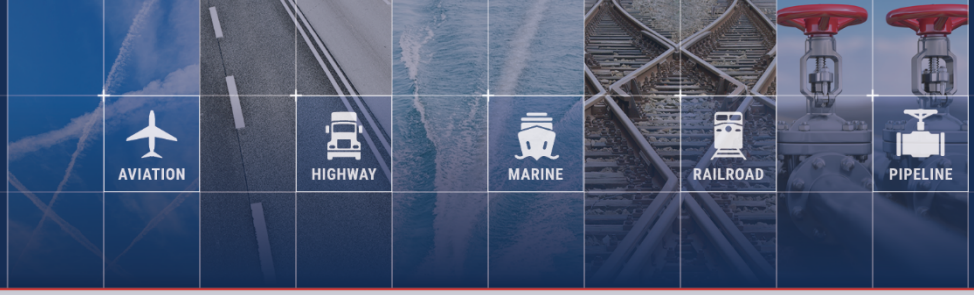

Aviation Investigation Final Report

Location:	Houston, Texas	**Accident Number:**	CEN20LA185
Date & Time:	May 19, 2020, 19:30 Local	**Registration:**	N501KM
Aircraft:	Cessna 501	**Aircraft Damage:**	Substantial
Defining Event:	Landing gear collapse	**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

On final approach to his destination airport, the pilot lowered the landing gear for a full stop landing. He received two of three green landing gear down position indicator lights. The left main landing gear light was not illuminated, and a warning horn sounded. The pilot recycled the landing gear and received the same result. The pilot queried the tower and another airplane to confirm that his landing gear were extended, and both told the pilot that they saw all three gear extended. Consistent with airplane manufacturer guidance, the pilot then performed maneuvers to generate lateral G-force on the landing gear in an attempt to get a gear locked indication on the left main gear, which was not successful. Upon landing, the left main landing gear collapsed, and the airplane veered off the runway, resulting in substantial damage to the left wing and underbelly of the airplane.

Examination of the airplane's landing gear system revealed the internal down lock mechanism of the left main landing gear actuator malfunctioned. The cockpit gear position indicator lights functioned normally. There were no recent logbook entries concerning anomalies with the left main landing gear.

Probable Cause and Findings

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

The malfunction of the left main landing gear down lock, which resulted in a gear collapse upon landing.

Findings

Aircraft	Landing gear actuator - Malfunction

Factual Information

History of Flight

Landing-flare/touchdown	Landing gear collapse (Defining event)

On May 19, 2020, about 1930 central daylight time, a Cessna 501, N501KM, sustained substantial damage when it was involved in an accident at Houston Hobby Airport (HOU), Houston, Texas. The pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

While on final approach to HOU, the pilot lowered the landing gear and received two of three green landing gear position indicator lights. The left main landing gear light was not illuminated, and a warning horn sounded. The pilot recycled the landing gear with the same result. He reported the situation to HOU tower and asked if they could visually see whether all the airplane's landing gear were down. The tower reported that all gear appeared down, as did the pilot of a commercial airliner who was taxiing on the airport.

As per the pilot operating handbook, the pilot initiated an aggressive bank right, followed abruptly by a left bank to generate sufficient lateral G-forces on the landing gear in an attempt to get a gear locked indication on the left main gear. This attempt did not work.

Upon landing, left main landing gear collapsed, the airplane veered left and came to a stop in a grassy area adjacent to runway resulting in structural damage to the left wing and underbelly of the airplane. The pilot exited the airplane and airport emergency services responded. Recovery personnel manually lifted and locked the left main landing gear down, and the airplane was towed to a hangar facility. The pilot reported that he decided to land because the left main landing gear indicator light had malfunctioned in years past, and it was found that the light had malfunctioned rather than the landing gear.

The landing gear was examined under the supervision of a Federal Aviation Administration (FAA) airworthiness inspector. Utilizing ground hydraulic and electrical power, the landing gear was cycled about 30 times with various hydraulic pressures. Both the nose landing gear and right main landing gear functioned normally. The cockpit landing gear position lights (nose, left main, and right main) functioned normally. The left landing gear actuator never locked in the down position under any hydraulic pressure setting. The only way to attain a locked down left main landing gear was to manually push the gear outward to the down and locked position. When the landing gear was pushed into the locked position, the left main landing gear down indicator light illuminated green.

Evaluation of the left main landing gear actuator revealed that its internal down-lock mechanism was not functioning. According to the certified repair facility, the actuator is a

component that is normally replaced at interval (37,000 cycles) or as needed. The FAA inspector reported that the aircraft logbook showed the left main actuator was original to the airplane and was last inspected on July 6, 2017, at 5,287 cycles. The logbook did not show any recent entries concerning anomalies with the left main landing gear.

Pilot Information

Certificate:	Commercial	**Age:**	71,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	January 7, 2019
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	October 18, 2019
Flight Time:	4107 hours (Total, all aircraft), 1324 hours (Total, this make and model), 4107 hours (Pilot In Command, all aircraft), 25 hours (Last 90 days, all aircraft), 10 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N501KM
Model/Series:	501 No Series	**Aircraft Category:**	Airplane
Year of Manufacture:	1979	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	501-0101
Landing Gear Type:	Retractable - Tricycle	**Seats:**	7
Date/Type of Last Inspection:	December 16, 2019 AAIP	**Certified Max Gross Wt.:**	11850 lbs
Time Since Last Inspection:	104 Hrs	**Engines:**	2 Turbo fan
Airframe Total Time:	5585 Hrs at time of accident	**Engine Manufacturer:**	Pratt & Whitney
ELT:	C91A installed, not activated	**Engine Model/Series:**	JT15D-1A
Registered Owner:	On file	**Rated Power:**	2200 Lbs thrust
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	HOU,46 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	19:32 Local	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	11 knots / None	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:	200°	**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.76 inches Hg	**Temperature/Dew Point:**	30°C / 21°C
Precipitation and Obscuration:			
Departure Point:	Gainesville, FL (GNV)	**Type of Flight Plan Filed:**	IFR
Destination:	Houston, TX (HOU)	**Type of Clearance:**	IFR
Departure Time:	17:32 Local	**Type of Airspace:**	Class B

Airport Information

Airport:	William P Hobby HOU	**Runway Surface Type:**	Asphalt
Airport Elevation:	46 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	13R	**IFR Approach:**	None
Runway Length/Width:	7599 ft / 150 ft	**VFR Approach/Landing:**	Full stop;Straight-in

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	29.6459,-95.2769(est)

Preventing Similar Accidents

Manage Risk: Good Decision-making and Risk Management Practices are Critical (SA-023)

The Problem

Although few pilots knowingly accept severe risks, accidents can also result when several risks of marginal severity are not identified or are ineffectively managed by the pilot and compound into a dangerous situation. Accidents also result when the pilot does not accurately perceive situations that involve high levels of risk. Ineffective risk management or poor aeronautical decision-making can be associated with almost any type of fatal general aviation accident.

What can you do?

- Develop good decision-making practices that will allow you to identify personal attitudes that are hazardous to safe flying, apply behavior modification techniques, recognize and cope with stress, and effectively use all resources. Understand the safety hazards associated with human fatigue and strive to eliminate fatigue contributors in your life.
- Understand that effective risk management takes practice. It is a decision-making process by which you can systematically identify hazards, assess the degree of risk, and determine the best course of action.
- Be honest with yourself and your passengers about your skill level and proficiency. Refuse to allow external pressures, such as the desire to save time or money or the fear of disappointing passengers, to influence you to attempt or continue a flight in conditions in which you are not comfortable.
- Be honest with yourself and the FAA about your medical condition. If you have a medical condition or are taking any medication, do not fly until your fitness for flight has been thoroughly evaluated.
- Plan ahead with flight diversion or cancellation alternatives, and brief your passengers about the alternatives before the flight.

See https://www.ntsb.gov/Advocacy/safety-alerts/Documents/SA-023.pdf for additional resources.

The NTSB presents this information to prevent recurrence of similar accidents. Note that this should not be considered guidance from the regulator, nor does this supersede existing FAA Regulations (FARs).

Administrative Information

Investigator In Charge (IIC):	Lemishko, Alexander
Additional Participating Persons:	Carl Thomas; FAA FSDO; Houston, TX
Original Publish Date:	July 12, 2022
Last Revision Date:	
Investigation Class:	Class 3
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=101313