NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Washington, D.C. 20594

July 6, 2022

Maintenance Group Chairman's Factual Report

NTSB No: ENG20LA016

A. ACCIDENT:

Operator:	Spirit Airlines
Aircraft:	Airbus A319, Registration number N521NK
Location:	Sacramento, Ca
Date:	February 15, 2020
Time:	0742 Pacific Daylight Time

B. GROUP MEMBERS:

Group Chairman:	Pocholo Cruz National Transportation Safety Board Washington, DC
Member:	Patrick Lusch Federal Aviation Administration Washington, DC

C. SUMMARY:

On February 15, 2020, Spirit Airlines flight 1818, an Airbus A319-132, registration N521NK, experienced a loss of both electrical main generators while on approach to the Sacramento International Airport (SMF), Sacramento, California. The flight crew switched to auxiliary power and landed uneventfully with the ram air turbine (RAT) extended and activated. The airplane was towed to the gate, and passengers deplaned normally. There were no reported injuries to the 112 passengers and 5 crew members. The flight was operated as a 14 Code of Federal Regulations Part 121 scheduled passenger flight from the McCarran International Airport (LAS), Las Vegas, Nevada to SMF

D. DETAILS OF THE INVESTIGATION:

D.1 Spirit Airlines Maintenance

D.1.1 Spirit Defect Report/Logbook

The following Table below shows the Maintenance Logbook/Defect Reports prior to the incident.

Date	Logpage	Discrepancy	Corrective Action
1/9/2020	2473173	#1 & #2 engine require oil servicing.	Serviced the #1 EMG with 1 quart of oil and #2 engine with 3 quarts of oil IAW AMM 12-13-79
1/19/2020	2554158	During taxi, after landing, shut down ENG 2. 2-3 minutes later, lost all electrical power plus the nose wheel steering.	Performed ENG 1 run up IAW AMM 71-00-00. Full load supported by GEN 1 and no faults noted. Ok for continued service.
1/21/2020	2554163	#1 ENG requires oil servicing.	Serviced #1 ENG with 3 quarts of oil IAW AMM 12-13-79.
	2554164	#2 engine requires oil servicing.	Serviced # 2 ENG with 2 quarts of oil IAW AMM 12-13-79.
1/23/2020	2554168	Lost GEN1, the nose wheel steering and all associated electrical components during single engine taxi. ELEC GEN 1 fault ECAM followed.	Performed the operational test for the AC main GEN 1 IAW AMM 24-22-00. No Faults were noted.
2/3/2020	2554193	#1 ENG requires oil service.	Serviced #1 engine with 2 quarts of oil IAW AMM 12-13-79.
	2554194	#2 ENG required oil service	Serviced #2 engine with 2 quarts of oil IAW AMM 12-13-79.
	2554196	#2 ENG IDG oil level low	Serviced #2 ENG IDG oil IAW AMM 12-13-24
2/10/2020	2546963	ENG 2 requires oil servicing	Serviced ENG 2 to FULL with 4 quarts of engine oil IAW AMM 12-13-79
		ENG 1 requires oil servicing	Serviced ENG 1 to FULL with 3 quarts of engine oil IAW AMM 12-13-79
2/14/2020	2546972	Dual Gen Fault and Failure. RAT deployed and APU Started. ECAM actions completed	Found IDG Oil levels good IAW 12-13-24. Stowed RAT IAW AMM 29-22-00. Ran engines IAW AMM71-00-00. Ops check good IAW AMM 24-41-00. No defects noted. OK for continued service. This is an SDR Reportable Item.
2/15/2020	2546974	Per MOC request, ENG 1 & ENG 2 with GEN 1 And GEN2 load checks requested.	Performed ENG1 + ENG2 run IAW AMM 71-00-00 GEN 1 + 2 put through various loads together and independently. No faults noted.
	2546977	Loss of AC Bus 1+2 on down wing (sic) to KSMF RAT is out. Also noticed CB E 14 OUT we didn't touch.	Removed and replaced #2 Engine Generator and GCU on L/P 2546981-2 Removed and Replaced #1 engine generator and GCU on L/P 2546982-1 accomplished all electrical ops checks on L/P 2546986-1
2/17/2020	2546979	Interigatco (sic)troubleshooting data for GAPCU, found fault for Ext Pwr plug/wrg ext pwr inti (sic)	Removed and replaced GAPCU 24X6 IAW AMM 24-41-34. Ops Ck Good IAW AMM 24-4134
	2546980	During inspection, found smoke/burn marks on outside (sic) of bus the contactor 3XC	Removed and replaced bus tie contractor 3XC IAW 24-25-55. Ops check good
	2546981	As precautionary, Engine 2 Generator Contactor 9X02 requires replacement.	Removed and replaced Gen #2 contactor 9X02 IAW AMM 24-22-55. Ops Good.
		Due to ENG 2 GEN FAIL in flight and CLIM troubleshooting data showing IDG2 SERVO VLV/GCU 2	Removed and replaced GCU2 IAW AMM 24-22-34. Ops check good.
	2546982	Due to ENG 1 GEN FAIL in flight and CLIM troubleshooting data showing IDG1 SERVO VLV/GCU1	Removed and replaced GCU1 IAW AMM 24-22-34. Ops check good. Removed IDG #1 shaft seal assy.
		Per TSM 24-50-00-810-816-A, As precautionary, Didde (sic) module 2420VD requires replacement	Removed and replaced didde (sic) module 2420VD IAW ESOM 20-44-23. Ops chk good.

Table 1 – Spirit Logbook writeups

D.2 Integrated Drive Generator (IDG) Maintenance:

A review of the data provided by Spirit Airlines on October 15, 2020, show Sprit Airlines having approximately 108 IDGs installed in its fleet of A319 having been repaired/overhauled by Lufthansa Technik.

#1 IDG (P/N 772292; S/N 1266) was installed on the incident aircraft on November 12, 2017, in PHL (Philadelphia, PA) and was removed on February 17, 2020 in SMF (Sacramento, CA). According to Spirit Airlines records, the #1 IDG was installed for approximately 827 days and accumulated 8,582 hours and 3,693 cycles prior to its removal.

#2 IDG (P/N 772292; S/N 1157) was installed on the incident aircraft on March 29, 2017 in MCO (Orlando, FL) and was removed on February 17, 2020 in SMF (Sacramento, CA). According to Spirit Airlines records the #2 IDG was installed for approximately 1,055 days and accumulated 10,584 hours and 4,581 cycles prior to its removal.

Spirit Airlines outsources the Repair/Overhaul of the A319 IDGs to Lufthansa Technik in Hamburg, Germany. Similarly, Lufthansa Technik outsources the repair/overhaul of certain components of the IDG to other vendors.

In the case of the incident IDGs' Cylinder Blocks (Both Fixed and Variable), Lufthansa Technik records show they were outsourced for repair/overhaul to Aircraft Component Repair Inc. in Valencia CA. The NTSB Materials Lab examined the Cylinder Blocks from the incident IDGs in conjunction with the Aircraft Component Repair Inc. repair and overhaul procedures. Results from the Examination can be seen in the NTSB Materials Lab Report.

According to Lufthansa Technik Repair and Overhaul records (EASA Form 1), the #1 IDG (S/N 1266) was released from Lufthansa Technik on September 26, 2017 (previously October 2013) and the #2 IDG (S/N 1157) was released on March 2, 2017 (previously October 2009).

D.3 Airbus:

Based on the current findings of the investigation, Airbus launched two actions:

1. Trouble Shooting Manual (TSM) update

During Airbus Troubleshooting Analysis of incident, Airbus have identified improvements to the TSM to help maintenance teams better manage events encountered in this case. Airbus has created specific crew observation entries to direct the maintenance towards a direct extraction of the Post Flight Report and the Troubleshooting Data. The revised TSM was released in August 2021.

2. Maintenance Planning Document (MPD) update

Airbus plans to introduce new recurrent maintenance tasks in the MPD to check the correct operation of the electrical generators, especially in case of failure and reconfiguration into single generator operation (mono-IDG or APU GEN only). The objective would be to detect degraded IDGs/APU GEN and replace them before they fail in service.

The MPD update including these new tasks (pending approval of the Industry Working Group & European Aviation Safety Agency) are scheduled for 2023.