

## Section 1: Preliminary engineering assessment.

### **1. Background**

Aircraft F20-065 owned by Ameristar Jet Charter, Inc. ran off the runway at Jamestown, NY. This is a report of the preliminary investigation of the damage incurred in that incident/accident. The investigation was conducted by an engineer from DFJ Service Engineering

By the time the team arrived, the aircraft had been moved to the ramp (means unknown) and any ruts in the grass had been filled in. Therefore, it was impossible to determine what stresses had been incurred during the incident/accident or the subsequent movement of the aircraft.

The aircraft was deemed unsafe to transport to the hangar area due to the condition of the strut, so the preliminary evaluation was performed on the ramp.

### **2. General**

The aircraft's fuselage has sustained significant damage, resulting in probable deformation of the original geometry. Upon arrival at the aircraft, the cargo door latch was unsecured. It was impossible to secure the latch due to possible deformation of the fuselage structure. Obvious fuselage damage extends from the nose aft to frame 12 on the lower portion of the fuselage from approximately stringer 15 down to the lower centerline on both sides. Severe damage was also observed on the nose landing gear. Several other areas of concern were noted but it could not be determined if they resulted from this incident/accident.

### **3. Fuselage (external)**

The fuselage damage extends from the nose aft to frame 12 on the lower portion of the fuselage from approximately stringer 15 down to the lower centerline on both sides.

the overall condition (buckling and paint) of the lower left fuselage forward of the cargo door. skin buckling near stringers 18 and 19 at frames 5, 5a, and 6 via a flexible ruler placed on the skin.

skin buckling between stringers 20 and 21 near frame 5a and 6 again with a flexible ruler placed on the skin. Measurements indicate deformation to be as much as 6

mm (0.240") in this area.  
reveal creases in the skin in addition to dents.

skin buckling around frame 7 and

the lower left hand area adjacent to the nose landing gear (NLG).  
The skin is severely buckled near the NLG trunnion.

a repair (doubler) at the aft left and  
right hand corners of the wheel well, respectively. This doubler is buckled and the  
fasteners appear to be sheared. This damage is associated with corresponding damage to  
the NLG attach fitting. the NLG strut is in contact with frame  
number 7.

the fuselage buckling at frames 7 and 8 adjacent to the cargo door.  
This may be one of the reasons that the cargo door could not be latched.  
damage to the paint and buckling at stringer 17 between frames 7 and 8.

skin buckling on the right hand side of the aircraft.  
right hand lower skin buckling and using a flexible ruler,  
indicates approximately 3 mm (0.120") distortion. buckling at frame  
7 skin junction near NLG door.

skin buckling at the centerline at frames 8 and 12, while  
skin buckling at the fuselage to wing fairing and on the right  
hand side of the tail cone respectively. deformation  
on top of fuselage

#### **4. Fuselage (internal)**

The extensive deformation of the fuselage's skin that is visible from the outside of the  
aircraft, strongly suggests that there is also damage to the associated stringers and frames.  
This was confirmed in part by observation of a few stringers under the pilot's seat.

Considerable additional effort will be required to fully  
determine the extent and severity of the damage to the fuselage.

#### **5. Nose landing gear strut, wheel well, and associated parts**

An initial walk around inspection revealed severe damage to the nose landing gear.  
There is a large fracture beginning at the top of the strut housing, extending down to the  
R/H side of the telescopic actuator arm, to the aft section of the housing.

disconnected steering fork. cracked NLG  
upper crossover beam.  
the left side of the NLG follow-up door has been sheared off.

Further evaluation of the landing gear and wheel well was not possible due to instability of the strut. The strut will need to be removed if further assessment is required. The nose landing gear attach fittings suffered major damage and temporary installation of spare nose landing gear (for aircraft towing and stabilization purpose) may be impossible. Any potential repair of this area would require extensive tooling and fixtures to ensure alignment of the nose landing gear strut in order to restore the fuselage and nose gear wheel well area to their original configuration. This tooling is currently unavailable and would have to be developed specifically for this repair.

## **6. Wings**

There was no apparent deformation on the upper wing spars in the wheel well areas. It is not known how far off the runway the aircraft traveled, so it is uncertain how much damage occurred to the main landing gear and associated wing structure. This will require shooting the wings with a Theodolite to verify that the geometry of the wing has not changed. The wheel wells will need to be thoroughly cleaned to perform a proper evaluation. The main landing gear doors seem to have excessive play, possibly suggesting that the area was subjected to abnormal stress and further damage that was not observable.

## **7. Overall condition of the aircraft**

- A. Inboard fixed leading edge and slats have multiple dented areas. Some have been filled (including major dents)
- B. Both wings have numerous fuel leaks from fasteners on the lower surfaces. Multiple temporary patches were observed over several fasteners.
- C. Severely corroded fasteners were observed all over the aircraft.
- D. A hydraulic leak was observed on the L/H main landing gear brake system.
- E. Both main landing gear struts have been sealed around the bottom to prevent hydraulic fluid leaks.
- F. Excessive oil leaks were noted under both engines.
- G. The L/H wing fence is damaged.

## **8. Conclusions**

While the observed damage is severe, a far more extensive examination will be necessary before it is possible to define what repairs are required in order to return the aircraft to service.

The aircraft's fuselage appears to have sustained significant damage, resulting in deformation of the original aircraft geometry. Determining the full extent of the damage will require laser measurements of the fuselage, wings, and horizontal stabilizer, as well

as a detailed examination of the stringers and frames forward of frame 12. This damage may also have serious implications regarding possible damage to the main landing gear.

The majority of the structural components and external skins needed for repair are not available at this time and will have to be manufactured. Extensive costs (engineering, tooling) will be required to evaluate and develop the required repairs. In addition, many of the skins on this aircraft are attached via spot welds. Replacement of any skins will also require replacement of the associated stringers. Finally, this aircraft is a modified cargo version of the Falcon 20, and original parts for the modified areas may be difficult to find or re-manufacture.