FAA IIC Inspector's Statement

Accident Narrative, N207JB, 5/23/2012

Operating under 14 CFR Part 91, the 1996 Bombardier Challenger 601-3R aircraft, s/n 5194, registered as N207JB and operated by Majestic Jet, Inc (1M9A), was fueled, and departed from the Miami Opa Locka Airport (OPF) at 15:45 for a planned 10 minute repositioning flight to its base at Pompano Airpark (PMP), FL. The flight was filed on an IFR flight plan, via a direct routing. Only the two required crew members were on board.

About five minutes after takeoff, while in cruise flight at an altitude of 3,000 feet MSL, and a cruise speed of about 230 KIAS the crew reported the Main Cabin Door of the aircraft opened and departed the aircraft. The crew attempted to declare an emergency with Miami Approach Control, who was working the flight, and set Code 7600 in the Transponder, but the door had damaged the #2 VHF Communications Antenna when it departed the aircraft, and their call was never heard. The crew reported that the wind noise in the cockpit made voice communications almost impossible. The First Officer (FO) was flying the aircraft in VMC conditions at the time. The Captain, looking outside and seeing the Ft. Lauderdale-Hollywood International Airport (FLL) beneath them, made the decision to divert there and assumed control of the aircraft.

Radio contact was again attempted with FLL Tower, but was unsuccessful. The pilot overflew the airport to the North, and entered a wide, left hand pattern for Runway 9L, visually clearing the traffic pattern. Not seeing any aircraft in the pattern or on the runway, he established the Challenger on a three-mile final for 9L and completed a normal landing. The Captain cleared the runway and was met by an airport operations vehicle, which guided him to the Bombardier Service Center ramp at FLL.

Noting the 7600 transponder code, MIA Approach Control had notified FLL Tower of the inbound aircraft, and the Tower held one outbound Air Carrier aircraft short of 9L until the Challenger was safely clear of the runway.

The door, and some of its components, landed on the Westin Diplomat Hotel Golf Course, in a position of 25 59' 18" N, 080 07' 52" W, about 4 miles South of FLL. The Course was closed at the time, and there were no injuries or damage from the door reported.

The IIC was notified at about 6PM that evening that the door had been located and was secured by the Hallandale, FL Police Department. The IIC made arrangements for the door to be recovered and the door and some components, which had landed nearby, were delivered the following morning to the Bombardier facility at FLL, where the aircraft had been secured pending an investigation.

The manufacturer, upon learning of the event, contacted the NTSB and requested to be a Party to the investigation. The IIC was informed that NTSB involvement would be Limited in nature. With the concurrence of the NTSB, the IIC accepted the request and invited the manufacturer to serve as a technical advisor and party to the investigation.

The Team consisted of the following individuals:

Ralph Hicks, Senior Investigator, NTSB, Atlanta, GA

Larry Hazel, Principal Operations Inspector, FAA FSDO SO-19, Miramar, FL, IIC

Michael O'hannesian, Principal Airworthiness Inspector, FAA FSDO SO-19, Miramar, FL, and PMI for the operator, Majestic Jet (1M9A)

Jimmy Avgoustis, Senior Air Safety Investigator, Bombardier Aerospace, Montreal, PQ, Canada

Keith Wood, Airframe Structural Engineer, Bombardier Aerospace, Montreal, PQ, Canada

The Team, minus Mr. Hicks, convened at the Bombardier FLL facility on the morning of 5/24. N207JB had been secured in their hangar overnight, and the facility Manager took appropriate steps to insure the aircraft was not disturbed prior to the Team's arrival. An in-depth examination of the airframe and door structure commenced, and over the course of the next three days, the following factual information was determined:

1. The hinge for the main passenger door was relatively intact, remained attached to the airframe, and operated smoothly. The door separated from the hinge along the rivet line which secured the door to the hinge.

2. The main passenger door upper half was found crushed from what is believed to be ground impact.

3. The lower forward and aft door roll latches were found in the unlocked position with no damage, and operated smoothly.

4. The upper forwarded and aft door roll latches were found in the unlocked position with no damage and operated smoothly.

5. No damage was observed on the 2 upper and 2 mid fuselage mounted spigots

6. No damage was observed on the 2 forward and 2 aft tension buttons.

7. No damage was observed on the forward and aft fuselage mounted door proximity sensors.

8. The control rod connecting the upper and lower roll latches was found crushed inside the air stair structure. Dents on the upper and lower surfaces of the control rod corresponded with internal door structure, and the location of the dents corresponded with the position the rod would be at if the door locking mechanism was in the unlocked position at the time the door impacted the ground.

9. The forward and aft door pull in levers were found with no damage.

10. The forward and aft door pull in lever stops were found with no damage.

11. The external door assist handle was found to be stowed flush with the external door surface under spring tension, but unsecured, with a bend at the lower 25% of the length causing the handle end to protrude from its housing in the door.

12. The fuselage beneath the door hinge was found to have a penetration aligned with the external door assist handle.

13. The external door "T" handle was found deployed, and in the unlocked position.

14. The fuselage immediately beneath the door had an impression similar to the “T” handle, and was at an angle aligned to the position that the “T” handle would be in when the door is unlocked.

15. The main passenger door “T” handle housing was found to have two strike marks.

16. No damage was observed on the main passenger door “T” handle other than the two strike marks mentioned above.

17. A small indentation in the external door skin was observed below the main passenger door “T” handle. This indentation corresponded to the location of a pin on the back side of the “T” handle, and was in a location that would have been made if the “T” handle were in the open and unlocked position, and was forced against the door skin.

18. The door’s ground support foot was found broken. The foot was located very near the door landing site.

19. The upper half of the main passenger door has a puncture on the outer skin in line with the gas spring mounting support beam.

20. The right side fuselage, just forward of the belly fairing, has a depression similar in size and shape to the door’s ground support foot.

21. The right inboard leading edge has a minor gouge.

22. The left fuselage, just aft and above the main passenger door area, has several scuff marks.

23. The left side of the vertical stabilizer has several scuff marks.

The design of the door locking mechanism utilizes two roller cam latches to hold the door in the closed position until the locking mechanism can be engaged by the crew. These roller cam latches engage when the door is almost fully closed against the pressure seal on the door. They will not keep the door closed in flight against the cabin pressurization differential.

At 3,000 feet MSL, with the cabin pressure controller set to Auto, manufacturer’s data indicates the cabin would be pressurized to about 1.5“hg.

Statements from the crew indicate it was the FO who closed, and locked, the door prior to flight. The crew reported no problems with the door or door warning system prior to the accident flight. The crew denied pulling the Door Warning circuit breakers. During the second interview of the F/O, he stated that he “believed” the door warning lights were working, but could not positively recall seeing the green “Door Safe” light illuminated after closing the door, nor did he recall activating the Master Warning System “Recall” switch prior to takeoff.

The F/O was employed by Majestic Jet since 10/21/2011. Prior to being assigned the F/O position on the Challenger in February, 2012, he had previously worked for the company as a F/O on Lear Jet series aircraft. His resume, provided by the company, indicates his total flying time when hired was 2100 hours, with no experience in pressurized or turbine-powered aircraft. The Training record provided by the company indicates the F/O completed Initial in-house training in the CL-601 on 2/25/2012. The aircraft systems ground and flight training was performed by the Captain of the aircraft. Training records do not indicate any training having been provided specifically in operation

of the Main Door. Company flight logs indicate the F/O had served as a required crewmember on 14 flights prior to the accident flight, logging 19.9 hours in Make and Model. The F/O stated he had never received any formal training on the Challenger other than what was provided by the Captain.

The Captain was a contract pilot employed part time by Majestic Jet who began working for the company in July of 2011. His resume indicates he had 11,900 hours of Total Time, with 11,500 of that being in various turbojets, of which 2900 hours were in the Challenger. His company training record indicates he also completed Initial Company training in the CL-601 on 2-25-2012. His training was provided by the company DO. His records further indicate he completed FlightSafety International's Challenger 600 Series 61.58 Recurrent PIC Course at the Montreal Learning Center on Sep. 21, 2010.

From these facts, the following conclusions were drawn:

1. The aircraft systems training provided to the F/O by the Captain was minimal, and inadequate for a complex, transport category turbine-powered aircraft like the CL-601, but met current regulatory requirements for operations under 14 CFR Part 91.

2. There was no evidence of a pre-existing structural failure affecting the ability of a crewmember to lock the door, nor was there evidence of an in-flight structural failure leading to an uncommanded door opening in flight.

3. The IIC concludes the door was not properly locked by the F/O prior to flight.

-23 Block 33, Narrative

N207JB DEPARTED FROM OPF AT 15:45 FOR A PLANNED 10 MINUTE REPOSITIONING FLIGHT TO ITS BASE AT PMP. THE FLIGHT WAS FILED ON AN IFR FLIGHT PLAN. TWO REQUIRED CREW MEMBERS WERE ON BOARD. ABOUT FIVE MINUTES AFTER TAKEOFF, WHILE IN CRUISE FLIGHT AT AN ALTITUDE OF 3,000 FEET MSL, AND A CRUISE SPEED OF ABOUT 230 KIAS THE CREW REPORTED THE MAIN CABIN DOOR OF THE AIRCRAFT OPENED AND DEPARTED THE AIRCRAFT. THE FIRST OFFICER (FO) WAS FLYING THE AIRCRAFT IN VMC CONDITIONS AT THE TIME. THE CAPTAIN, LOOKING OUTSIDE AND SEEING THE FT. LAUDERDALE-HOLLYWOOD INTERNATIONAL AIRPORT (FLL) BENEATH THEM, MADE THE DECISION TO DIVERT THERE AND ASSUMED CONTROL OF THE AIRCRAFT.

THE DOOR, AND SOME OF ITS COMPONENTS, LANDED ON THE WESTIN DIPLOMAT HOTEL GOLF COURSE, IN A POSITION OF 25 59' 18" N, 080 07' 52" W, ABOUT 4 MILES SOUTH OF FLL. THE COURSE WAS CLOSED AT THE TIME, AND THERE WERE NO INJURIES OR DAMAGE FROM THE DOOR REPORTED. THE DOOR AND SOME COMPONENTS WHICH HAD LANDED NEARBY, WERE SECURED AND DELIVERED THE FOLLOWING MORNING TO THE BOMBARDIER FACILITY AT FLL, WHERE THE AIRCRAFT HAD BEEN SECURED PENDING AN INVESTIGATION.

THE MANUFACTURER, UPON LEARNING OF THE EVENT, CONTACTED THE NTSB AND REQUESTED TO BE A PARTY TO THE INVESTIGATION. THE IIC WAS INFORMED THAT NTSB INVOLVEMENT WOULD BE LIMITED IN NATURE. WITH THE CONCURRENCE OF THE NTSB, THE IIC ACCEPTED THE REQUEST AND INVITED THE MANUFACTURER TO SERVE AS A TECHNICAL ADVISOR AND PARTY TO THE INVESTIGATION.

THE FOLLOWING FINDINGS WERE SIGNIFICANT:

1. THE HINGE FOR THE MAIN PASSENGER DOOR WAS RELATIVELY INTACT, REMAINED ATTACHED TO THE AIRFRAME, AND OPERATED SMOOTHLY. THE DOOR SEPARATED FROM THE HINGE ALONG THE RIVET LINE WHICH SECURED THE DOOR TO THE HINGE.

2. THE MAIN PASSENGER DOOR UPPER HALF WAS FOUND CRUSHED FROM WHAT IS BELIEVED TO BE GROUND IMPACT.

3. THE LOWER FORWARD AND AFT DOOR ROLL LATCHES WERE FOUND IN THE UNLOCKED POSITION WITH NO DAMAGE, AND OPERATED SMOOTHLY.

4. THE UPPER FORWARDED AND AFT DOOR ROLL LATCHES WERE FOUND IN THE UNLOCKED POSITION WITH NO DAMAGE AND OPERATED SMOOTHLY.

5. NO DAMAGE WAS OBSERVED TO ANY OF THE FUSELAGE MOUNTED DOOR LOCKING STRUCTURE, NOR WAS ANY DAMAGE FOUND ON THE FORWARD AND AFT FUSELAGE MOUNTED DOOR PROXIMITY SENSORS.

7. THE CONTROL ROD CONNECTING THE UPPER AND LOWER ROLL LATCHES WAS FOUND CRUSHED INSIDE THE AIR STAIR STRUCTURE. DENTS ON THE UPPER AND LOWER SURFACES OF THE CONTROL ROD CORRESPONDED WITH INTERNAL DOOR STRUCTURE, AND THE LOCATION OF THE DENTS CORRESPONDED WITH THE POSITION THE ROD WOULD BE AT IF THE DOOR LOCKING MECHANISM WAS IN THE UNLOCKED POSITION AT THE TIME THE DOOR IMPACTED THE GROUND.

8. THE FUSELAGE BENEATH THE DOOR HINGE WAS FOUND TO HAVE A PENETRATION ALIGNED WITH THE EXTERNAL DOOR ASSIST HANDLE.

9. THE EXTERNAL DOOR “T” HANDLE WAS FOUND DEPLOYED, AND IN THE UNLOCKED POSITION.

10. THE FUSELAGE IMMEDIATELY BENEATH THE DOOR HAD AN IMPRESSION SIMILAR TO THE “T” HANDLE, AND WAS AT AN ANGLE ALIGNED TO THE POSITION THAT THE “T” HANDLE WOULD BE IN WHEN THE DOOR IS UNLOCKED.

11. THE CIRCUIT BREAKERS FOR THE DOOR WARNING SYSTEM, LOCATED ON THE COPILOT’S B OUTBOARD (#160) AND D (#17) CIRCUIT BREAKER PANELS WERE OPEN.

43 Brief Explanation Of Issues Involved

THE DESIGN OF THE DOOR LOCKING MECHANISM UTILIZES TWO ROLLER CAM LATCHES TO HOLD THE DOOR IN THE CLOSED POSITION UNTIL THE LOCKING MECHANISM CAN BE ENGAGED BY THE CREW. THESE ROLLER CAM LATCHES ENGAGE WHEN THE DOOR IS ALMOST FULLY CLOSED AGAINST THE PRESSURE SEAL ON THE DOOR. THEY WILL NOT KEEP THE DOOR CLOSED IN FLIGHT AGAINST THE CABIN PRESSURIZATION DIFFERENTIAL.

AT 3,000 FEET MSL, WITH THE CABIN PRESSURE CONTROLLER SET TO AUTO, MANUFACTURER’S DATA INDICATES THE CABIN WOULD BE PRESSURIZED TO ABOUT 1.5“HG.

STATEMENTS FROM THE CREW INDICATE IT WAS THE FO WHO CLOSED, AND LOCKED, THE DOOR PRIOR TO FLIGHT. THE CREW REPORTED NO PROBLEMS WITH THE DOOR OR DOOR WARNING SYSTEM PRIOR

TO THE ACCIDENT FLIGHT. THE CREW DENIED PULLING THE DOOR WARNING CIRCUIT BREAKERS. DURING THE SECOND INTERVIEW OF THE F/O, HE STATED THAT HE "BELIEVED" THE DOOR WARNING LIGHTS WERE WORKING, BUT COULD NOT POSITIVELY RECALL SEEING THE GREEN "DOOR SAFE" LIGHT ILLUMINATED AFTER CLOSING THE DOOR, NOR DID HE RECALL ACTIVATING THE MASTER WARNING SYSTEM "RECALL" SWITCH PRIOR TO TAKEOFF.

THE F/O WAS EMPLOYED BY MAJESTIC JET SINCE 10/21/2011. PRIOR TO BEING ASSIGNED THE F/O POSITION ON THE CHALLENGER IN FEBRUARY, 2012, HE HAD PREVIOUSLY WORKED FOR THE COMPANY AS A F/O ON LEAR JET SERIES AIRCRAFT. HIS RESUME, PROVIDED BY THE COMPANY, INDICATES HIS TOTAL FLYING TIME WHEN HIRED WAS 2100 HOURS, WITH NO EXPERIENCE IN PRESSURIZED OR TURBINE-POWERED AIRCRAFT. THE TRAINING RECORD PROVIDED BY THE COMPANY INDICATES THE F/O COMPLETED INITIAL IN-HOUSE TRAINING IN THE CL-601 ON 2/25/2012. THE AIRCRAFT SYSTEMS GROUND AND FLIGHT TRAINING WAS PERFORMED BY THE CAPTAIN OF THE AIRCRAFT. TRAINING RECORDS DO NOT INDICATE ANY TRAINING HAVING BEEN PROVIDED SPECIFICALLY IN OPERATION OF THE MAIN DOOR. COMPANY FLIGHT LOGS INDICATE THE F/O HAD SERVED AS A REQUIRED CREWMEMBER ON 14 FLIGHTS PRIOR TO THE ACCIDENT FLIGHT, LOGGING 19.9 HOURS IN MAKE AND MODEL. THE F/O STATED HE HAD NEVER RECEIVED ANY FORMAL TRAINING ON THE CHALLENGER OTHER THAN WHAT WAS PROVIDED BY THE CAPTAIN.

THE CAPTAIN WAS A CONTRACT PILOT EMPLOYED PART TIME BY MAJESTIC JET WHO BEGAN WORKING FOR THE COMPANY IN JULY OF 2011. HIS RESUME INDICATES HE HAD 11,900 HOURS OF TOTAL TIME, WITH 11,500 OF THAT BEING IN VARIOUS TURBOJETS, OF WHICH 2900 HOURS WERE IN THE CHALLENGER. HIS COMPANY TRAINING RECORD INDICATES HE ALSO COMPLETED INITIAL COMPANY TRAINING IN THE CL-601 ON 2-25-2012. HIS TRAINING WAS PROVIDED BY THE COMPANY DO. HIS RECORDS FURTHER INDICATE HE COMPLETED FLIGHTSAFETY INTERNATIONAL'S CHALLENGER 600 SERIES 61.58 RECURRENT PIC COURSE AT THE MONTREAL LEARNING CENTER ON SEP. 21, 2010.

FROM THESE FACTS, THE FOLLOWING CONCLUSIONS WERE DRAWN:

1. THE AIRCRAFT SYSTEMS TRAINING PROVIDED TO THE F/O BY THE CAPTAIN WAS MINIMAL, AND INADEQUATE FOR A COMPLEX, TRANSPORT CATEGORY TURBINE-POWERED AIRCRAFT LIKE THE CL-601, BUT MET CURRENT REGULATORY REQUIREMENTS.

2. THERE WAS NO EVIDENCE OF A PRE-EXISTING STRUCTURAL FAILURE AFFECTING THE ABILITY OF A CREWMEMBER TO LOCK THE DOOR, NOR WAS THERE EVIDENCE OF AN IN-FLIGHT STRUCTURAL FAILURE LEADING TO AN UNCOMMANDED DOOR OPENING IN FLIGHT.

3. THE IIC CONCLUDES THE DOOR WAS NOT PROPERLY LOCKED BY THE INADEQUATELY TRAINED AND EXPERIENCED F/O PRIOR TO FLIGHT.

4. THE IIC WAS NOT GIVEN ACCESS BY THE NTSB TO DATA RECOVERED FROM THE CVR OR DFDR. The lack of certain unique sounds which occur when the door is properly closed and locked would confirm #3.