

ALERT BULLETIN

AB 2017:1/3-1

2/1/2017

1382304

TO: Boeing Commercial Airplane Company, FAA (AFS-300)

INFO: FAA (AVP-1, AVP-200, AFS-200, AFS-280, AFS-900, ANM-100, SEA-ACO, SEA-AEG, AQS-230), A4A, AFA, ALPA, AMFA, APFA, ASAP, ATSG, CAPA, IAM, ICAO, ICASS, IFALPA, NTSB, PAMA, SWAPA, TWU

FROM: Linda J. Connell, Director
NASA Aviation Safety Reporting System

SUBJ: B737-900 Electrical System Anomaly

We recently received an ASRS report describing a safety concern that may involve your area of operational responsibility. We do not have sufficient details to assess either the factual accuracy or possible gravity of the report. It is our policy to relay the reported information to the appropriate authority for evaluation and any necessary follow-up. We feel you should be aware of the following:

ASRS received a report from a B737-900 Captain describing an electrical power issue that resulted in the loss of multiple systems. The reporter stated that it was unclear to the flight crew which QRH procedure would be most effective in dealing with the multiple failures. Additional systems continued to fail as the flight progressed, and a divert to a nearby alternate was requested. On the ground, it was determined the primary cause of the failure was the #1 GCU, and there is reportedly no specific annunciation of the fault, and no QRH procedure that directly addresses this failure.

To properly assess the usefulness of our alert message service, we would appreciate it if you would take the time to give us your feedback on the value of the information that we have provided. Please contact Dennis Doyle at (408) 541-2831 or email at dennis.j.doyle@nasa.gov



Aviation Safety Reporting System
P.O. Box 189 | Moffett Field, CA | 94035-0189



ACN: 1382304

Time

Date: 201608

Local Time Of Day: 0601-1200

Place

Locale Reference.Airport: ZZZ.Airport

State Reference: US

Altitude.MSL.Single Value: 33000

Environment

Flight Conditions: VMC

Aircraft 1

ATC / Advisory.Center: ZZZ

Make Model Name: B737-900

Component 1

Aircraft Component: Electrical Power

Person 1

Function.Flight Crew: Captain

Function.Flight Crew: Pilot Not Flying

ASRS Report Number: 1382304

Events

Anomaly.Aircraft Equipment Problem: Critical

Detector.Automation: Aircraft Other Automation

Detector.Person: Flight Crew

Result.General: Maintenance Action

Result.Flight Crew: Diverted

Result.Flight Crew: Landed in Emergency Condition

Result.Air Traffic Control: Provided Assistance

Narrative 1

We departed in a timely manner with no mechanical issues. This was day 3 of 3 and the crew was working well together. We also had a jumpseater on the flight deck. We were eating breakfast when numerous faults occurred:

#2 Electric hydraulic pump
#1 FWD fuel pump low pressure
#2 Aft fuel pump low pressure
TR (Transformer Rectifier) Unit
#1 associated generator pitot systems
Equipment cooling exhaust
GPWS off
Yaw damper

I then asked for the aircraft and had the first officer run the QRH. This is where we had some quick discussion on what checklist to run. We decided to run the TR unit checklist knowing we had an electrical problem. This checklist was a dead end. We didn't have a Generator source off light but had a major electrical power issue. I then knew we needed to get [Maintenance

Control] involved. A quick call to the flight attendants to get rid of our trays and an initial heads up we have an aircraft problem.

I transferred controls back to the First Officer. I asked the First Officer to descend to FL250 so we could have full use of the APU if needed by a checklist. I tried to go to the ACARS to prompt dispatch to call us. ACARS was unavailable. I then remember at the time of the master caution we had lost both FMCs. This was overlooked because it fixed itself during our initial system check. I then contacted commercial radio to make contact with dispatch and [Maintenance Control]. During our brief conversation we discussed no amps on TR1. We then lost communication on Radio 2 with dispatch and [Maintenance Control]. Shortly after this the speed trim and stab trim were lost noted by the First Officer and jumpseater during the descent. He then began to hand fly the aircraft with no vertical display from the flight directors. Flight Attendants called and explained they also had lost power to certain items. I believed at that time we were about to lose even more system since systems continued to lose a power source.

I then contacted ATC. I also asked for direct [to a nearby alternate] with radar vectors not knowing if we would continue to lose systems. We at that time went from trying to fix problems to getting the aircraft to a safe airport. Battery discharge was also noted during this phase of flight. I changed destination in the FMC and gave him heading select. I communicated with the flight attendants and passengers we were heading to [an alternate] and it would be a normal landing.

Approach was normal but we continued to lose systems, autobrake, speed brake, and the Primary Flight Display began to cycle with a sound coming from the panels. This event was a high stress situation with only system knowledge and the help of my crew to make wise decisions. I feel we worked well as an entire crew, Flight Attendants and the jumpseater included. I'm glad we chose to go to [an alternate] as soon as possible.

Callback 1

The reporter stated that the cause of the massive electrical failure was the #1 GCU (Generator Control Unit) had failed, therefore all systems associated with #1 GCU failed. The reporter stated he received information from Maintenance that when this occurs the aircraft system is designed to prevent any other system (i.e. APU or #2 GCU) from powering the failed systems. The reporter also stated that there is no indication in the flight deck when a GCU fails or any procedure in the QRH that addresses this type of failure. The reporter stated that flying for 20+ years he has never seen this type of failure.

Synopsis

A B737-900 Captain reported being alerted to numerous faults which indicated a massive electrical failure.