SERIOUS INCIDENT

Aircraft Type and Registration:	Beechcraft 95-B55 Baron, 2-NOVA
No & Type of Engines:	2 Lycoming O-540 piston engines
Year of Manufacture:	1961 (Serial no: TC-1272)
Date & Time (UTC):	13 August 2021 at 1232 hrs
Location:	Gloucestershire Airport
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Landing gear door damaged
Commander's Licence:	Private Pilot's Licence
Commander's Age:	53 years
Commander's Flying Experience:	398 hours (of which 31 were on type) Last 90 days - 6 hours Last 28 days - 2 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB

Synopsis

The pilot reported that he was unable to resolve an electrical problem during the flight. After the loss of aircraft electrical systems, he extended the landing gear manually, but almost ran out of fuel due to a lack of fuel quantity indication.

History of the flight

The pilot was flying the aircraft to Dunkeswell Aerodrome for its annual check. He selected the auxiliary fuel tanks during the flight, believing that they contained sufficient fuel for the intended journey. The flight was uneventful until there was an electrical problem with "a warning light" and no current flow displayed on the ammeter. Unable to rectify the problem he diverted to Gloucester Airport, where ATC told him he could land without delay. He selected the landing gear down, but the aircraft then lost electrical power. The pilot was unable to confirm if the landing gear had extended or communicate with ATC using the radio. He spoke to ATC using his mobile telephone and, after a low-level pass, they told him that the landing gear was not down.

He selected the fuel mixture to rich and the propeller pitch to fine and flew away from the airport to an area where he could orbit whilst he tried to lower the landing gear using the manual extension system. Having never done this before, he "exercised the gear twice"

to make sure it was down[1]. He was unable to monitor the fuel status because the gauges stopped working when the electrical power was lost.

He returned to Gloucester for another low-level pass to check the landing gear and approached Runway 27 "relatively steeply looking to level at 300 feet". He increased engine power just outside the airport perimeter but the left engine did not respond. The aircraft yawed to the left, bringing Runway 22 into view, and the pilot managed to land immediately without further incident.

Aircraft examination

Both hinges on the right main landing gear door were found to be broken (Figure 1). There was no other damage to the aircraft.

Figure 1

Right main landing gear door retained by the two lower links

The left auxiliary fuel tank was reported to have been found empty, and the right auxiliary tank contents were low. The main tanks were quarter-full[2], and the fuel selector was found in the auxiliary tank position.

Functional tests on the aircraft at Gloucester did not identify an electrical fault, and the pilot subsequently flew it to Dunkeswell for its annual service.

Footnote

1 The Pilot's Operating Handbook (POH) contains a cautionary note that the manual extension system should not be used to retract the landing gear.

2 This is the reported tank contents as shown on the fuel gauges.

Aircraft information

Alternators

2-NOVA is equipped with two alternators, each with its own associated ammeter (loadmeter) on the aircraft instrument panel. Each alternator can be turned ON or OFF independently using toggle switches on the instrument panel. There are two voltage regulators to control the alternators, but only one regulator is in use at any time. The pilot can select the active regulator using a two-position selector switch.

Landing gear

The landing gear is electrically actuated but there is also a manual emergency extension system. A cautionary note in the Pilot's Operating Handbook (POH) states that the emergency system should not be used to retract the landing gear. The aircraft manufacturer advised that there is very little clearance between the landing gear doors and the adjacent wing skins, and manually retracting the landing gear can pull it up too far, stressing the hinges.

Analysis

The pilot was unable to resolve the electrical problem using the alternator switches, but he did not select the alternate voltage regulator, so it is not known if this action would have rectified the issue.

The pilot used the emergency landing gear manual extension system twice, which was contrary to the POH. The aircraft manufacturer said that the landing gear can over-travel if it is retracted using the manual system, thereby adversely loading the hinges. Both hinges were found to be broken after the aircraft landed and it is possible that retracting the gear manually could have caused or contributed to this.

The pilot selected the auxiliary fuel tanks during the flight, but was unable to monitor their contents after the loss of electrical power. He believed that there was sufficient fuel for the originally intended journey but might have become preoccupied with the landing gear and did not consider his increased fuel usage and the effect of selecting the fuel mixture to rich and the propeller to fine. There was limited fuel remaining in the auxiliary tanks as he approached the airport for another flypast and the left engine did not respond when he tried to increase power. The aircraft yawed to the left as the right engine power increased, and he was able to land immediately on an alternate runway that came into view.

Conclusion

The pilot reported that the aircraft suffered an electrical problem in flight, and he was unable to restore electrical power. He used the emergency landing gear extension system twice, and almost ran out of fuel as he positioned the aircraft for a visual inspection. He was able to land immediately when the aircraft yawed to the left and an alternate runway came into his field of view.

This event is a reminder of the importance of referring to the POH in unfamiliar situations and the need to consider the implications of unexpected events on fuel status.