



AIRFRAME AND ENGINE EXAMINATION REPORT

NTSB ACCIDENT NUMBER: ERA20FA020

AIRCRAFT REGISTRATION: N959MJ

OPERATOR: Individual

ACCIDENT LOCATION: Colonia, New Jersey

BRIEF NARRATIVE

On October 29, 2019, at 1058 eastern daylight time, a Cessna 414A airplane, N959MJ, was destroyed when it was involved in an accident in Colonia, New Jersey. The commercial pilot was fatally injured. The airplane was operated as a Title 14 **Code of Federal Regulations (CFR)** Part 91 personal flight.

BASIC AIRCRAFT INFORMATION

According to Federal Aviation Administration (FAA) airworthiness records, the 6-seat, multi-engine, low-wing airplane was manufactured in 1980. It was powered by two Continental TSIO-520-NB, 335-horsepower engines, which had been modified with RAM Aircraft conversions. The airplane was also equipped with RAM Aircraft winglets and vortex generators.

MAINTENANCE RECORDS

Fragments of the maintenance records were located in the wreckage and were photographed. The most recent annual inspection was completed on October 18, 2019. The following photographs show the most recent maintenance entries in the airframe, engine, and propeller logbooks.

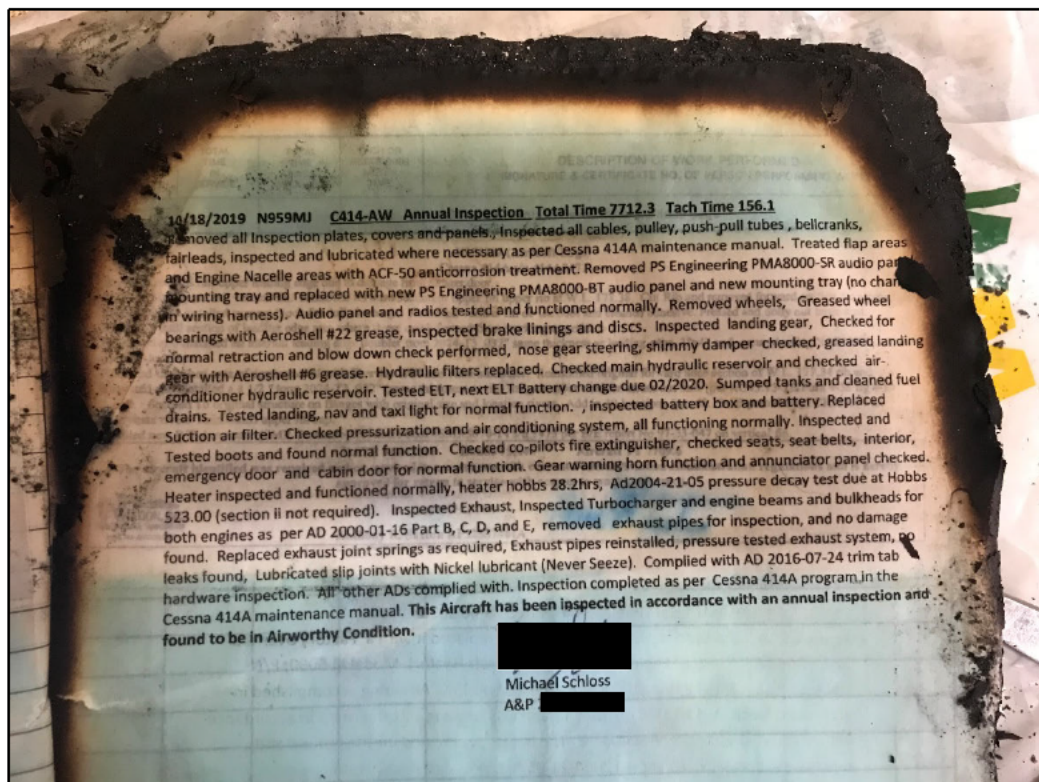


Photo 1: Annual inspection, airframe logbook maintenance record entry.

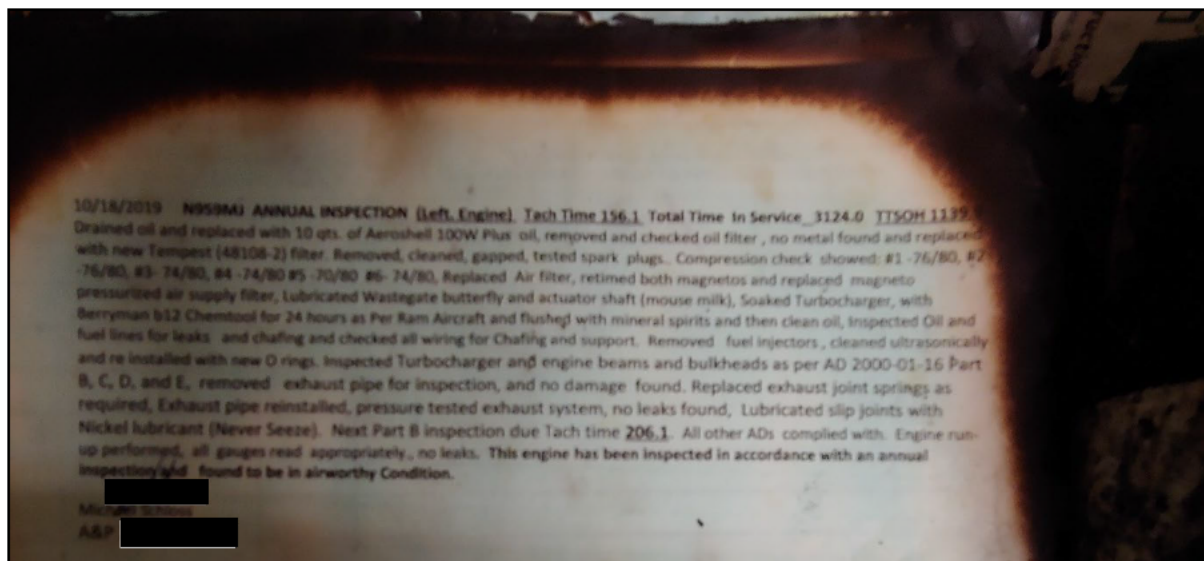


Photo 2: Annual inspection, left engine logbook maintenance record entry.

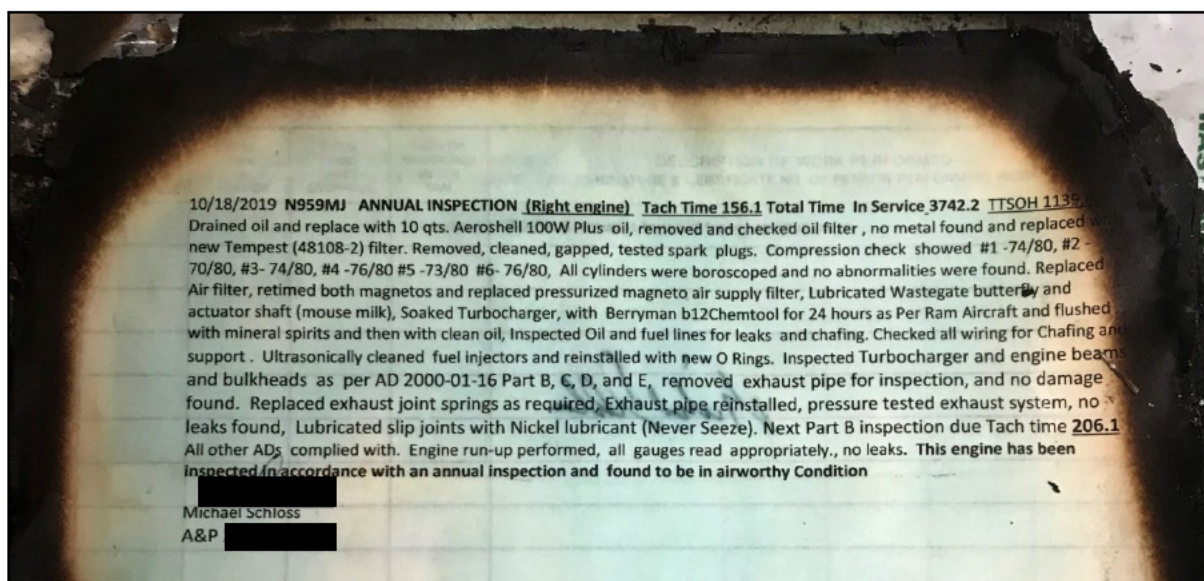


Photo 3: Annual inspection, Right engine logbook maintenance record entry.

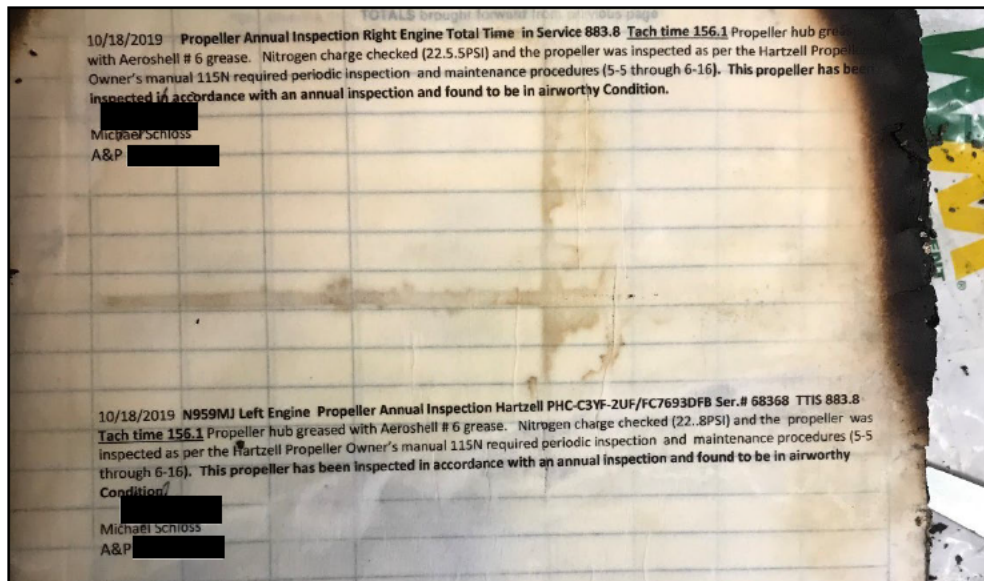


Photo 4: Annual inspection, left and right propeller logbook maintenance record entry.

WRECKAGE AND IMPACT INFORMATION

The main wreckage was located in the basement of a residential home about 3 nautical miles southwest of the Linden, New Jersey airport; the airplane sustained significant impact and thermal damage as a result a post-crash fire and was destroyed.



Photo 5: Photo of the residential home the airplane impacted (Courtesy of FAA).

The initial impact point was observed to coincide with large broken tree branches about 40 ft from the main wreckage; the wreckage path was oriented on a true heading of 278°. Multiple trees branches located below and near the initial impact exhibited clean cut surface areas.



Photo 6: One of several clean-cut tree branches, found below the initial impact area.

The accident site elevation was about 90 ft mean sea level. Figures 1 and 2 provide an overview of the flight track, witness locations, and nest cameras, which recorded the visual/audio of the final portions of the flight.¹

¹ Witness statements and nest camera videos are located in the public docket.

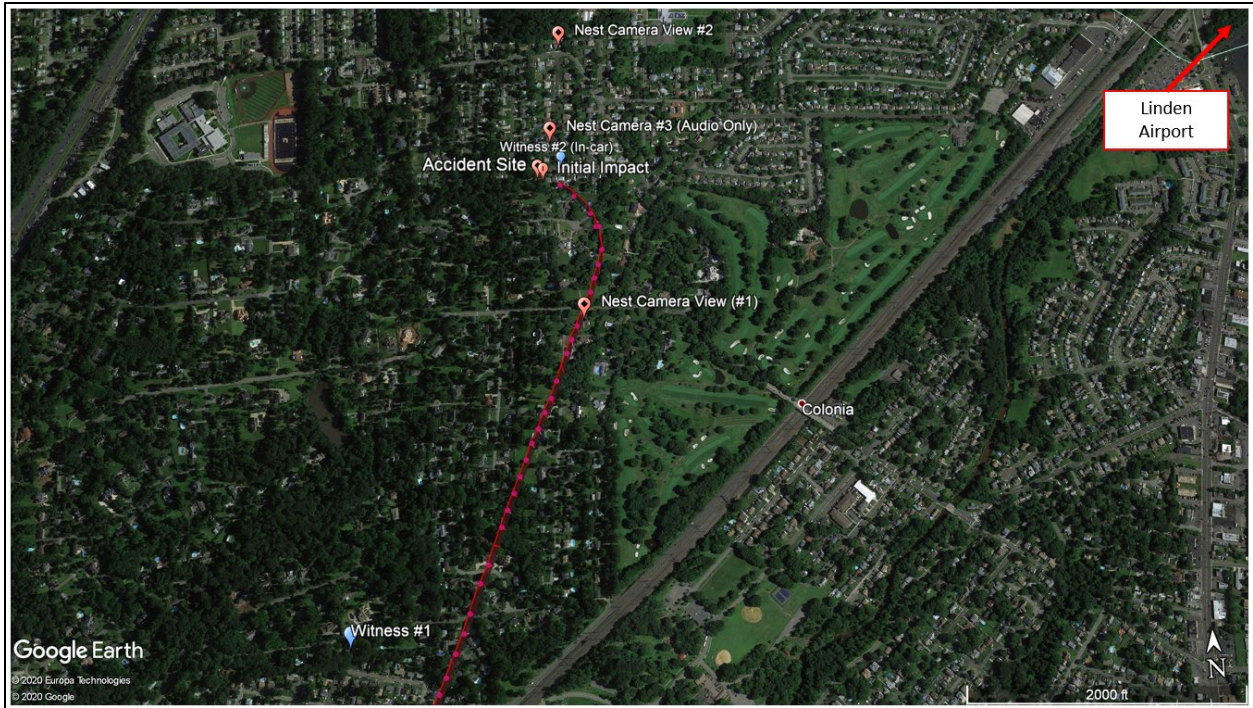


Figure 1: Overview of the flight track, witness locations, and nest cameras.

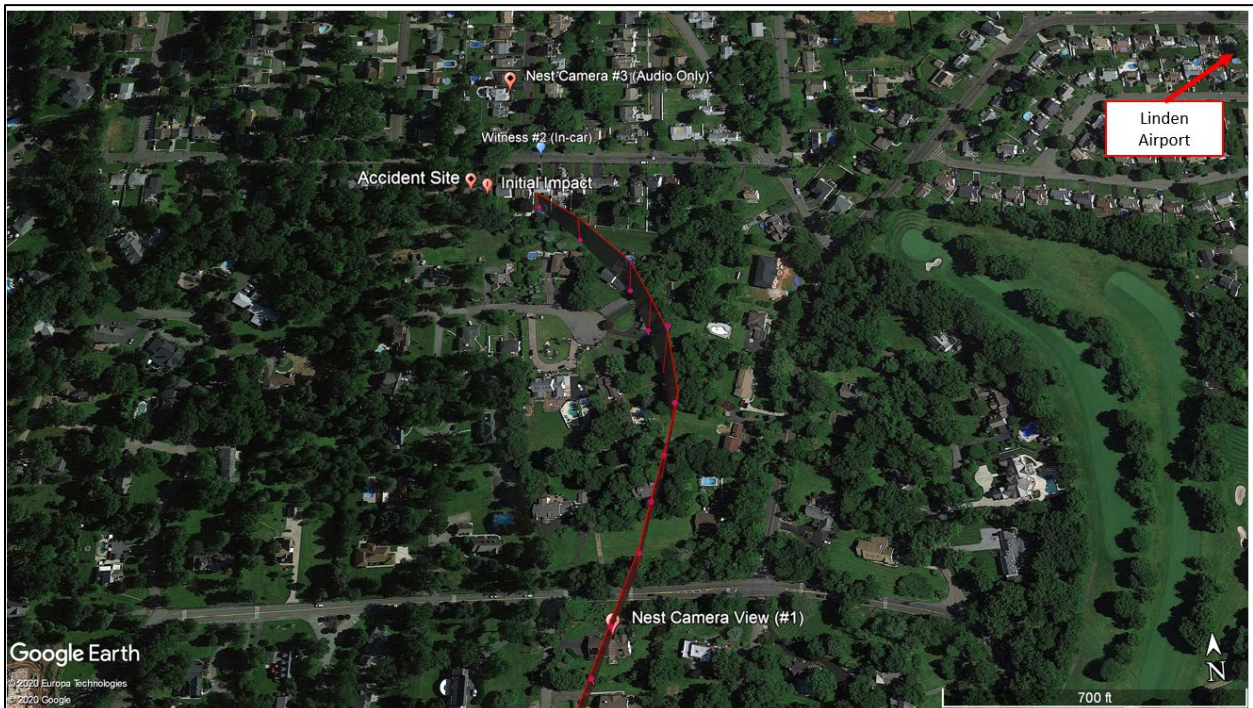


Figure 2: Closer view of the flight track, initial impact, and accident site.

AIRFRAME EXAMINATION

The largest piece of wreckage was the forward cabin area from the instrument panel to just aft of the pilot seat tracks.



Figure 3: The cockpit/ forward cabin area, denoted by the red box. The pop-out photo represents a closer view of the cockpit area.



Photo 7: The throttle, mixture, and propeller control quadrant.

The fuselage crown skin and the majority of the right side of the instrument panel were consumed by fire. The throttle, mixture, and propeller control levers were found full forward. Several of the instruments in the left side of the panel sustained thermal damage. The nose cone was observed separated from the nose section; it did not appear to sustain significant impact damage and largely retained its shape.

The majority of the left and right wings were consumed by the post-impact fire. The left aileron, with aileron trim tab attached, had separated from the wing and sustained minor thermal damage on the upper skin surface near the inboard end. The aileron trim tab actuator was extended approximately 1.8" which was beyond the normal maximum trailing edge up travel limit of 21°.



Photo 8: View of fragmented flight control surface

The left- and right-wing flap tubes and bellcranks were observed; fractured cable fragments remained attached to the inboard flap bellcranks. The flap actuator motor and gearbox were observed. The right flap chain remained attached to the sprocket; the left flap chain was not observed. The right flap chain indicated the flaps were extended 15°.

An approximately 4 ft long section of the top of the rudder and approximately 2 ft of the upper portion of the vertical stabilizer were impact separated from the fuselage. The lower portion of the vertical stabilizer, rudder, and the left and right horizontal stabilizers were consumed by fire. An approximately 2' long section of the outboard left elevator was recovered; it sustained impact and thermal damage. The right elevator and elevator trim tab were not observed.



Photo 9: Overview of airframe fragments located in debris

The left yoke was moved by hand and the right control column tube was observed moving in unison. Partial aileron and elevator control cable continuity was established by observing the cables moving in the lower forward floor assembly area. Rudder cable continuity to the rudder pedals was not established. Control cable continuity was not established to the flight control surface bellcranks which were consumed by the post-impact fire and/or not located in the residence during wreckage recovery efforts.

The left and right fuel selector handles were found pointing straight forward in an intermediate position between main and crossfeed. The crossfeed shutoff handle was also in an intermediate position between off (stowed) and full on (lever up).

The left, right and nose landing gear were separated from the fuselage. The nose gear remained relatively intact. The left and right main landing gear trunnions and actuators sustained significant impact and thermal damage. Landing gear position could not be determined based on observation of the landing gear actuators. The landing gear knob was separated from the handle on the instrument panel. The landing gear handle arm was twisted; its position could not be determined.

One complete flight crew seat frame base and back were recovered; they were separated from each other and sustained thermal damaged. The other flight crew seat base was recovered; the back was not observed. It also sustained significant thermal damage.

The majority of the right side of the instrument panel was consumed by the post-impact fire. The left side of the instrument panel was thermally damaged, and the instruments were covered in

soot. The airspeed indicator was found indicating about 55 knots. The primary attitude indicator was found displaying a 120° left roll, and the pitch indicated a 5° pitch up. The altimeter was set to 30.31 inches and indicated 200 ft.

The primary heading indicator was found indicating a heading of 260°, and the course was set to 010°. The heading bug was found set to 050°. The vertical speed indicator was found to indicate 0 feet per minute. The course deviation indicator was found indicating that the airplane was left of course.



Photo 10: View of the primary flight instruments located on the left side of the cockpit.

The standby VOR course was set to 020°, and the CDI displayed a full right deflection (left of course). The altitude warning device was set to 300 ft. The left manifold displayed 23 inches and the right displayed 25 inches. The rpm indicator displayed 0 rpm for the left engine and 500 rpm for the right engine. The left and right engine ignition switches were found on.

ENGINE EXAMINATION

Right Engine

TSIO-520-NB

Serial Number: 182844-R

Modified by RAM Aircraft to 335-HP

The engine was located in the basement of the house forward of the main wreckage. The engine was impact separated from the airframe and exhibited impact and thermal damage.



Photo 11: View of the propeller and engine buried in housing debris.



Photo 12: View of left engine being hoisted away from the housing debris.

The fuel pump was removed, and the drive turned freely by hand with suction felt on the fuel pump inlet. The drive coupling was intact and fell into the engine crankcase when being removed.

The fuel nozzles were removed and were free of obstructions. The fuel manifold valve was disassembled and the diaphragm and retaining nut were intact and secure. The fuel manifold valve screen was free of obstruction. The throttle body/mixture control was not observed in the wreckage.

The right turbo charger exhibited thermal damage. The compressor housing and compressor wheel were not observed. The turbo controller was not observed with the wreckage. The magnetos remained attached to the engine and exhibited light thermal damage. The ignition harness was thermally damaged. The magnetos were removed, and the drives turned freely by hand with impulse coupling engagement heard. The magnetos produced spark on all ignition terminals.

The top spark plugs were removed, and the electrodes exhibited light grey combustion deposits and normal electrode wear. The cylinder combustion chambers were inspected with a lighted borescope and no anomalies were observed.

The crankshaft was rotated by hand using the propeller. Continuity to rear of the engine and the valve train was confirmed and thumb compression was obtained on all six cylinders.

The vacuum pump was removed and disassembled with no anomalies noted. The vacuum pump drive coupling was intact.

The 3-bladed propeller remained attached to the propeller hub; one blade had fragmented about 1/3 of its span, the two other blades remained intact and displayed chord-wise scratching, torsional twisting, and s-bending.

Left Engine

TSIO-520-NB

SN: 290494-R

Modified by RAM Aircraft to 335 HP

The left engine was located in the basement of the house, under the fuselage wreckage. The left engine exhibited impact and thermal damage.



Photo 13: View of the left engine after removal from the housing debris

The induction system had been thermally destroyed. The engine driven fuel pump was thermally damaged and melted.

The fuel manifold valve remained attached to the engine and exhibited thermal damage. The manifold valve cover was partially melted. The diaphragm was thermally destroyed, and the screen exhibited burnt debris.

Fuel nozzle number 5 was impact separated from the cylinder and fuel nozzle three was impact damaged. Fuel nozzles 3 and 5 contained debris. The rest of the fuel nozzles were free of obstruction.

The throttle body/mixture control was not observed with the wreckage. The magnetos were thermally damaged and partially disassembled with thermal damage noted internally.

The left turbo charger was intact, and the turbine wheel turned freely by hand. The wastegate exhibited thermal damage and the controller was not observed in the wreckage. The crankshaft was rotated by hand using the propeller and continuity to the accessory section and throughout the valve train. Thumb compression was obtained on cylinders 1,2,3 and 5. Cylinders 4 and 6 did not produce thumb compression and thermal debris was noted on the valve seats preventing full closure of the valves.

The top spark plugs were removed, and the electrodes exhibited light grey combustion deposits and normal electrode wear. The cylinder combustion chambers were examined with lighted borescope with no anomalies noted other than thermal debris.

The vacuum pump was removed and disassembled with no anomalies noted. The stator remained intact. The vacuum pump drive coupling was melted.

The 3-bladed propeller remained attached to the propeller hub; each blade remained intact and displayed chord-wise scratching and torsional twisting.

Reported Submitted by Adam Gerhardt