EAA Chapter 81 Minutes
October 16, 2021

President Erik Fjerstad opened the meeting at 10AM in the Ryan Airfield Administration Building meeting room.

Secretary's Report - Secretary Bob Miller was not present, so to our dismay, we were unable to force him to read his previous meeting minutes. We therefore reluctantly approved them as posted in the newsletter.

Treasurer's report - Kevin Byers reported the chapter's bank balance is 11,300 after the deposit of the proceeds from the sale of the chapter's donated Cessna 140 aircraft.

New Business - Tim Kaping of Tucson has a Stitts Playboy SA3B aircraft (2-place, side-by-side, tailwheel) that hasn't been used for some years and has agreed to donate to the chapter. I brought the offer to the chapter board and received a unanimous (of those responding) affirmative agreement. Our options upon accepting the aircraft would be to sell as-is, make flyable and sell to a 3rd party (person or flying club), or donate as-is to a museum or other 501-c3 organization. This was described to the chapter in the monthly meeting and vocal concurrence was received. The aircraft will be formally transferred to the chapter and moved into the hangar after the meeting.

Next up was the featured speaker, Erik Fjerstad, presenting on aircraft starting systems including batteries, interconnecting cables, and starters. Erik presented an overview of aircraft starter systems including how the components are configured including size and capacity. From first principles Erik calculated the power needed to adequately spin up a Lycoming O-360-A3A (180 hp, 8.5:1 compression). The estimated peak power was 3 hp, with an average of 2 hp once rotating, implying peak currents of 300 amps and continuous currents of 200 amps, which compare favorably to measurements taken on Erik's aircraft. At these currents any resistance in the system, whether cables, connections, or internal battery resistance, is unwelcome. Traditional voltmeters and ohmeters can be used to assess most cables and connections, with a good guide being a maximum of 0.5 ohms total for all interconnect (cables from the battery (plus) to the starter relay, the relay itself, the cables from the starter relay to the starter, and the cable or path from the starter case (ground) to the battery negative. , The assessment of battery performance requires more specialized tools. Generally, the battery must be loaded to 300 amps and confirmed to maintain at least 8 volts. If an airplane engine won't start because it won't "crank over fast enough", the current and voltage at the starter can be measured during the start attempt and the general diagnosis is..... voltage above 8 and inadequate spin

means a bad starter. Voltage below 8 and current at or below 300 means a bad battery.

The test should be repeated measuring the voltage at the battery during the test, and if the voltage at the battery (+ to -) is more than 2v higher than the voltage at the starter (starter + to case) with the current over 200, there is a connection problem that should be tracked down - the wire gauge is too small, or the bolted connections are loose, or the starter relay is bad. Erik presented details on a number of test instruments that he has, including a 600 amp DC meter that clips around the battery lead, a 500 amp variable DC load for battery testing, plus a battery conductance tester that rapidly performs a load test to determine battery health and internal resistance. A healthy Odyssey battery will have a CCA of over 500 and an internal resistance of less than 10 milliohms.

Readings of less than 200 CCA and more than 15 milliohm suggest a problem worth investigating with a variable 500 amp load tester. If you have a starting problem and have any doubt as to what the root cause is, have Erik help you work it out. Erik also presented information on current battery technologies including the new Earth-X lithium iron phosphate batteries now finding their way into GA aircraft.

The next meeting will involve a review of the Stitts S3AB project in the chapter hangar on 20 November.

Respectfully,
Erik Fjerstad