**National Transportation Safety Board**

# Memorandum For The Record

**DATE**: December 2, 2016

**FROM:** Courtney Liedler, NTSB IIC

**SUBJECT:** Details of Aircraft Wreckage Examination for N38DM

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The NTSB IIC and party members did not travel to the accident site. On November 29-30, 2016, the NTSB IIC and above-listed party members met at Saint Peters Recover and Storage in Wright City, Missouri to conduct an aircraft wreckage exam for N38DM. Below is a summary of the exam.

**Airframe**

The aircraft wings were impact damaged. The left wing was severed nine feet outboard of inboard rib. The left aileron and flaps were removed by impact. Left aileron flight control tubes were evident on the wing. The right wing was severed just outboard of the fuel cap. The upper and lower wings skins between forward and aft spars were absent exposing the fuel bay. The left and right flaps were detached from the wings. The three position flap selector knob was found in the 25 degree takeoff/approach position. The flap electric flap actuator rods were found extended 2 and ¼ inches from the housing.

The fuselage maintained occupiable space from the firewall to the empennage. All four seats remained affixed to their respective mounts. The right copilot window shattered near the edge where it is bonded to the fuselage. The left hand pilot carved wooden control stick was broken at its base from the flight control rod. The front seat lap belts and single strap retractable shoulder harnesses remained attached to their respective fittings.

The power lever was found near idle, the prop control near feather and the condition lever was found near midrange. The aircraft was not equipped with a MOR or standby power lever. The landing gear handle was in the “down” position. The left main landing gear tire had mud around its circumference and mud was spattered on the MLG strut consistent with being down during the off airport landing.

The BAT 1 and BAT 2 switches were found “on”. The GEN switch was “on”. The ALT switch was “off”. The DOOR SEAL switch was “on”, the IGNITOR switch was “off”, the PARTICLE SEPARATOR switch was “off”, the FUEL PUMP switch was “off”. The spring loaded START switch was “off”. The PITOT HEAT and BLEED AIR switches were “off”. The DUMP switch

was “off”. The AIRFRAME DEICE, PROP INLET HEAT and ICE LIGHT switches were “off”. Many circuit breakers in the center pedestal were found popped.

The empennage was severed due to impact from the fuselage between the air conditioning intake on the left side and the exhaust on the right side forward of the vertical stabilizer and horizontal stabilizer with severe contact marks on the right side of the empennage. The horizontal stabilizer was found in one piece with the left elevator attached. The rudder was detached from the vertical stabilizer.

The wing fuel tank single point drains were attached to their respective wing components. Neither wing contained any fuel. The two main fuel tanks contain up to 172 gallons of fuel (168 gallons useable). The aircraft was equipped with a 30 gallon auxiliary fuel tank located in the baggage compartment. The auxiliary fuel tank was not compromised and was borescoped, it contained no fuel. The auxiliary fuel tank was plumbed with an aluminum line to the right hand wing fuel cell. The aux tank feed line had an electric transfer pump and manual fuel shut off valve located under the rear seat passenger floorboard. The fuel shut off valve was installed to facilitate maintenance and was found in the open position. The fuel selector is a three position fuel selector and is located on the shear web between the pilot and copilot seats. The positions are left, right and off. The off position can only be selected by pulling a spring loaded pin then moving the valve to off. The fuel selector valve was found in the left position. The exterior firewall mounted electric fuel boost pump was not located with the wreckage. The firewall mounted Parker 1J18-4 sn 2BH11 fuel filter/ gascolator was found separate from the airframe. It contained a small amount of liquid. The filter was opened and disassembled revealing the four filtration wafers. Each wafer had whitish in color contaminant adhering to the wafer.

The main landing gear were found detached from the wing attach fittings. The nose landing gear was not found with the wreckage.

The engine mounts were found detached from the firewall with evidence of the engine mount bolts being pulled through the firewall.
The MT propeller was found in or near the feathered positon with all four blades broken from the hub.

The Pilot’s Operating Handbook was found in the baggage compartment. No quick reference checklists were found in the cabin.

The Electronics International, Inc. EDC-33T sn 144951 was removed from behind the instrument panel to facilitate download of the MVP 50 at the NTSB lab in Washington, DC.

**Engine**

The engine examination did not reveal any evidence of any pre-impact mechanical anomalies that would have precluded normal operation. However, visually fuel samples collected from the fuel pump filters, fuel line and fuel/oil heater appeared to be contaminated, possibly with water.

The engine was separated from the aircraft. The accessory gearbox and inlet case were separated from the engine but were still connected with some external lines. The inlet case studs were all fractured. The No. 1 bearing cage, balls, one inner race and the compressor hub coupling were missing. The propeller blades were all fractured.

The gas generator case was buckled and bent from impact. The exhaust duct was unremarkable. The exhaust stacks were bent and distorted.

The engine was separated at the “C” flange to expose the hot section components. The center bore on the downstream side of the compressor turbine disc and blades exhibited very light rotational scoring from contact with its respective adjacent static components. The upstream face of the compressor turbine disc and blades were unremarkable. The 1st stage power turbine vane and baffle exhibited rubs on both sides from contact with the power turbine and compressor turbine discs and blades. The 1st stage power turbine disc exhibited rotational scoring on the upstream side.

The residual fuel was collected from the fuel to oil heater, fuel line from the fuel control to the flow divider, the high pressure fuel line between the fuel pump and the fuel control, the fuel pump inlet filter, and the outlet fuel filter. The fuel was contaminated with unknown substances.

The oil filter was removed and no visible contamination was noted. Several magnetic particles were attached to the reduction gearbox magnetic chip detector poles.
The compressor turbine disc and compressor were not capable manual rotation. The starter generator and air conditioner pump were removed from the accessory gear box and the gearbox was capable of some limited rotation. One 1st stage compressor rotor blade exhibited a bent tip and one blade exhibited some impact damage.

The very light rotational scoring on the compressor turbine disc/blades, and the rotational scoring on the 1st stage power turbine disc indicates that the engine was most likely wind milling and not operating under power at the time of impact.