

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



CEN23FA361

POWERPLANTS

Specialist's Factual Report

December 22, 2023

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A. INCIDENT

Location: Belleville, Michigan, USA
Date: August 13, 2023
Time: 14:00 CDT (Central Daylight Time)
Airplane: Russian built MIG-23UB, N23UB
NTSB IIC: John Brannen

B. POWERPLANTS SPECIALIST

Thomas Driscoll
National Transportation Safety Board
Washington, D.C., USA

C. SUMMARY

On August 13, 2023, a Russian built MIG-23UB trainer, registration number N23UB, powered by a single Tumansky R27F2M-300 turbojet with an afterburner was performing exhibition flights at the Thunder Over Michigan Air Show in Michigan near the towns of Ypsilanti and Belleville when it crashed next to an apartment complex in Belleville Michigan. The aircraft had been operating out of Willow Run airport for exhibition flights on August 12 and 13, 2023. The accident flight was the second flight of the day. The pilot/owner and the backseat observer ejected from the airplane before it crashed and sustained minor injuries.

D. DETAILS OF THE EXAMINATION

This examination consisted of a tabletop review of the aircraft and engine logbooks provided by the owner/operator/pilot, the pilot's formal statement following the accident and photos taken of the accident scene.

1.0 Review of the Pilot's Statement

The pilot provided a written, post-accident, statement to the NTSB where he described the events of the day as well as a prior loss of engine power event in 2018, which entailed the replacement of the Fuel Control Unit (FCU) to resolve the issue. Based on the pilot's statement, the cause of the accident was not an engine malfunction or complete loss of thrust but the premature ejection of the pilots by the back seat observer while the pilot was in the process of troubleshooting a perceived engine anomaly. Although the pilot's statement is quite extensive and addresses potential sources (i.e. FCU, exhaust nozzle, etc.) for degraded engine performance, the NTSB could not qualify/validate the pilot's opinion as to root cause of the engine anomaly because the NTSB did not perform an examination or evaluation of the engine after the accident.

According to the pilot/owner's post-accident statement, the incident flight began as planned with an uneventful takeoff and setup for the exhibition pass (Photo/Banana Pass), followed by an attempted flight with afterburner for the exhibition pass when the pilot selected

the full maximum power but there was no subsequent perceived power/thrust increase as expected. A second attempt to ignite the afterburner was also unsuccessful and the pilot perceived a partial engine rollback at which point the pilot decided an immediate return to the airfield was necessary.

The pilot stated at while he was troubleshooting, the back seat observer communicated that they needed to exit the aircraft, with the pilot's immediate response being "no". The pilot's statement adamantly states he had complete control of the aircraft, and the engine remained operational, still producing some level of thrust above idle but not enough to maintain altitude and airspeed. The pilot continued to fly the aircraft back toward the airfield in parallel with troubleshooting the engine anomaly. At this point, the pilot states he selected the Emergency Nozzle Control switch in an attempt to resolve the issue or at least increase the engine's thrust, but this action did not result in any improvement to engine performance. The pilot then attempted to select the Emergency Engine Control switch but prior to switch activation, the back seat observer pulled the ejection handle without being commanded to do so and both the pilot and back seat observer were ejected from the aircraft; the aircraft continued to fly for an unknown amount of time before it crashed.

2.0 Review the Aircraft/Engine Logbooks

A review of the aircraft and engine logbooks for the accident airplane provided by the owner/pilot revealed an engine logbook entry for an installation of a new fuel control unit on a page dated with the year 2018. This is assumed to address the engine anomaly that the pilot alluded to in his post-accident statement. The pilot stated that his mechanic purchased three brand new FCUs on his behalf from a source in the Ukraine; one of which was installed on the accident airplane. It is not known whether the term 'new' means recently manufactured or manufactured 30 years ago with no operating time. According to the pilot's post-accident statement, replacement of the FCU was thought to have fixed the engine anomaly experienced in 2018. The accident FCU had accumulated approximately 13 flight hours of use between the 2018 and the day of the incident.

The 2018 engine logbook entry related to the replacement of the FCU read only as "FCU Δ". No other information such as part number, serial number, exact date of installation, reason for removal/installation, reference to any installation/testing instructions, or any serviceability document was included in the entry. Various different models of the FCU can be installed on the Tumansky engine depending on the variant of the engine. Verification whether the correct FCU was installed would require an engine/component exam, or at least a photo of the FCU data plate, and comparing it with the engine's illustrated parts breakdown (IPB) for approved/authorized FCU model installation. Given there was approximately 13 flight hours between the FCU installation and the accident, this indicates that the FCU was functioning properly for a period of time.

The pilot in his post-accident statement indicated that he now believes the engine anomaly that he experienced on the accident flight was due to a problem with the exhaust nozzle assembly actuation system. He also now seems to think that the 2018 engine anomaly, which was assumed to have been fixed with the replacement of the FCU, may have been caused by a problem with the exhaust nozzle assembly actuation system and not the FCU;

therefore, the root cause of the engine anomaly in 2018 may not have been actually addressed. It is not currently possible to validate the pilot's statement with regard to the failure of the FCU versus the exhaust nozzle actuation system.

3.0 Review of the Accident Scene Photos

The fan blades exhibited multiple hard body impacts on the leading edges, multiple blade tip fractures on different blades around the circumference (i.e. not localized), and circumferential scoring and rub marks on the spinner dome, all suggesting the engine was rotating under power at the time of impact. However, based on this visual evidence it is not possible to estimate an exact power level. This seems to corroborate the pilot's statement that the engine was operating and producing some level of thrust during the incident flight.



4.0 Potential Additional Engine Examination

Other than the owner/operator's mechanic, the NTSB is unaware of any independent, engine shop or manufacturer within the United States with the appropriate tooling and expertise capable of performing an engine teardown/exam. Therefore, no engine exam was conducted to document the condition of the engine at impact.

The NTSB investigator-in-charge verified that there are currently no other known Mig 23UB type aircraft in operation in the United States by researching the FAA's aircraft registry website. This suggests that there is no fleet safety concerns to address.