



# Aviation Investigation Final Report

<b>Location:</b>	Fort Lauderdale, Florida	<b>Accident Number:</b>	WPR18LA209
<b>Date &amp; Time:</b>	June 14, 2018, 12:00 Local	<b>Registration:</b>	N322HA
<b>Aircraft:</b>	Cessna 402	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Landing gear not configured	<b>Injuries:</b>	4 None
<b>Flight Conducted Under:</b>	Part 135: Air taxi & commuter - Non-scheduled		

## Analysis

About 20 minutes into the flight, the airplane experienced a total electrical failure. The pilot maneuvered the airplane in circles while attempting to troubleshoot the problem and perform emergency checklists. Despite his efforts, power was not restored, and the electrically actuated hydraulic landing gear would not extend. The pilot attempted to extend the landing gear using the emergency extension system, but when he pulled the T-handle, it broke off from its housing, separating it from the cable. After additional troubleshooting attempts on the electrical system, the pilot chose to land at a nearby airport, and the airplane landed on the runway with the landing gear retracted, which resulted in substantial damage to the fuselage. A mechanic who performed a postaccident examination of the airplane stated that the left starter motor and starter relay/solenoid had electrical shorts. Additionally, the starter relay remained in the closed position, which likely resulted in the airplane drawing a greater electrical load and draining the battery, leading to a complete loss of power.

The emergency extension T-handle was not examined after the accident. However, based on the pilot's account of the handle breaking off when he attempted to use the emergency extension system, it is likely this prevented the manual extension of the landing gear, which resulted in the forced landing with the landing gear retracted.

## Probable Cause and Findings

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

The failure of the left starter relay, which resulted in a loss of electrical power during the flight and the failure of the T-handle from the cable led to a forced landing with the landing gear retracted.

## Findings

Aircraft	Gear extension and retract sys - Malfunction
Aircraft	Ignition power supply - Malfunction

## Factual Information

### History of Flight

Enroute	Electrical system malf/failure
Landing-landing roll	Landing gear not configured (Defining event)

On June 14, 2018, about 1200 eastern daylight time, a Cessna 402C airplane, N322HA, was substantially damaged when it was involved in an accident near Fort Lauderdale, Florida. The pilot and three passengers were not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 135 on-demand air taxi flight.

The flight originated from Palm Beach International Airport, West Palm Beach, Florida, about 0830 and was destined for Andros Town International Airport, Fresh Creek, Bahamas. According to a statement submitted by the pilot's attorney, about 20 minutes into the flight, the pilot observed a low voltage annunciation. About 10 seconds after the annunciator light illuminated, the airplane experienced a total electrical failure. The pilot maneuvered the airplane in circles while attempting to troubleshoot the problem and run through emergency checklists. However, power was not restored, and the pilot understood that the hydraulic landing gear would not extend because it was electrically actuated. After running another checklist and attempting to extend the landing gear to no avail, the pilot made a low pass by a nearby airport tower, which confirmed the landing gear remained retracted. The pilot then attempted to use the emergency extension system for the landing gear and pulled hard on the T-handle. However, instead of actuating the gear, the T-handle broke off from its housing, separating it from the swaged cable.

The pilot performed another low pass by the tower and confirmed that the landing gear were still retracted. The pilot opted to continue to troubleshoot the electrical problem while burning off fuel. He then decided to perform a gear-up landing at Fort Lauderdale/Hollywood International Airport, Fort Lauderdale, Florida and briefed the passengers. The airplane landed on runway 10R with the landing gear retracted, which resulted in substantial damage to the fuselage.

A mechanic examined the airplane after the accident. He stated that a visual external examination revealed that the left starter motor had overheating damage. Disassembly of the starter motor revealed an electrical short inside the unit. He removed and examined the starter relay/solenoid; the relay stayed in the closed position and showed evidence of shorting out. He further stated that when the relay is in the closed position, the starter puts a large load on the airplane's electrical system, and the battery is not capable of maintaining a charge with a constant load draw.

## Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	21,Male
<b>Airplane Rating(s):</b>	Single-engine sea; Multi-engine sea	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 1 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	September 7, 2017
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	November 13, 2017
<b>Flight Time:</b>	(Estimated) 1342 hours (Total, all aircraft), 343 hours (Total, this make and model), 1213 hours (Pilot In Command, all aircraft), 144 hours (Last 90 days, all aircraft), 37 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Cessna	<b>Registration:</b>	N322HA
<b>Model/Series:</b>	402 C	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1981	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	402C0418
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	8
<b>Date/Type of Last Inspection:</b>	June 7, 2018 AAIP	<b>Certified Max Gross Wt.:</b>	6850 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	2 Reciprocating
<b>Airframe Total Time:</b>	6185.4 Hrs	<b>Engine Manufacturer:</b>	Continental
<b>ELT:</b>	C91A installed, not activated	<b>Engine Model/Series:</b>	TSIO520VB
<b>Registered Owner:</b>		<b>Rated Power:</b>	285 Horsepower
<b>Operator:</b>		<b>Operating Certificate(s) Held:</b>	On-demand air taxi (135)

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	KFLL, 11 ft msl	<b>Distance from Accident Site:</b>	0 Nautical Miles
<b>Observation Time:</b>	15:53 Local	<b>Direction from Accident Site:</b>	229°
<b>Lowest Cloud Condition:</b>	Few / 2500 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Broken / 12000 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	/	<b>Turbulence Type Forecast/Actual:</b>	None / None
<b>Wind Direction:</b>		<b>Turbulence Severity Forecast/Actual:</b>	N/A / N/A
<b>Altimeter Setting:</b>	30.11 inches Hg	<b>Temperature/Dew Point:</b>	29°C / 27°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Fort Lauderdale, FL (FLL )	<b>Type of Flight Plan Filed:</b>	VFR
<b>Destination:</b>	Fresh Creek, OF (MYAF)	<b>Type of Clearance:</b>	VFR flight following
<b>Departure Time:</b>	08:30 Local	<b>Type of Airspace:</b>	Class C

## Airport Information

<b>Airport:</b>	Fort Lauderdale/Hollywood Intl FLL	<b>Runway Surface Type:</b>	Concrete
<b>Airport Elevation:</b>	65 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	10R	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	8000 ft / 150 ft	<b>VFR Approach/Landing:</b>	Stop and go

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	3 None	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>		<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	4 None	<b>Latitude, Longitude:</b>	26.074443,-80.150833

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Keliher, Zoe		
<b>Additional Participating Persons:</b>	Mark Hemmerle; Federal Aviation Administration; Orlando, FL		
<b>Original Publish Date:</b>	May 25, 2021	<b>Investigation Class:</b>	3
<b>Note:</b>	The NTSB did not travel to the scene of this accident.		
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=97953">https://data.nts.gov/Docket?ProjectID=97953</a>		

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).