



# Aviation Investigation Final Report

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<b>Location:</b>	Opa-Locka, Florida	<b>Accident Number:</b>	ERA23LA058
<b>Date &amp; Time:</b>	November 14, 2022, 13:30 Local	<b>Registration:</b>	CU-A1885
<b>Aircraft:</b>	Antonov AN2	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of engine power (partial)	<b>Injuries:</b>	2 None
<b>Flight Conducted Under:</b>	Public aircraft		

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## Analysis

The pilot and copilot were hired to relocate the radial engine-equipped biplane as a public flight. The pilot stated that, while enroute, the airplane began to smoke and the engine lost power. The pilot performed a forced landing to a levee; however, the airplane’s main landing gear were wider than the levee, and after touchdown, the airplane traveled off the left side, nosed over, and came to rest inverted, resulting in substantial damage.

Postaccident examination of the airplane revealed that the engine oil system used an oil cooler, which was mounted under the airplane’s fuselage and was surrounded by a tunnel with electrically-controlled shutters that could be opened to increase airflow through the oil cooler or closed to decrease airflow through the oil cooler. The shutters were found in the closed position. The engine cowling was also equipped with cowl flaps, which were found in the closed position, and examination of videos of the airplane indicated that the cowl flaps were closed during both the engine runup and takeoff on the accident flight. Metal contamination was discovered inside the main engine oil filter, oil pump filter, and two other oil strainers, which were indications that the engine had incurred some internal damage before the loss of power.

The airplane’s cockpit instruments and switches were labeled in Cyrillic script. During a postaccident interview, the pilot stated that he only had partial excerpts of a flight manual for the accident airplane that was in Spanish, so his copilot had to translate what the labeling in the cockpit said. The manual also listed reference airspeeds in miles per hour, though the airplane was marked in kilometers per hour. The oil cooler and cowl flap position switches were located next to each other, on the aft right upper surface of the “central control desk.” Both switches were found in the off position after the accident. Although the airplane was equipped with a cylinder head temperature (CHT) gauge, the pilot stated that this gauge was

inoperative, which he noticed during the first of three runups that he performed in the days leading up to the accident flight.

The pilot (who was also an airframe and powerplant mechanic with an inspection authorization) advised that he had traveled to the airport on three occasions before the accident flight. On each occasion (including the day of the accident flight) he had performed a preflight inspection and engine runup. He did not use a checklist during any of the preflight inspections. When asked if he had the cowl flaps in the open position for the accident flight, he advised that he might have had them closed. When asked how they were operated, he could not remember. When asked about the oil cooler and where the switch was located to open and close the shutters, he did not remember anything about an oil cooler.

Review of an English language version of the airplane flight manual revealed that it contained recommended parameters for engine operation that required opening and closing the oil cooler shutters and cowl flaps by referencing the temperatures presented on the CHT gauge. The outside air temperature around the time of the accident was about 82°F.

In summary, the circumstances of the accident are consistent with the pilot's failure to adequately familiarize himself with the airplane's systems and their operation before the flight, which resulted in his operation of the airplane during the taxi, takeoff, and initial climb with the cowl flaps and oil cooler shutters closed. Additionally, his decision to fly the airplane with the inoperative CHT gauge resulted in his inability to monitor engine temperatures and likely led to the exceedance of the engine's maximum CHT, which in turn resulted in the loss of engine power.

## **Probable Cause and Findings**

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's failure to properly configure the cowl flaps and oil cooler shutters, which resulted in a total loss of engine power due to overheating of the engine. Contributing to the accident was the pilot's decision to operate the airplane in with an inoperative cylinder head temperature gauge.

## Findings

<b>Personnel issues</b>	Decision making/judgment - Pilot
<b>Personnel issues</b>	Preflight inspection - Pilot
<b>Personnel issues</b>	Use of manual - Pilot
<b>Personnel issues</b>	Use of equip/system - Pilot
<b>Aircraft</b>	Cylinder head temp (CHT) - Inoperative
<b>Aircraft</b>	Cooler - Not used/operated
<b>Aircraft</b>	Cowl flap system (recip. only) - Not used/operated
<b>Personnel issues</b>	Identification/recognition - Pilot

## Factual Information

### History of Flight

<b>Enroute</b>	Loss of engine power (partial) (Defining event)
<b>Emergency descent</b>	Loss of engine power (total)
<b>Landing</b>	Off-field or emergency landing
<b>Landing-landing roll</b>	Runway excursion
<b>Landing-landing roll</b>	Nose over/nose down

On November 14, 2022, about 1330 eastern standard time, an Antonov AN2 airplane, Cuban registration CU-A1885, was substantially damaged when it was involved in an accident near Opa-Locka, Florida. The pilot and copilot were not injured. The airplane was operated as a public aircraft ferry flight.

On October 21, 2022, a pilot seeking asylum in the United States departed Sancti Spiritus Airport (MUSS), Sancti Spiritus, Cuba, and landed at Dade-Collier Training and Transition Airport (TNT), Miami, Florida.

After landing at TNT, the pilot was detained, and the airplane was taken into custody by United States Customs and Border Protection (CBP). Custody of the airplane was transferred to a national seized property contractor, who then hired a subcontractor to move the airplane. The subcontractor determined that the airplane was airworthy and decided to fly it from TNT to Fort Lauderdale Executive Airport (FXE), Fort Lauderdale, Florida, where it could be stored in a secure facility.

The pilots performed a preflight inspection and engine runup before departing TNT about 1306. After a few minutes of flight, the pilot noticed that the airplane was smoking more than normal.

The pilots continued the flight and were flying over a canal that ran through the Everglades with a levee on the east side of the canal. About 1325, the engine started to lose power, and its airspeed and altitude began to decrease. About 1330, when the airplane was about 15 miles west of Miami-Opa Locka Executive Airport (OPF), Miami, Florida, the pilot aligned the airplane with the levee and touched down on the main landing gear. As the tailwheel was about to touch down, the airplane turned to the left, and the pilot was unable to keep the airplane on the levee. The airplane then rolled down the bank on the side of the levee, contacted the water, nosed over, and came to rest inverted in water and vegetation.

## Pilot Information

<b>Certificate:</b>	Airline transport; Commercial	<b>Age:</b>	54, Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	Helicopter	<b>Restraint Used:</b>	Lap only
<b>Instrument Rating(s):</b>	Airplane; Helicopter	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	Airplane multi-engine; Airplane single-engine; Instrument airplane	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 1 With waivers/limitations	<b>Last FAA Medical Exam:</b>	November 1, 2021
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	March 8, 2022
<b>Flight Time:</b>	(Estimated) 16000 hours (Total, all aircraft), 16000 hours (Pilot In Command, all aircraft), 250 hours (Last 90 days, all aircraft), 85 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

## Co-pilot Information

<b>Certificate:</b>	Airline transport; Private	<b>Age:</b>	39, Female
<b>Airplane Rating(s):</b>	Multi-engine land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Lap only
<b>Instrument Rating(s):</b>		<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	
<b>Medical Certification:</b>	Class 1 With waivers/limitations	<b>Last FAA Medical Exam:</b>	May 4, 2022
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	June 14, 2022
<b>Flight Time:</b>	(Estimated) 3000 hours (Total, all aircraft), 1600 hours (Pilot In Command, all aircraft), 30 hours (Last 90 days, all aircraft), 11 hours (Last 30 days, all aircraft)		

### Pilot

The pilot held an airline transport pilot certificate with a rating for airplane multi-engine land, and commercial privileges for airplane single-engine land and rotorcraft-helicopter. He also possessed type ratings in the DA-10, DA-50, DA-200, EA-500S, G-100, G-1159, G-IV, HS-125, IA1125, IA-JET, and LR-Jet, with the G-100 and IA-1125 being for second-in-command privileges only.

He reported that he had accrued about 16,000 total hours of flight experience, none of which was in the accident airplane make and model.

### Copilot

The copilot held an airline transport pilot certificate with a rating for airplane multi-engine land, and possessed type ratings for the G-IV, GIV, and LR-60, with the type ratings for the G-IV and LR-60, being for second-in-command privileges only.

She also held a private pilot certificate with ratings for airplane single-engine land and airplane multi-engine land, which was issued on the basis of her Argentinian private pilot license. She reported that she had accrued about 3,000 total hours of flight experience, none of which was in the accident airplane make and model.

### Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Antonov	<b>Registration:</b>	CU-A1885
<b>Model/Series:</b>	AN2	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1982	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Unknown	<b>Serial Number:</b>	1G20025
<b>Landing Gear Type:</b>	Tailwheel	<b>Seats:</b>	2
<b>Date/Type of Last Inspection:</b>	July 7, 2022 Continuous airworthiness	<b>Certified Max Gross Wt.:</b>	12125 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	7190 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Shvetsov
<b>ELT:</b>	Not installed	<b>Engine Model/Series:</b>	ASz-62IR
<b>Registered Owner:</b>	Ensa Servicios Aeros	<b>Rated Power:</b>	987 Horsepower
<b>Operator:</b>	Risk Mondial Aviation & Recovery	<b>Operating Certificate(s) Held:</b>	None

The accident airplane was a single-bay biplane equipped with conventional (tailwheel type) landing gear and was configured for agricultural spraying.

The airplane was powered by a 987-horsepower Shvetsov ASz-62 IR geared, 9-cylinder radial engine driving a 4-blade AW-2 propeller.

According to information provided by the Republic of Cuba, the airplane was manufactured in 1982. The airplane's most recent continuous airworthiness inspection was completed on July 7, 2022. At the time of the inspection, the airplane had accrued about 7,190 total hours of operation, and the engine had accrued approximately 600 hours of operation since major overhaul.

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KOPF,4 ft msl	<b>Distance from Accident Site:</b>	10 Nautical Miles
<b>Observation Time:</b>	18:53 Local	<b>Direction from Accident Site:</b>	109°
<b>Lowest Cloud Condition:</b>	Few / 3900 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	9 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	80°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.01 inches Hg	<b>Temperature/Dew Point:</b>	28°C / 20°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Miami, FL (TNT)	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Fort Lauderdale, FL (FXE)	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	13:06 Local	<b>Type of Airspace:</b>	Class G

The recorded weather at OPF about 47 minutes after the accident, included wind from 080° at 9 kts, 10 miles visibility, few clouds at 3,900 ft above ground level, temperature 28°C, dew point 20°C, and an altimeter setting of 30.01 inches of mercury.

## Wreckage and Impact Information

<b>Crew Injuries:</b>	2 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	N/A	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>		<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 None	<b>Latitude, Longitude:</b>	25.962858,-80.45595(est)

## Airplane

Examination of the accident site revealed evidence consistent with the main landing gear being too wide for the airplane to land on the levee, and damage consistent with the airplane having traveled off the left side of the levee, nosing over, and coming to rest inverted.

The right lower wing and right upper wing sustained impact, crush, and compression damage outboard of the interplane strut. The left lower wing incurred substantial damage to its structure about 4 ft outboard of the wing root, with the wing bent downward from its usual mounting location. The left upper wing also received substantial damage to its internal structure and was bent aft outboard of the wing root. The vertical stabilizer was damaged.

The fuel found in the gascolator was bright blue in color and had an odor consistent with 100LL aviation gasoline. When water-finding paste was introduced, no evidence of contamination was indicated.

Further examination of the airplane also revealed a large amount of oil aft of the engine bay.

### Propeller and Engine

None of the four propeller blades displayed evidence of leading-edge gouging, chordwise scratching, or S-bending. Only two of the propeller blades showed minimal aft bending, consistent with little or no power upon ground contact.

Examination of the cylinders with a borescope did not reveal any damage to the cylinder walls or tops of the pistons. The piston skirts could not be viewed.

### Oil System

The oil system consisted of a tank, oil cooler, pipes, fittings, and an oil pump. Oil was drawn from the oil tank by the oil pump and pumped to the engine. After circulating in the engine, oil was drawn out of the engine by the same pump and pumped back to the oil tank.

While circulating from the engine to the oil tank, oil passed through the oil cooler. The oil cooler was mounted under the airplane's fuselage and was surrounded by a tunnel with electrically-controlled shutters that could be opened to increase airflow through the oil cooler or closed to decrease airflow through the oil cooler.

Examination of the oil system revealed the presence of metal contamination inside the main engine oil filter, oil pump filter, and two other oil strainers. Use of a magnetic probe indicated that some of the particulate was ferrous (steel or iron). The shutters for the oil cooler were found in the closed position.

### Engine Cowling

The engine cowling was equipped with cowl flaps which, when opened, would increase the airflow through the engine compartment and around the cylinder cooling fins. When closed, they would reduce the amount of cooling air flowing through the cowling and around the cylinder cooling fins. The cowl flaps were found in the closed position.

### Cockpit



Examination of the cockpit revealed that the instruments and switches were labeled in Cyrillic script. Further examination also revealed that the airplane was equipped with a cylinder head temperature (CHT) gauge that would react more quickly than an oil temperature gauge.

Two switches were located next to each other on the aft right upper surface of the “central control desk.” One controlled the oil cooler shutters and the other controlled the cowl flaps. Both switches were found in the off/closed position.

## **Additional Information**

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### Witness Video

Review of videos taken of the engine runup and takeoff indicated that the cowl flaps were closed while the airplane was on the ground and during the takeoff from TNT.

Video of the flight shot from a helicopter indicated that the smoke that began to emanate from the airplane before the accident was consistent with oil smoke.

### NTSB Interview

The pilot was interviewed at FXE by the NTSB and FAA on December 6, 2022. He stated that he had been flying for the contractor for years and the contractor had asked him to fly the accident airplane from TNT to FXE. Both he and the copilot were being paid for the flight.

He traveled to TNT about a week before the accident and made sure there was fuel in the airplane and oil in the engine. He then ran up the engine.

He then came back on another day, but cancelled the flight due to the wind conditions.

On the day of the accident, he started the engine, then took off from runway 9, flew over a levee, and was cruising at 600 feet. About 15 minutes after takeoff, he realized that he was going to have to land on the levee, as the engine began to blow more smoke than normal and was losing power. At 200 feet, the engine lost power completely and after landing on the levee, the airplane went off the side of the levee and nosed over.

When asked about the preflight, the pilot advised that he had conducted three different preflight inspections (once each time he had traveled out to TNT). When asked if he used a checklist each time, he responded no, and that he just used common sense.

When asked about the airplane flight manual he used, he advised that it was in Spanish, but the airplane was labeled in Russian, so his copilot translated what the labeling in the cockpit said. The manual had airspeeds listed in miles per hour, but the airplane was marked in kilometers per hour; the crew also only had pieces of the manual that were sent by a friend in Argentina. The pilot did not know if it was an official flight manual.

When asked about the runups, he advised that, after starting the engine with the inertial starter, he let the engine stabilize, then increased the rpm, built up pressure for the pneumatics, and checked the magnetos and flight controls.

When asked if everything was working correctly, he advised that the cylinder head temperature gauge did not work. When asked when he noticed that it did not work, he advised that it was on the very first runup.

When asked if he had the cowl flaps in the open position, he advised that he might have had them closed. When asked how they were operated on the airplane, he could not remember.

When asked about the oil cooler and where the switch was located to open and close the louvers, he did not remember anything about an oil cooler.

When asked about the oil temperature, he believed that it might have been indicating "high green."

When asked about his experience with radial engine airplanes, he advised that he had about 500 hours of radial engine time, but he had only flown an Antonov about 30 years before the accident, and he did not remember everything about it; however, review of the pilot's submitted NTSB Accident/Incident Report Form 6120 did not reflect that he or the copilot had any flight experience in the accident airplane make and model.

#### Flight Manual

Review of an English language version of the flight manual revealed that it contained parameters for engine operation that required opening and closing the oil cooler shutters and cowl flaps by referencing the temperatures presented on the CHT gauge. It also listed a maximum redline (never exceed) cylinder head temperature of 245°C.

#### FAA Advisory Circular (AC) 20-105C

According to AC 20-105C (Reciprocating Engine Power-Loss Accident Prevention and Trend Monitoring), mismanagement of the engine control systems by the pilot continues to be a leading cause of engine failure. The AC goes on to say, in part, that:

*Pilots and operators should review their aircraft's fuel and engine system operating requirements to help ensure that:*

- 1. The pilot is completely familiar with both the airframe and engine operating manuals, especially chapters concerning fuel management, engine power settings, use of carburetor heat, and each of the aircraft's systems' design, locations, and controls.*
- 2. The pilot adheres to all of the manufacturer's operating instructions, placards, and other limitations and avoids overtemp, overboost, and overspeed operations.*
- 3. The pilot uses the aircraft's checklist during normal and emergency operations.*

The AC also states that:

*Reciprocating engine reliability depends on the engine operating within a narrow performance range. This operating range has specific limits such as rpm, fuel flow and mixture settings, manifold pressure, CHT, oil pressure, and temperature, none of which should be exceeded. All reciprocating engines are temperature sensitive. Engine cylinders and valves can be damaged by thermal shock if the engine is not properly warmed up prior to full-power applications. Cylinder heads can also crack by allowing the engine temperature to cool off too rapidly.*

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Gunther, Todd
<b>Additional Participating Persons:</b>	Juan Garcia; FAA/FSDO; Miramar, FL Lisa K. Sanatana Fox; U.S. Customs and Border Protection; Washington, DC
<b>Original Publish Date:</b>	January 22, 2025
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class 3</a>
<b>Note:</b>	The NTSB did not travel to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.ntsb.gov/Docket?ProjectID=106294">https://data.ntsb.gov/Docket?ProjectID=106294</a>

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The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).