

**SERIOUS INCIDENT**

<b>Aircraft Type and Registration:</b>	Boeing 747-436, G-BNLW	
<b>No &amp; Type of Engines:</b>	4 Rolls-Royce RB211-524G2-T-19 turbofan engines	
<b>Year of Manufacture:</b>	1992 (Serial no: 25432)	
<b>Date &amp; Time (UTC):</b>	14 October 2013 at 0630 hrs	
<b>Location:</b>	In flight, approx 2 hours from London Heathrow Airport	
<b>Type of Flight:</b>	Commercial Air Transport (Passenger)	
<b>Persons on Board:</b>	Crew - 17	Passengers - 274
<b>Injuries:</b>	Crew - None	Passengers - None
<b>Nature of Damage:</b>	Fire damage to In-Flight Entertainment (IFE) unit and surround	
<b>Commander's Licence:</b>	Airline Transport Pilot's Licence	
<b>Commander's Age:</b>	42 years	
<b>Commander's Flying Experience:</b>	14,574 hours (of which 6,578 were on type) Last 90 days - 187 hours Last 28 days - 24 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot	

**Synopsis**

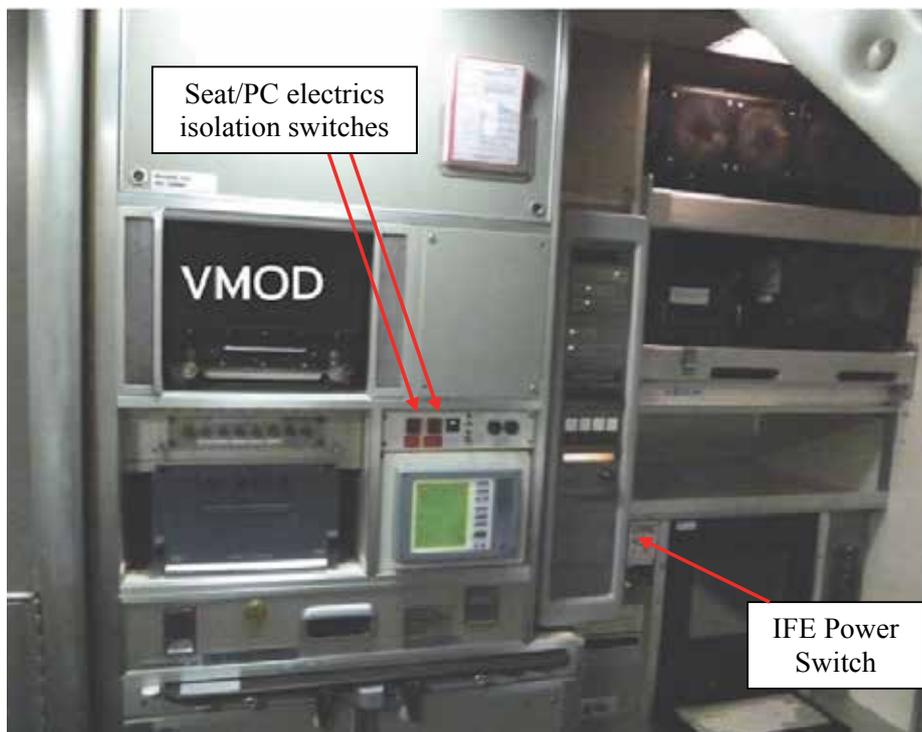
The aircraft was about 2 hours from its destination, when the flight crew and some members of the cabin crew smelt an "acrid, electrical burning smell". Flames and smoke were then reported to be emanating from an item of In-Flight Entertainment (IFE) equipment located in the Galley 4 area. The cabin crew tackled the fire with BCF extinguishers but had difficulty due to continual re-ignition of the fire. It was subsequently considered that the unit had not been electrically isolated during the event and the operator has accordingly made several internal safety recommendations regarding both cabin and flight crew procedures and training.

**History of the flight**

The aircraft was on an overnight flight from Dallas/Fort Worth Airport, USA, to London Heathrow Airport. At approximately 0628 hrs, as the aircraft was about 2 hours from its destination, both pilots noticed a smell reminiscent to them of disinfectant, and they checked the cockpit door surveillance system to ascertain whether the forward toilet on the upper deck was being cleaned. Whilst they discussed the smell, the upper deck cabin crew member called them to report a "funny smell" and during the course of the conversation, the flight crew noted that the smell became a "strong, acrid electrical burning smell".

The call was terminated when a >SMOKE LAVATORY EICAS message was received, indicating that smoke was detected either in a lavatory or in the cooling duct of the IFE system. The upper deck cabin crew member went to investigate whilst the commander handed control to the co-pilot and consulted the Non-Normal Checklist (NNC) for the caption SMOKE LAVATORY in the Quick-Reference Handbook. There were no flight crew actions in the NNC associated with this message. The flight crew elected not to don oxygen masks nor to broadcast a distress call.

About 2 minutes later, the commander received calls from two cabin crew members who stated that flames were visible in Galley 4, situated between doors 2 left and 2 right, and these were being tackled with BCF extinguishers. An open communication line to the flight deck was maintained throughout the event. The smoke and flames were emanating from a component of the IFE equipment called the Video Modulator (VMOD), situated in the Cabin Service Director's (CSD) office in Galley 4 (Figure 1). A third cabin crew member tried to discharge the first extinguisher but mishandled it, so another crew member took over. Ultimately, five extinguishers were used because the fire appeared to re-ignite repeatedly. Eventually the cabin crew were able to report that the fire was out.



**Figure 1**

View of Galley 4 and CSD's office showing location of IFE VMOD and associated switches

At about this time, the flight crew consulted the 'Smoke, Fire or Fumes' NNC but did not action any of the checklist items. They considered the incident was over and they were concerned about degrading the lighting in the cabin which was a consequence of removing utility power as part of the procedure. A senior cabin crew member later called to confirm

that the fire was out and the flight crew placed the air conditioning packs in 'high-flow' to try and clear the odour. The VMOD had been removed and was secured in a trolley. The event was deemed to be over by 0640 hrs and normal cabin service was resumed.

### Relevant crew drills

The operator's cabin crew were issued with a type-specific 'Safety Equipment and Procedures Manual' during training and a copy was held in the CSD's office in Galley 4. The section of the manual dealing with an IFE smoke warning was prefaced with the sentence:

*'When dealing with a potential electrical problem or fire involving the IFE system located beneath a passenger seat, seat power and IFE power must first be switched off as follows:'*

The first action was to press two guarded switches in the CSD's office ( Figure 1) labelled 'SEAT/PC ELECTRICS ISOLATION' for first class and business/premium economy class cabins.

*'This isolates power to the passenger seat controls and PC power outlet in the respective cabins. These switches illuminate ISOLATED when the isolation function is activated.'*

The next action was to press a guarded switch on another panel in Galley 4 labelled 'IFE POWER' which:

*'Isolates power to the distributed video system.'*

Essentially the same instructions were contained in a cabin crew 'B747 Quick Reference Guide' but the operator found that its existence was only highlighted during initial training and that no initial or recurrent training was given as to its use. It was not referred to during the incident.

The flight crew 'Smoke, Fire or Fumes' NNC contained a number of actions of which number 4 was:

*'Instruct the Cabin Crew to turn off the main IFE and PC power switches (as installed)'*

Action number 7 was:

*'Utility power switches.....OFF'*

This action would have isolated a number of non-essential electrical services, including the main cabin lighting and completely de-powered the IFE system but, for the reasons stated previously, the flight crew did not carry out this checklist.

## Analysis

The VMOD unit was sent to its manufacturer for investigation but, at the time of preparation of this account, their report has not been received. However it was noted that the unit is certified to self-extinguish when electrically isolated.

An internal investigation by the operator concluded that it was likely the VMOD had remained powered during the incident and this was the reason it continued to re-ignite. One of the cabin crew described how he believed he had isolated the IFE, but his description of events suggested that he had only actioned the 'SEAT/PC ELECTRICS ISOLATION' part of the 'Safety Equipment and Procedures Manual' and that this had been done from memory.

The operator's investigation included a number of Recommended Actions concerning cabin crew training, both in regard to use of checklists, operation of extinguishers and their understanding of the electrical equipment in the CSD's office.

In addition, the operator is reviewing the flight crew QRH, to ascertain whether annunciated smoke warnings such as >SMOKE LAVATORY be linked to the 'Smoke, Fire or Fumes' NNC in order to prompt flight crews to consider actioning the latter at an early stage. Flight crew training for the 'Smoke, Fire or Fumes' NNC drill, particularly use of Oxygen and the functionality of the Utility Switches, will also be reviewed.