MV Systems Architectures

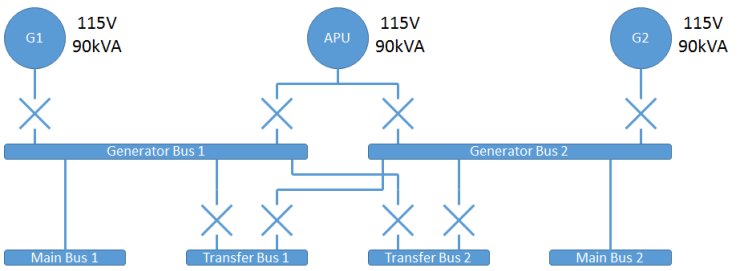
Power system architectures to integrate with existing aircraft architectures were developed. Higher voltages were added for the large power requirements for the BLI fans.

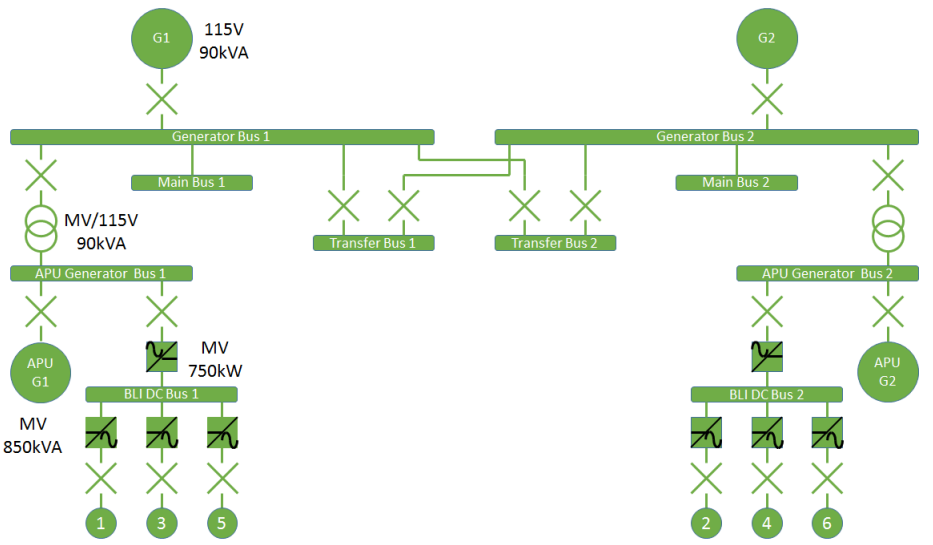
Figure 1 is the power system architecture on a current 737 (classic).

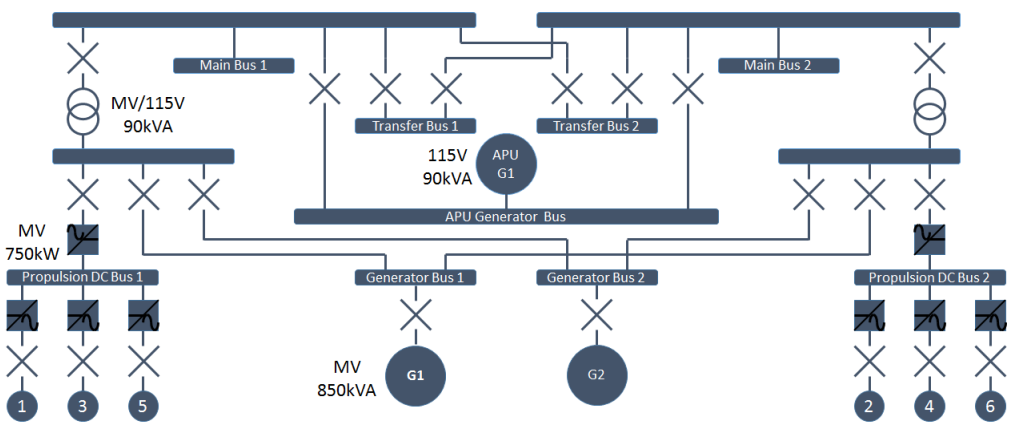
Figure 2 shows the addition of 6 off 250kW BLI fans in two banks of three, each bank fed from a medium voltage (≥ 1kV) dc busbar. 2 off 850kVA medium voltage generators are added to power the fans. MV / LV transformers are required to support the engine generator busses in the event of an engine generator failure.

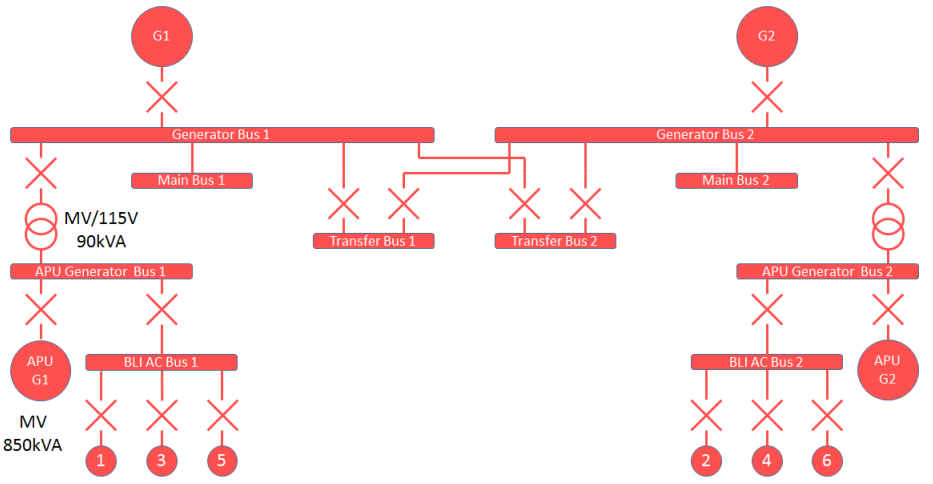
Figure 3 shows an alternative power system architecture with the engine driven generators upgraded to power the BLI fans.

Figure 4 shows an architecture which assumes operation of the BLI motors at constant speed, subject to detailed design of the motor.









Architectures which allow a staged development of higher voltage systems without the requirement to re-certify all loads for operation at these higher voltages have been proposed. This phased introduction of higher voltage systems is required for the electrical network to power the large BLI motors. Initially, the dc medium voltage busses allows for a battery to power the BLI motors but longer term this power would be provided either by a new design of APU with large, medium voltage generators or by larger engine drive generators.

At the higher voltages proposed here, all switching is done at ac for safety and reliability. For the foreseeable future, this switching will be done by specialist vacuum circuit breakers such as the Self-Actuating Vacuum Interrupter (SAVI) device also investigated under the EPSRC Systems theme.