-232s.

The incident airplane is owned by Wells Fargo Bank Northwest NA trustee and operated by JetBlue Airways Corporation for common carrier passenger operations.

ADDITIONAL INFORMATION

Training

The company provided training to flight crews for hydraulic system malfunctions and failures during qualification training (QT) and during continuing qualification training (CQT). However, crews only received training on dual hydraulic system malfunctions during QT. At the time of the incident, CQT training focused on single system hydraulic malfunctions. Although interviews with company training management indicated that the company conducted training for multiple emergencies, the captain could not recall when he had received that training.

History of Occurrence and Corrective Actions

An article in the June 2007 issue of *Safety First*, Airbus' safety magazine published for use by operators' flight and ground crews, described a scenario in which a leak in the Green hydraulic system can lead to the loss of the Yellow hydraulic system. In this scenario, a leak in the Green system results in that system's loss of fluid; as the hydraulic pressure decreases and reaches a point of 500 psi differential between the Green and Yellow system, the PTU, by design, automatically activates and operates at maximum speed in an effort to transfer pressure to the Green system. Due to low fluid levels in the Green system, the maximum speed operation of the PTU results in overheating and subsequent loss of the Yellow hydraulic system within about 2 minutes.

The loss of the Green hydraulic system would normally trigger a caution message that guides the flight crew to shut off the PTU. However, this caution message is inhibited when the airplane is below 1,500 feet; as a result, the PTU remains activated.

In response to previous incidents in which this scenario occurred, and before the incident involving JetBlue flight 194, Airbus issued four service bulletins outlining corrective actions that will automatically inhibit operation of the PTU in the event of a loss of the Green or Yellow hydraulic systems resulting from hydraulic fluid leaking. Service Bulletin (SB) A320-29-1115 was issued on

February 20, 2007, and revision 3 was issued on July 23, 2010. SB A320-29-1147 was issued on July 23, 2010, and revision 1 was issued on March 3, 2011. Accomplishing either of these SBs, depending on aircraft effectivity, introduces wiring provisions for new PTU inhibit logic.

Service Bulletin SB A320-29-1126 was issued on May 15, 2007, and revision 2 was issued on July 23, 2010. Service Bulletin SB A320-29-1145 was issued on December 11, 2008. Accomplishing either of these SBs, depending on aircraft effectivity, activates the PTU inhibit logic introduced by SB A320-29-1115 or SB A320-29-1147 or the equivalent production modifications.

The new PTU inhibit logic was designed to prevent dual Green and Yellow hydraulic system losses in flight (mainly at takeoff) due to a low fluid level in the Green (or Yellow) reservoir followed by overheating and loss of pressure in the other system. The PTU inhibit logic introduced by the aforementioned SBs is available when both engines are running and the airplane is in flight, stays activated with one engine running, and is deactivated only once the airplane is on the ground or when both engines are stopped. The PTU inhibit logic is activated when the Green (or Yellow) hydraulic system low pressure condition is detected for more than 6 seconds. This new PTU inhibit logic will automatically switch off the PTU before it comes to a high speed running condition resulting in triggering of the Yellow (or Green) reservoir overheat warning.

At the time of the event, SBs A320-29-1115, A320-29-1147, A320-29-1126, or A320-29-1145, had not yet been incorporated on the incident airplane.

Subsequent to the JetBlue incident, Airbus developed an optimized retrofit solution that includes both the wiring provisions and the logic activation. This retrofit was covered under SB A320-29-1156, which was issued on October 16, 2012. The new PTU inhibit logic is armed when the airplane is in flight and when both engines have been started, stays armed with one engine running, and is deactivated only once the airplane is on the ground or both engines are stopped.

Previous Recommendations

Following the in-flight engine fire accident involving American Airlines flight 1400 in St Louis, Missouri, on September 28, 2007, the NTSB issued Safety Recommendations A-09-24 and -25 to the FAA regarding pilot handling of multiple emergencies or abnormal situations. The recommendations were as follows:

- Establish best practices for conducting both single and multiple emergency and abnormal situations training. (A-09-24)

- Once the best practices for both single and multiple emergency and abnormal situations training asked for in Safety Recommendation A-09-24 have been established, require that these best practices be incorporated into all operators' approved training programs. (A-09-25)

In response to the recommendations, the FAA published a notice of proposed rulemaking titled "Qualifications, Service, and Use of Crewmembers and Aircraft Dispatchers" that would require 14 CFR Part 121 certificated operators to incorporate scenario-based training into their training programs. The proposed rule became policy effective March 12, 2014, requiring compliance by operators no later than

March 2019. However, the policy specified a scenario-based training requirement only for stall prevention training. The NTSB classified the recommendations "Closed Unacceptable Action."

Pilot Information

Certificate:	Airline transport; Flight instructor	**Age:**	36
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	November 21, 2011
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	May 29, 2012
Flight Time:	9187 hours (Total, all aircraft), 4687 hours (Total, this make and model)		

Co-pilot Information

Certificate:	Airline transport	**Age:**	54
Airplane Rating(s):	Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	October 4, 2011
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	January 6, 2012
Flight Time:	13700 hours (Total, all aircraft), 4800 hours (Total, this make and model), 2500 hours (Pilot In Command, all aircraft), 240 hours (Last 90 days, all aircraft), 85 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Airbus	**Registration:**	N552JB
Model/Series:	A320 232	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Transport	**Serial Number:**	1861
Landing Gear Type:	Retractable - Tricycle	**Seats:**	160
Date/Type of Last Inspection:	June 13, 2012 Continuous airworthiness	**Certified Max Gross Wt.:**	170635 lbs
Time Since Last Inspection:		**Engines:**	2 Turbo fan
Airframe Total Time:	38705 Hrs at time of accident	**Engine Manufacturer:**	IAE
ELT:	Installed, not activated	**Engine Model/Series:**	V2527
Registered Owner:	WELLS FARGO BANK NORTHWEST NA TRUSTEE	**Rated Power:**	27000 Lbs thrust
Operator:	JETBLUE AIRWAYS CORPORATION	**Operating Certificate(s) Held:**	Flag carrier (121)
Operator Does Business As:	JetBlue Airways	**Operator Designator Code:**	YENA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	LAS,2181 ft msl	**Distance from Accident Site:**	
Observation Time:	15:56 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Few / 14000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	11 knots / 23 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	240°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.78 inches Hg	**Temperature/Dew Point:**	40°C / -8°C
Precipitation and Obscuration:			
Departure Point:	Las Vegas, NV (LAS)	**Type of Flight Plan Filed:**	IFR
Destination:	New York, NY (JFK)	**Type of Clearance:**	IFR
Departure Time:	16:00 Local	**Type of Airspace:**	Class B

Airport Information

Airport:	Las Vegas McCarran Internation LAS	**Runway Surface Type:**	Asphalt
Airport Elevation:	2181 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	25R	**IFR Approach:**	ILS
Runway Length/Width:	14510 ft / 150 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	5 None	**Aircraft Damage:**	None
Passenger Injuries:	149 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	154 None	**Latitude, Longitude:**	40.759628,-73.710739(est)

Administrative Information

Investigator In Charge (IIC):	Helson, David
Additional Participating Persons:	
Original Publish Date:	March 25, 2015
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=84047