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## Nimrod MR Mk2 General Condition Survey Report

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QINETIQ/MS/SES/TR0900165/1  
17 February 2009

82 pages

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## Administration page

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### Customer Information

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Customer reference number	DE&S (WYT)/4/3/2/12/1 dated 27 May 2008
Project title	Nimrod Ageing Aircraft Audit
Customer Organisation	Nimrod IPT DE&S
Customer contact	X X X X
Contract number	NIMES/8052
Milestone number	
Date due	

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### Record of changes

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Issue	Date	Detail of Changes
1	17 February 2009	Initial issue

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## Executive Summary

This report details the observations from the General Condition Survey conducted on Nimrod MR Mk2 XV236. All observations were categorised by a Sentencing Panel from the Nimrod IPT, BAE SYSTEMS and QinetiQ. Twenty-six observations were initially categorised as having potential airworthiness implications and were reported to the Nimrod IPT for immediate consideration. The observations, sentencing and subsequent Nimrod IPT mitigation actions are described in this report.

The Nimrod IPT has completed suitable mitigation for 11 IFRs and has effective management actions in place to adequately mitigate the remainder. On the basis of the information available from this assessment to date, it is concluded that there are no residual airworthiness issues of sufficient individual or cumulative concern arising from this assessment to warrant recommending grounding of the Nimrod Fleet.

The next phase of the Ageing Aircraft Audit has commenced which involves removal of the components identified for teardown and forensic analysis.

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# 1 Introduction

## 1.1 Background

- 1.1.1 As part of a continuing airworthiness process the Nimrod Integrated Project Team (IPT) tasked QinetiQ to undertake an Ageing Aircraft Audit (AAA) of the Nimrod MR Mk2 and Nimrod R Mk1. The purpose of the audit was to assess the existing assumptions used to support the airworthiness case and assure they are valid until the out of service date.
- 1.1.2 A Nimrod MR Mk2 (XV236) was delivered to QinetiQ at MoD Boscombe Down and was subjected to a General Condition Survey (GCS) prior to the planned teardown and forensic investigation.
- 1.1.3 A report covering the first phase of the GCS [1] was issued on 15 October 2008. Six observations were categorised as having potential airworthiness implications, none of the observations were considered to be serious enough to recommend grounding of the Nimrod fleet.
- 1.1.4 The GCS has now been completed and the next phase commenced which involves removal of the components identified for teardown and forensic analysis.

## 1.2 Scope

- 1.2.1 This report details the GCS observations which were deemed to have potential airworthiness implications; it includes the findings from the first GCS report [1] for completeness.

# 2 Assessment Process

- 2.1 All of the observations from the GCS were categorised by a Sentencing Panel that was convened in October 2008. The Sentencing Panel, which was led by QinetiQ, comprised a Level J equivalent holder from the Nimrod IPT and engineering maintenance specialists from BAE SYSTEMS and QinetiQ.
- 2.2 The Sentencing Panel considered whether the observation would be rectifiable if the aircraft was being operated prior to flight, or deferrable until the next maintenance opportunity. All observations were categorised using the definitions derived from the Nimrod husbandry audit [2] detailed in Table 2-1 below.
- 2.3 Where the Sentencing Panel categorised the observation as having potential airworthiness implications an Immediate Fault Report (IFR) was raised in the format of a Serious Fault Signal and sent to the Nimrod IPT in accordance with the QinetiQ Nimrod Ageing Aircraft Audit procedure.
- 2.4 An Observation Report expanding upon each IFR, including photographic records and narrative, was generated by the Sentencing Panel.

CATEGORY	DEFINITION
A1	Potential airworthiness issue requiring possible Technical Servicing Instruction SI(T) action across the Fleet
A2	Potential airworthiness issue requiring immediate rectification but not Fleet-wide
A(Inv)	Potential airworthiness issue requiring further investigation
E1	Serious engineering issue requiring immediate action
E2	Engineering issue requiring rectification
E3	Minor rectification
E(Inv)	Possible engineering issue requiring immediate investigation
M	Minor issues requiring assessment / possible ADF action
SC	Surface Corrosion
H	Husbandry

*Table 2-1 – Sentencing Panel categories*

2.5 The process adopted by the Nimrod IPT to address each IFR as follows:

- a. On receipt of an IFR, the Nimrod IPT conducted a pre-mitigation assessment, considered any functional hazard resulting from the identified issue and the potential accident sequence. The functional assessment considered whether the hazard could cause catastrophic loss of the aircraft. This approach mirrors that adopted in the Nimrod IPT Cassandra Hazard Log, in that it considers only the likelihood of a hazard causing catastrophic loss of the aircraft. The final step of the pre-mitigation assessment was then for the Nimrod IPT to consider, in the light of their initial assessment, whether they had sufficient evidence to re-categorise the issue in accordance with the process defined in Para 2.2.
- b. Nimrod IPT staff then commenced mitigation action, typically through the issue of Technical Instructions. Where it was considered that extant activity or other evidence had already addressed the issue, this was recorded.
- c. The Nimrod IPT then conducted a post mitigation assessment and considered the likelihood of a catastrophic loss of the aircraft following the mitigating action (using the qualitative terms used in Annex A to BP1201). The assessment also considered whether new evidence justified re-categorising the issue iaw the process defined in Para 2.2.

2.6 The Nimrod IPT mitigation actions were received by QinetiQ and, for completeness have been inserted directly into a table within each Observation Report. QinetiQ reviewed each Nimrod IPT mitigating action to determine whether or not it adequately addressed the observation.

## 3 Assessment Findings

### 3.1 General

3.1.1 The GCS has been completed with all of the observations categorised by the Sentencing Panel. There were a total of 1495 observations from the GCS and these are summarised at Annex A.

3.1.2 Of these, 21 observations required IFRs to be issued which are summarised at Annex B. An Observation Report was raised for each IFR. All IFR Observation Reports are included at Annex C. The Category A observations from the first sentencing report [1] are included at Annex D. Observation No 19 from that report [1] was also reported as IFR 001 and is therefore duplicated at Annexes C & D for completeness. The Nimrod IPT mitigation actions were received via email [3] and have been incorporated into tables within each Observation Report.

### 3.2 Analysis of Observations

3.2.1 All of the Observation Reports were assessed for both their individual and cumulative effects on the Platform. From this assessment, although multiple observations occurred within a single zone, no airworthiness issues were identified to be of sufficient individual or cumulative concern to warrant recommending grounding of the Nimrod Fleet.

3.2.2 For all observations, each step of the Nimrod IPT mitigation process has been closely scrutinised to ensure the safety arguments are complete and robust. QinetiQ concurs that the planned mitigations detailed in the Nimrod IPT response [3] are appropriate actions with respect to each of the IFR observations. The mitigating actions for IFRs 011, 014, 015, 016, 018, 020, 022, 023, 024 and Observation 5 are however ongoing and require continuing management attention to ensure satisfactory completion.

## 4 Conclusion

4.1 The GCS generated 1495 observations which were assessed by the Sentencing Panel using the definitions derived from the Nimrod husbandry audit [2]. Twenty six observations were initially categorised by the Sentencing Panel as having potential airworthiness implications and were reported to the Nimrod IPT for immediate consideration.

4.2 The Nimrod IPT has completed suitable mitigation for 11 IFRs and has effective management actions in place to adequately mitigate the remainder. On the basis of the information available from this assessment to date, it is concluded that there are no residual airworthiness issues of sufficient individual or cumulative concern arising from this assessment to warrant recommending grounding of the Nimrod Fleet.



## A Summary of Observations and Categorisation

A.1 The Table A-1 below defines the categories used by the sentencing panel and the total number of observations for each category.

CATEGORY	DEFINITION	NUMBER OF OBSERVATIONS
A1	Potential airworthiness issue requiring possible TI action across the Fleet	2
A2	Potential airworthiness Issues requiring immediate rectification but not Fleet-wide	14
A(Inv)	Potential airworthiness issue requiring further investigation	10
E1	Serious engineering issue requiring immediate action	9
E2	Engineering requiring rectification	1043
E3	Minor rectification	258
E(Inv)	Possible engineering issue requiring immediate investigation	106
M	Minor issues requiring assessment / possible ADF action	0
SC	Surface Corrosion	0
H	Husbandry	53
	<b>TOTAL</b>	<b>1495</b>

*Table A-1; Total number of observations per category*

## B Summary of Immediate Fault Reports

B.1 The Table B-1 below summarises the IFRs submitted to the Nimrod IPT.

IFR No	Originator	Brief Fault Description	Status
001	TD Team	Cable assy not clamped by back shell	Issued
002	TD Team	Mainplane leading edge anti icing sensor overheat cable fretting	Issued
003*	TD Team	Control cable fretting against servo hyd pipe	Not issued
004*	TD Team	Control cable contacting fairleads	Not issued
005*	TD Team	Control cable contacting structure	Not issued
006	TD Team	Port U/C mounting beam assembly `Y` attachment bolt insecure	Issued
007	TD Team	Keel drainage system	Issued
008*	TD Team	Loose & incorrect fuel pipe P clips	Not issued
009	TD Team	Loose FRS couplings	Issued
010	TD Team	LOX P clip damage	Issued
011	TD Team	Cable loom chafing on a fuel pipe in APU Bay	Issued
012	TD Team	Fuel pipe chafing on structure	Issued
013	TD Team	CSDU pipe, rivets embedded	Issued
014	SP team	Oxygen pipe chafing	Issued
015	SP team	Fuel pipe chafing on fuel cock flange	Issued
016	SP team	Nitrogen pipe damage Zone 135	Issued
017	SP team	Fuel feed pipe damage Zone 154	Issued
018	SP team	Electrical cable blackening	Issued
019	SP team	Zone 423 refuelling & defuelling pipe chafing	Issued
020	SP team	Secondary conditioning pack	Issued
021	TD Team	Capacitance stack connectors	Issued
022	SP team	Stbd UC accumulator- severe corrosion	Issued
023	SP team	Doppler Bay cable	Issued
024	SP team	Fuel feed pipe dented distorted	Issued
025	SP team	Interspace drain hose trapped	Issued

*Table B-1; IFRs submitted to the Nimrod IPT*

\* Initially identified as an IFR and subsequently downgraded

## C IFR Observation Reports

### C.1 IFR 001 - Cable assy not clamped by back shell

#### C.1.1 Location

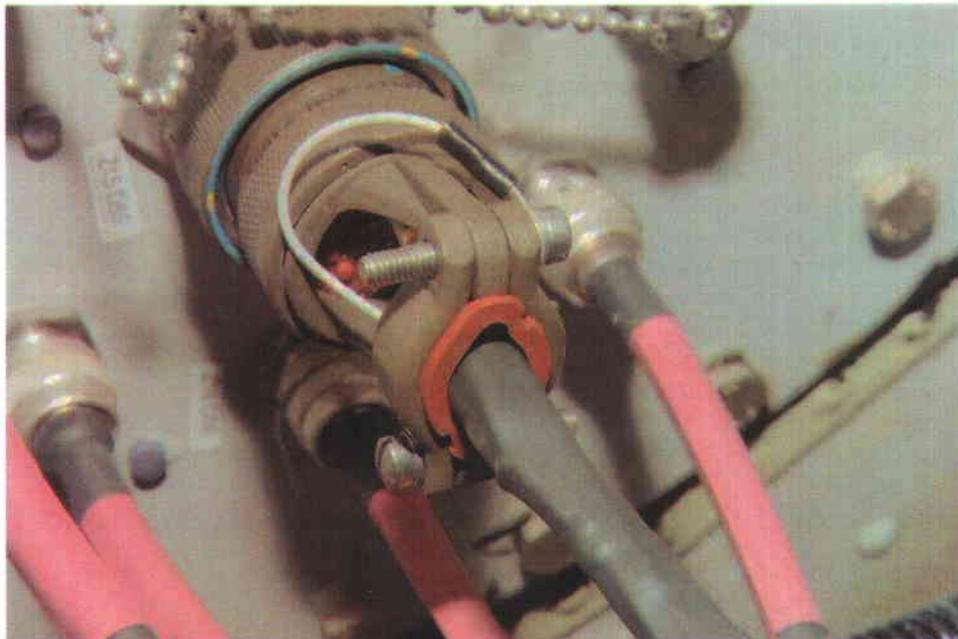
C.1.1.1 Zone 852 – Rear hinge fairing starboard.

#### C.1.2 System

C.1.2.1 Communications – SM/NIM/271 electrical plug.

#### C.1.3 Part number

C.1.3.1 6027/20/41PN (Connector); GS3417-20N (Back Shell); 012-7532-000 (Grommet); unrestrained cable in the main plug for SM/NIM/271.



#### C.1.4 Reference

C.1.4.1 AP101B-0502/0503-2(R)2A.

#### C.1.5 F700 review

C.1.5.1 No MOD F704/704A/704D entry had been raised for this fault.

**C.1.6 Assessment**

C.1.6.1 Although the plug was correctly assembled, the clamp failed to secure the cable. The cable was permitted to move in a longitudinal manner increasing the risk of conductor failure and exposing live conductors presenting a potential source of ignition.

C.1.6.2 It is noted that this observation was raised as an Immediate Fault Report (IFR) from the GCS. On receipt of the IFR, Nimrod IPT initiated action to inspect those aircraft which had been modified to satisfy SM/NIM/271 and confirmed that there were no loose connections that would present a potential source of ignition on any other aircraft. RTI/NIM/266 was raised to direct an inspection and corrective action (see paragraph B.19.8.1).

**C.1.7 Proposed recovery action**

C.1.7.1 Reassemble clamp with additional packing material.

**C.1.8 Full repair**

C.1.8.1 RTI/NIM/266 requires the inspection of all aircraft and, where faults are discovered; make good the clamping of the cable in accordance with SM/NIM/271.

**C.1.9 Category**

C.1.9.1 A1.

**C.1.10 Nimrod IPT actions**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	<p>No Functional risk as cable supplies data to a mission system.</p> <p>This type of plug, correctly fitted, ensures a firm and secure cable connection; therefore, the risk of conductor failure due to longitudinal movement is considered unlikely. As no obvious source of accelerant present in this area, the risk from fire and explosion is considered negligible.</p>
<b>Mitigating action</b>	<p>RTI/Nimrod/266 issued on 15 Oct 08 to check connectors across the fleet and rectify as appropriate. This RTI is now fleet satisfied. ALTI/Kin/Husbandry/0408, dated 5 Sep 08, and ALTI/Wad/Husbandry/0108, dated 15 Sep 08, conducted zonal inspections and reported no similar occurrences.</p> <p>Both Stations will be informed of the issue in order to raise awareness amongst tradesmen.</p>
<b>Post-mitigation assessment</b>	<p>With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.</p> <p>Re-categorised as E2.</p>

**C.1.11 IFR mitigation status**

C.1.11.1 Nimrod IPT mitigation in place and all Fleet aircraft have been satisfied, no further action required.

## C.2 IFR 002 - Mainplane leading edge anti icing

### C.2.1 Location

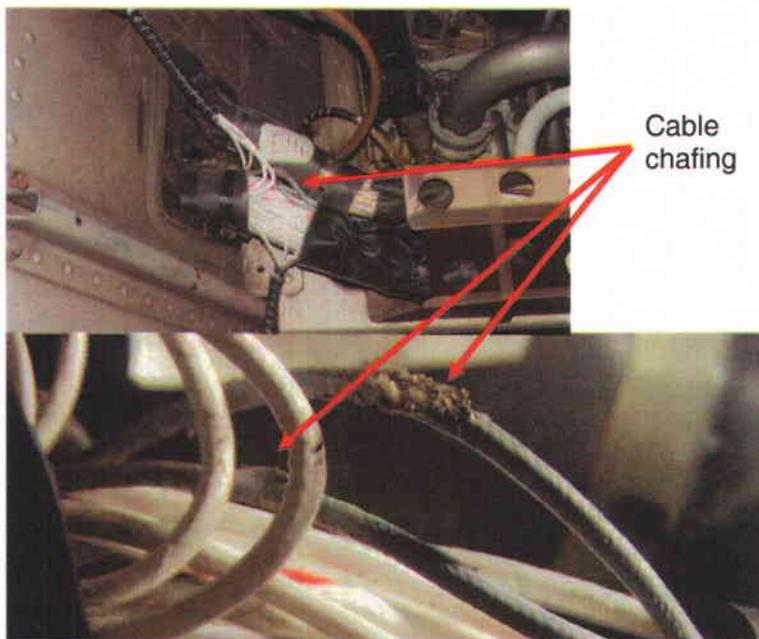
C.2.1.1 Zone 512 - Intake compartments

### C.2.2 System

C.2.2.1 Ice & Rain Protection.

### C.2.3 Part Number

C.2.3.1 Cable Ident 9T35-1 & 9T35-2.



### C.2.4 Reference

C.2.4.1 Located behind AP101B-0503-1AH, Chap 7-30 Fig 2 Panel 13.

### C.2.5 F700 Review

C.2.5.1 No MOD F704/704A entry had been raised for this fault.

### C.2.6 Assessment

C.2.6.1 Both cables were chafed. The chafing had penetrated the outer insulation material and also damaged the inner insulation. However the cable conductors however were not exposed. Probable cause not known. Potential effect would be the loss of wing leading edge temperature warning.

**C.2.7 Proposed Recovery Action**

- C.2.7.1 Temporary or permanent repair to be carried out in accordance with AP101B-0503-10J. Consider additional protection as part of recovery action.
- C.2.7.2 No MOD F704 entry required if permanent repair carried out.

**C.2.8 Full Repair**

- C.2.8.1 Replace cable at next scheduled maintenance activity if temporary repair applied.

**C.2.9 SP Category**

- C.2.9.1 A(Inv).

**C.2.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	<p>Functional risk mitigated as the Flight Engineer would be alerted to an in-flight failure by loss of skin temperature reading, and FRC drills cover loss of system (AP101B-0503-14A, Card 23).</p> <p>There is a risk of fire and explosion as this is a 28-Volt system and accelerant could be present in the zone.</p>
<b>Mitigating action</b>	<p>It is believed that this damage was caused during maintenance activity. RTI/Nimrod/299 issued on 7 Jan 09 to examine cabling and rectify damage iaw Topic 10J. RTI is to be complete within 28 days.</p> <p>This RTI is now fleet satisfied.</p> <p>Both Stations will be informed of this issue, in order to raise awareness amongst tradesmen.</p>
<b>Post-mitigation assessment</b>	<p>With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.</p>

**C.2.11 IFR mitigation status**

- C.2.11.1 Nimrod IPT mitigation in place and all Fleet aircraft have been satisfied, no further action required.

### C.3 IFR 006 - Port U/C mounting beam assembly

#### C.3.1 Location

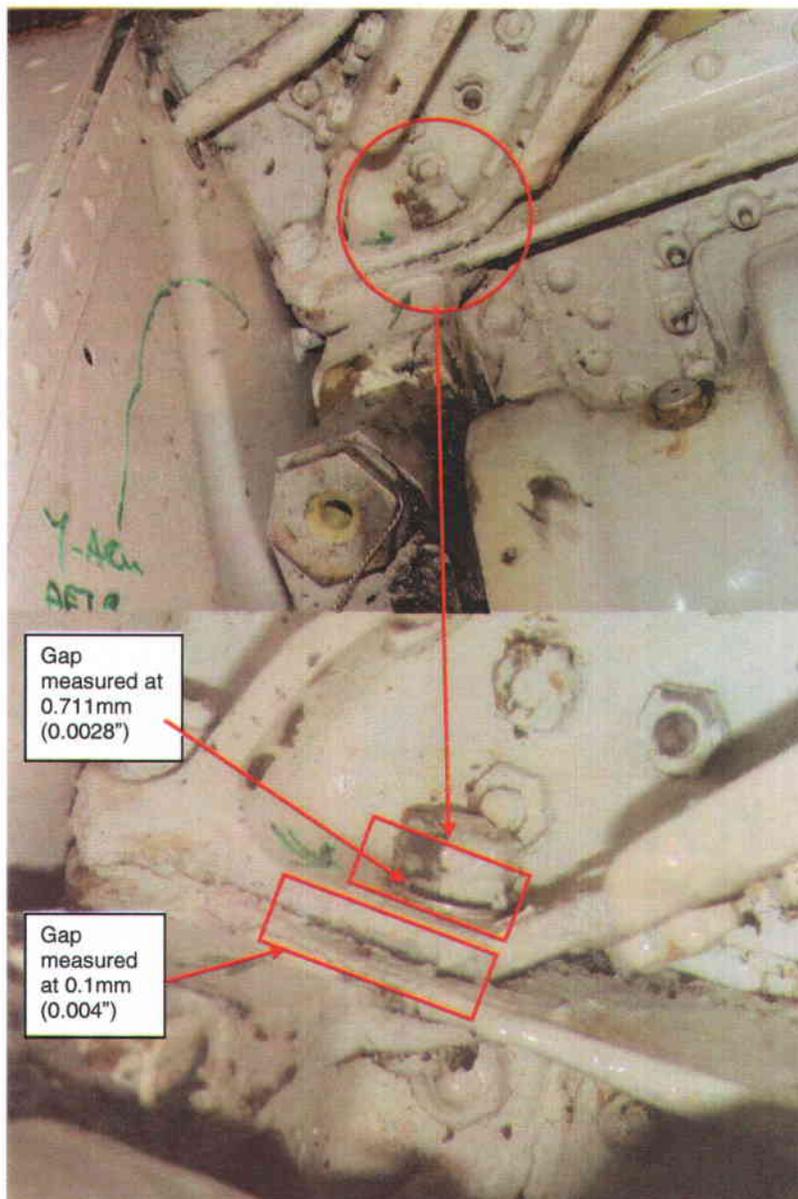
C.3.1.1 Zone 523 - Main gear compartment.

#### C.3.2 System

C.3.2.1 Mainplanes.

#### C.3.3 Part Number

C.3.3.1 6M4WC10541A.



**C.3.4 Reference**

C.3.4.1 AP101B-0503-3A Chap 16-20, Fig 3B, Item 23.

**C.3.5 F700 Review**

C.3.5.1 No F704 entry had been raised for this item.

**C.3.6 Assessment**

C.3.6.1 Gap evident between port 'Y' beam assembly and forward inboard attachment fitting with evidence of fretting. One of the attachment nuts is insecure by approximately two threads; there is evidence of peening having been applied to the bolt.

**C.3.7 Proposed Recovery Action**

C.3.7.1 Strip and survey/NDT area of bolt and repair as necessary. Consult DO if oversize fastener required.

C.3.7.2 No MOD F704 entry required. Permanent repair to be carried out.

**C.3.8 Full Repair**

C.3.8.1 Consideration should be given that the 'Y' beam assembly be examined for any other defects.

**C.3.9 SP Category**

C.3.9.1 A2.

**C.3.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	Advice from BAE SYSTEMS required.
<b>Mitigating action</b>	Advice received from BAE SYSTEMS (Email from BAES on 17 Oct 08 and NDT assessment EFD/LF/39/27309 dated 11 Dec 08) regarding apparent insecurity of fitting that concluded that gaps between components was not significant but recommended that NDT inspection of components be carried out. NDT inspection was carried out and some mechanical damage was identified. BAE SYSTEMS analysis of the damage reported (6 Jan 09) concluded that the damage and the presence of peening did not present cause for concern or have any fleet implications. The report concluded that no further action was necessary.
<b>Post-mitigation assessment</b>	With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.

**C.3.11 IFR mitigation status**

C.3.11.1 Nimrod IPT mitigation in place and all Fleet aircraft have been satisfied, no further action required.

## **C.4 IFR 007 - Keel drainage system**

### **C.4.1 Location**

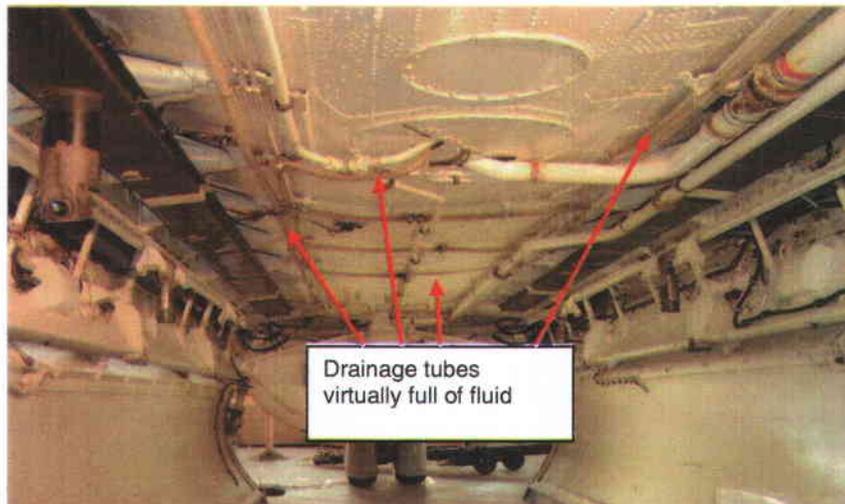
C.4.1.1 Zones 133, 134, 147 & 148 - Bomb bay.

### **C.4.2 System**

C.4.2.1 Fuselage.

### **C.4.3 Part Number**

C.4.3.1 Drain Tube MH13/19, Bottle 6M4S9935.



### **C.4.4 Reference**

C.4.4.1 AP101B-0503-3A Chap 15-10, Fig 57 various locations.

C.4.4.2 AP101B-0503-1BA Chap 15-10, Para 1.27.

### **C.4.5 F700 Review**

C.4.5.1 No F704/F704A entry had been raised for this item.

### **C.4.6 Assessment**

C.4.6.1 Residual fluid was found in the keel pipe-work. A sample of the fluid was analysed (Ref QinetiQ FRN Report FE6878) and consisted of 78% OX87 and 22% water.

C.4.6.2 Hydraulic or fuel leaks within the fuselage would cause those fluids to pool in the bottom of the bay and enter the keel drain system. The possibility of these fluids in the drain system may result in an inflammable mixture being present.

**C.4.7 Proposed recovery action**

- C.4.7.1 Initial action would be to check the fleet for presence of residual fluid and carry out remedial action. Include the requirement to check the keel drain tubes at each After Flight, Before Flight and Turn Round Servicing.
- C.4.7.2 MOD F704 entry not required.

**C.4.8 Full Repair**

- C.4.8.1 Examine keel drains system at next scheduled maintenance opportunity to ascertain if drains are routed correctly to ensure correct evacuation of all fluids.

**C.4.9 SP Category**

- C.4.9.1 A(Inv).

**C.4.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	<p>There is no functional hazard from this issue.</p> <p>The presence of hydraulic oil in the pipe lines is likely to be a result of the ac being static for a prolonged period. Standing fluid in the pipes is not representative of an in-use aircraft, as fluid would be expected to drain from the pipes into the bottles during normal flight manoeuvring.</p>
<b>Mitigating action</b>	<p>Current inspection regime iaw the aircraft maintenance schedule requires a check of the keel drain collector bottles for residual fluid at every flight servicing and is used to indicate the presence and location of leaks.</p>
<b>Post-mitigation assessment</b>	<p>With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.</p> <p>Re-categorised as E2.</p>

**C.4.11 IFR mitigation status**

- C.4.11.1 Nimrod IPT mitigation in place and all Fleet aircraft have been satisfied, no further action required.

## C.5 IFR 009 - Loose FRS couplings

### C.5.1 Location

C.5.1.1 Zones 512 - Intake compartments & 612 - Intake compartments.

### C.5.2 System

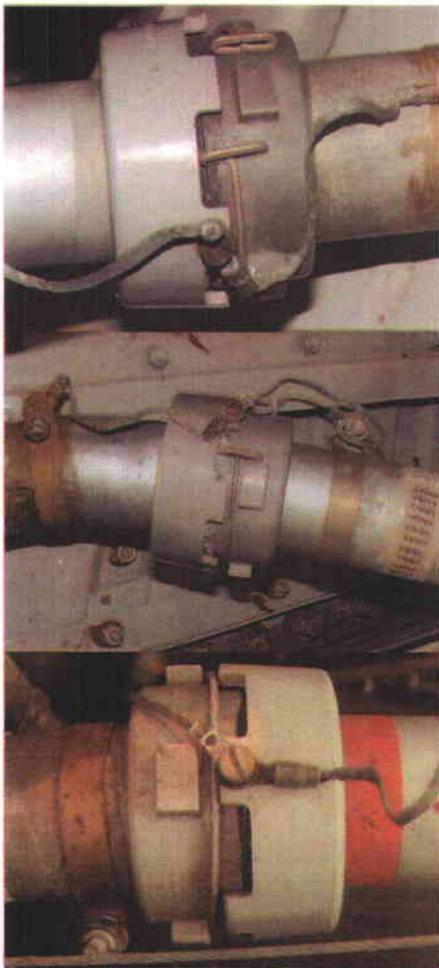
C.5.2.1 Fuel System Vent.

### C.5.3 Part Number

C.5.3.1 In line Connector FRS110K1.

C.5.3.2 Flexible Hose 6M4P7151/ND.

C.5.3.3 Flexible Pipe Coupling DHS 160/K26.



Loose coupling with inner and outer sleeves able to rotate

Corroded threads on coupling

Vent pipe with loose outer sleeve above No2 engine intake



Loose coupling in vent pipe above No 3 engine intake



Outboard position loose coupling with outer sleeve able to rotate and inner sleeve unable to rotate



Inboard position loose coupling with outer sleeve able to rotate and inner sleeve unable to rotate



Signs of cracking of the port vent pipe rubber coupling above no 2 engine intake

#### C.5.4 Reference

C.5.4.1 AP101B-0503-3A, Chap 41-30, Fig 5, Items 20, 30 & 6.

C.5.4.2 AP101B-0503-1DK, Chap 41-30.

C.5.4.3 AP101B-0503-1DK, Chap 41-21.

**C.5.5 F700 Review**

C.5.5.1 No F704/F704A entry had been raised for this item.

**C.5.6 Assessment**

C.5.6.1 The fuel vent system pipework in Zones 512/612 above the engine intakes were found to have five couplings with some rotational movement, a single coupling that had signs of corrosion in its threads, and a perished rubber pipe coupling.

C.5.6.2 On the port side, the outboard coupling above No 1 intake was found to have an outer sleeve that was able to rotate; the inner sleeve was unable to rotate, the pipes were misaligned. The inboard coupling above No 1 intake was unable to rotate, but had corrosion in the coupling threads. The outer sleeve of the coupling above No 2 intake was able to rotate; the inner sleeve was unable to rotate.

C.5.6.3 On the starboard side, the coupling above No 3 intake was found to have an outer sleeve that was able to rotate, the inner sleeve was unable to rotate. The outboard coupling above No 4 intake was found to have an outer sleeve that was able to rotate; the inner sleeve was unable to rotate. On the inboard coupling above No 4 intake both the inner and outer sleeves were able to freely rotate on the pipe.

C.5.6.4 A full assessment of the cause of these observations cannot be made until forensic analysis of the seals has been carried out. The locking circlips were found to permit some rotation of the outer sleeves; however this is a feature of this type of locking arrangement.

C.5.6.5 The rubber coupling joining the vent pipes on the port side above No 2 intake was found to have signs of external cracking.

**C.5.7 Proposed Recovery Action**

C.5.7.1 At the earliest maintenance opportunity, remove the couplings and examine the seals to determine their condition and take remedial action as necessary. Replace all couplings that show signs of corrosion. Replace all damaged or deteriorated hoses. Carry out a vent system test.

C.5.7.2 MOD F704 entry required to defer corrective maintenance.

**C.5.8 Full Repair**

C.5.8.1 These Vent System Couplings will be examined during the current Fuel Seal Replacement programme. Seek DO advice regarding the suitability of the rubber hoses in this area.

**C.5.9 Category**

C.5.9.1 A(Inv).

**C.5.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	<p>There is no functional hazard.</p> <p>There would be a fire and explosion hazard if fuel entered the fuel vent system, and a coupling was loose enough to allow a leak to develop and there was a coincident source of ignition.</p>
<b>Mitigating action</b>	<p>RTI/Nimrod/293 was issued on 15 Dec 08 to check for loose or corroded FRS couplings, degradation of rubber hoses and correct assembly, alignment and locking of the couplings. The RTI had a 30-day timescale and all aircraft in forward have been completed. To date, no further instances have been found of loose connectors. One instance has been found of an incorrectly seated flexible hose which has been rectified.</p> <p>A leak check of the vent systems under air pressure (RTI/Nimrod/196 issued in Mar 07) is made during Equalised Maintenance.</p> <p>A comprehensive examination of aircraft fuel couplings in the fuel feed and refuel/defuel system between No 3 Rib Port to No 3 Rib Stbd is being undertaken every 30 days via RTI/Nimrod/212.</p> <p>A training package detailing the correct fitment of FRS couplings has been introduced for mechanical tradesmen on both Stations. Only those personnel who have completed this training are now permitted to work on Nimrod fuel systems.</p> <p>QinetiQ, in conjunction with the Coupling OEM, will conduct further investigation to establish what led to these couplings becoming loose.</p>
<b>Post-mitigation assessment</b>	<p>With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.</p>

**C.5.11 IFR mitigation status**

C.5.11.1 Nimrod IPT mitigation in place and all Fleet aircraft have been satisfied, no further action required.

## C.6 IFR 010 - LOX P clip damage

### C.6.1 Location

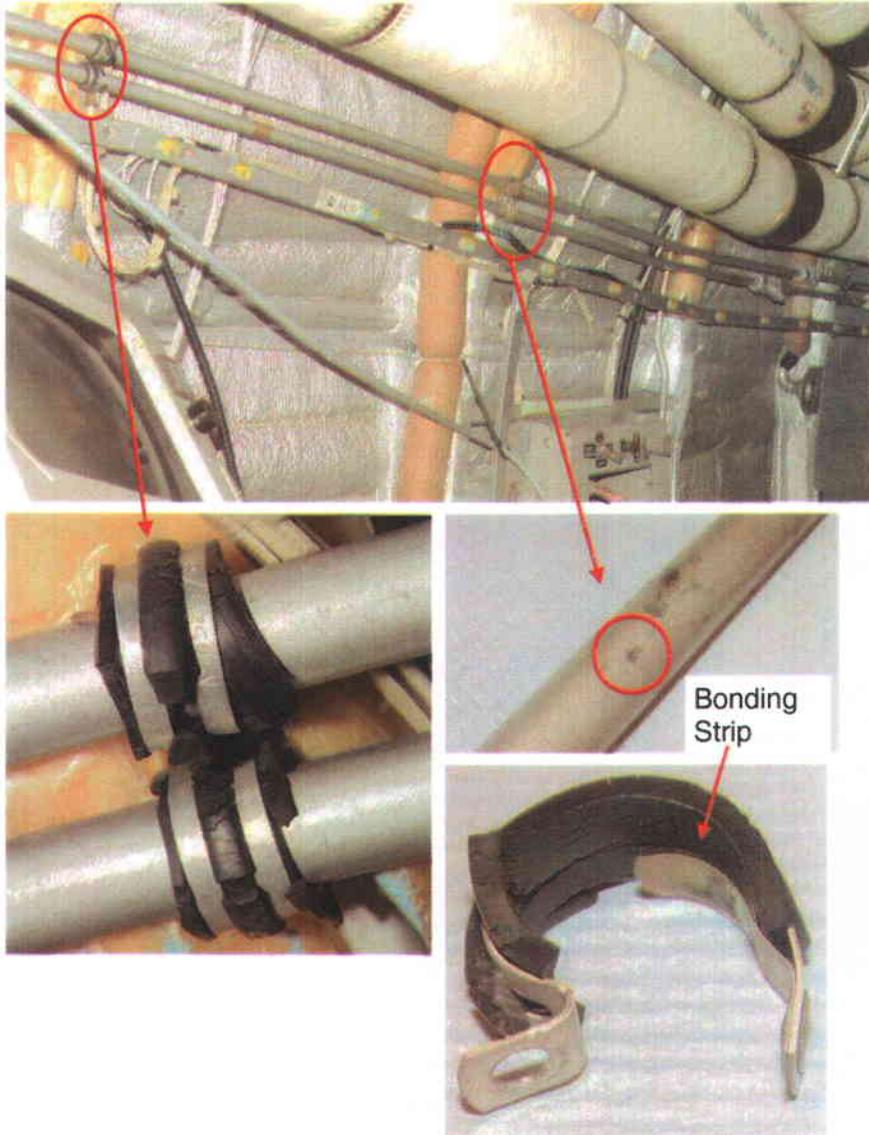
C.6.1.1 Zone 247 - Ordnance compartment, Port.

### C.6.2 System

C.6.2.1 Oxygen.

### C.6.3 Part Number

C.6.3.1 Aft Pipe 6MS10405A/ND, Fwd Pipe 6MS10409A/ND, 'P'Clip AS4525/8.



**C.6.4 Reference**

C.6.4.1 AP101B-0503-3A Chap 25-20, Fig 1, Items 22, 25, & 26.

**C.6.5 F700 Review**

C.6.5.1 No F704/F704A entry had been raised for this item.

**C.6.6 Assessment**

C.6.6.1 A 'P' clip with a bonding strip has caused some fretting to the oxygen supply pipe. The fretting does not show a significant loss of material. The bonding clip has been confirmed as the correct item in accordance with the IPC (it was noted that the 'P' Clips showed significant deterioration of the rubber component).

**C.6.7 Proposed Recovery Action**

C.6.7.1 This zone is surveyed at Major Maintenance during zonal survey. It is recommended that the NIPT consider rescheduling the zonal survey with trim panels removed to a more regular frequency, or carrying out a zonal survey using SI(T) as a vehicle.

C.6.7.2 MOD F704 entry required to defer corrective maintenance.

**C.6.8 Full Repair**

C.6.8.1 Review zonal survey criteria for this area.

**C.6.9 SP Category**

C.6.9.1 A(Inv).

**C.6.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	<p>Functional risk is mitigated ability of by Flight Engineer to get warning of low pressure (40psi) in the system, allowing the opportunity to isolate the system (AP101B-0503-14A, Card 24).</p> <p>A fire and explosion hazard would require presence of an accelerant and a coincident electrical fault, in proximity to an oxygen leak. There are no obvious sources of accelerant in this zone.</p>
<b>Mitigating action</b>	<p>Analysis by BAE SYSTEMS (email dated 4 Feb 09 from BAES CST Team Leader) concludes that the witness mark has not compromised the integrity of the pipe and confirmed that pipes are being properly bonded to P clips.</p> <p>P clips were examined on XW664 for deterioration of rubber inserts. Although external deterioration of the rubber was observed, the inner contact area of the rubber inserts were in good condition. No instances of P clip to pipe contact were observed. In order for such</p>

	contact to occur a large (40-50%) area of the rubber insert would need to be missing.
<b>Post-mitigation assessment</b>	With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.  Re-categorised as H.

**C.6.11 IFR mitigation status**

C.6.11.1 Nimrod IPT mitigation in place and all Fleet aircraft have been satisfied, no further action required.

**C.7 IFR 011 - Cable loom chafing on a fuel pipe in APU bay**

**C.7.1 Location**

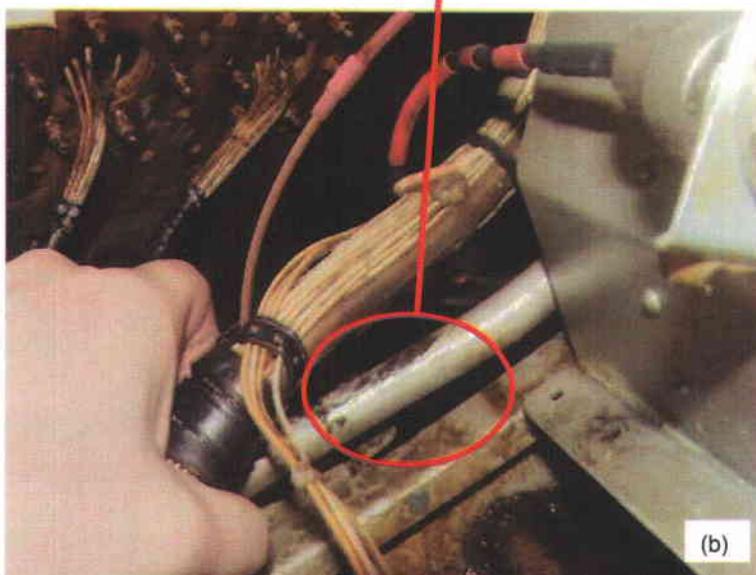
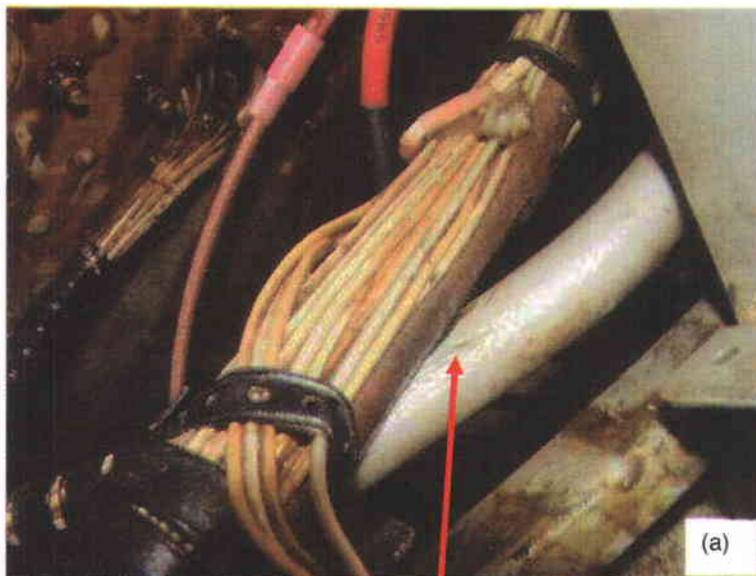
C.7.1.1 Zone 311 & 312 - Rear fuselage

**C.7.2 System**

C.7.2.1 Auxiliary Power Plant.

**C.7.3 Part Number**

C.7.3.1 APP Fuel Feed Pipe 6M4P5491/ND at Frame 55 starboard.



**C.7.4 Reference**

C.7.4.1 AP101B-0503-3A Chap 32-20, Fig 1, Item 9.

**C.7.5 F700 Review**

C.7.5.1 No F704 entry had been raised for this item.

**C.7.6 Assessment**

C.7.6.1 Significant chafing found on fuel feed pipe caused by the electrical loom passing from the rear pressure bulkhead and resting on the APU fuel pipe, located at Frame 55. The loom did not suffer any noticeable damage as the main contact point was on a large diameter braided cable.

**C.7.7 Proposed Recovery Action**

C.7.7.1 Replace pipe and re-position cable loom to achieve adequate clearance.

C.7.7.2 No MOD F704 entry required pipe to be replaced.

**C.7.8 Full Repair**

C.7.8.1 Consult with DO and IPT on a permanent solution.

**C.7.9 SP Category**

C.7.9.1 A2.

**C.7.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	No functional risk as APU used on the ground only.  Hazard from leakage of fuel. Isolation of the fuel system by the LP solenoid and LP pump switch means that the APU fuel feed is not pressurized in flight.
<b>Mitigating action</b>	RTI/Nimrod/296 issued on 7 Jan 09 to examine, re-establish clearances and rectify as required cables and fuel pipes in the APU bay. RTI had to be satisfied within 28 days and all aircraft in Forward have been completed.  To date, ten aircraft have completed, with eight requiring rectification to re-establish appropriate clearances.
<b>Post-mitigation assessment</b>	With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.  Re-categorised as E1.

**C.7.11 IFR mitigation status**

C.7.11.1 Appropriate IPT mitigation planned, the Fleet will be satisfied during ongoing IPT management process.

## C.8 IFR 012 - Fuel pipe chafing on structure

### C.8.1 Location

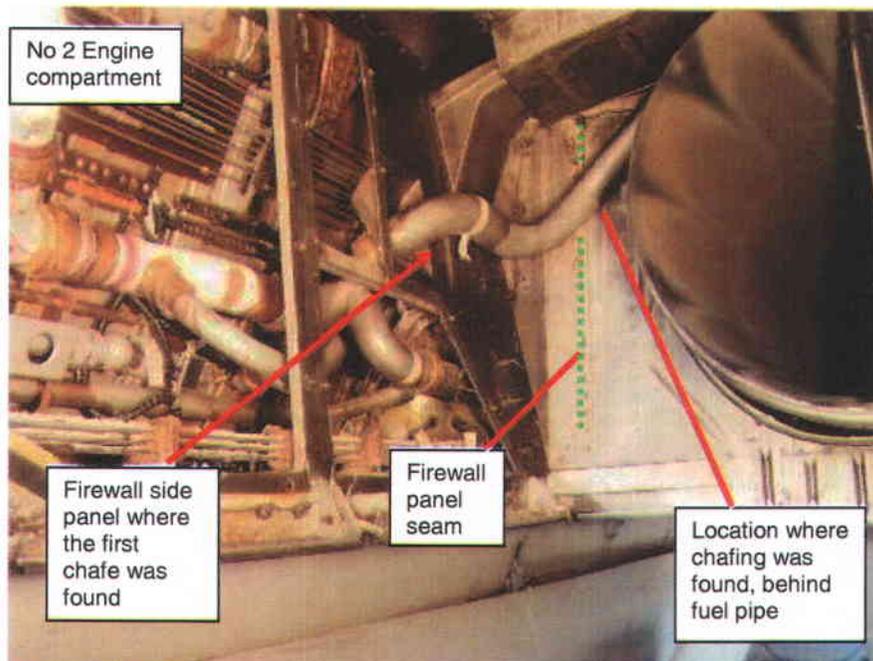
C.8.1.1 Zone 423 - No.2 engine compartment.

### C.8.2 System

C.8.2.1 Fuel System, Refuel.

### C.8.3 Part Number

C.8.3.1 Pipe 6M4P1477A/ND, Firewall Panel 6M4E1693A.



### C.8.4 Reference

C.8.4.1 AP101B-0503-3A Chap 41-40, Fig 2, item 3.

### C.8.5 F700 Review

C.8.5.1 No F704 entry had been raised for this item.

### C.8.6 Assessment

C.8.6.1 The pipe was found chafed at two locations. Firstly at the firewall side panel where it contacted the edge of the panel recess. Secondly, the pipe was chafed by a vertical seam on the firewall that divides zone 1 from zone 2 engine bays.

**C.8.7 Proposed Recovery Action**

- C.8.7.1 Examine pipe to determine extent of damage and replace as necessary, ensuring adequate clearance is achieved during fitment.
- C.8.7.2 MOD F704 entry required pipe to be replaced at earliest maintenance opportunity if damage within limits.

**C.8.8 Full Repair**

- C.8.8.1 DO advice should be sought to determine the clearances for fuel pipes in this area.

**C.8.9 SP Category**

- C.8.9.1 A2.

**C.8.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	<p>There is no functional hazard as the refuel system is not used during flight.</p> <p>The refuel pipe is not pressurised in flight. There is a fire and explosion hazard. Area protected by fire detection and suppression system.</p> <p>Re-categorised as A1.</p>
<b>Mitigating action</b>	<p>UTI/Nimrod/59 was issued on 26 Sep 08 to inspect pipe at specific area of damage and was to be completed within seven days. Three aircraft were subsequently rectified.</p> <p>RTI/Nimrod/279 was issued on 22 Oct 08 to inspect whole pipe and was to be complete within 30 days for those aircraft in Forward. To date returns for 11 aircraft have been received, all declaring the pipe serviceable. The remaining six aircraft will be completed during scheduled maintenance.</p> <p>BAE SYSTEMS advice was sought on pipe clearances through Minor Query; this guidance was passed on to the Stations as part of the Minor Query response.</p> <p>RTI/Nimrod/297 issued on 15 Dec 08 introduces a purge of the refuel system with Nitrogen following refuelling and prior to flight.</p>
<b>Post-mitigation assessment</b>	<p>With the mitigation in place, it has been assessed that the probability of this event leading to a catastrophic loss of an aircraft is incredible.</p>

**C.8.11 IFR mitigation status**

C.8.11.1 Nimrod IPT mitigation in place and all Fleet aircraft have been satisfied, no further action required.

**C.9 IFR 013 - CSDU pipe, rivets embedded**

**C.9.1 Location**

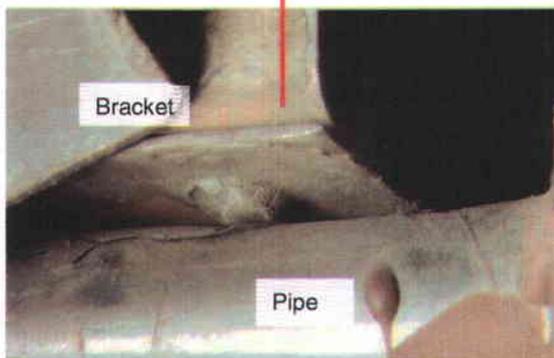
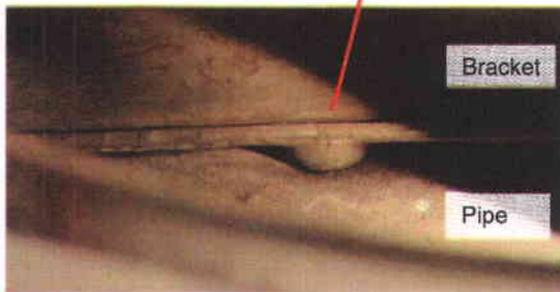
C.9.1.1 Zone 413 - No.1 engine compartment.

**C.9.2 System**

C.9.2.1 CSDU Oil.

**C.9.3 Part Number**

C.9.3.1 CSDU Feed Pipe 6M4E1419/2, DPRV Bracket Assembly 6M4WC8313A.



**C.9.4 Reference**

- C.9.4.1 AP101B-0503-3A Chap 54-20, Fig 1, Item 27.
- C.9.4.2 AP101B-0503-3A, chap 16-20, Fig 9, Item 10.

**C.9.5 F700 Review**

- C.9.5.1 No F704 entry had been raised for this item.

**C.9.6 Assessment**

- C.9.6.1 CSDU oil cooler pipe found to have significant damage in two positions, due to contact with rivets on the DPRV support bracket.

**C.9.7 Proposed Recovery Action**

- C.9.7.1 Replace pipe ensuring that adequate clearance is obtained. Recommend a fleet check using SI(T) as a vehicle.
- C.9.7.2 No MOD F704 entry required.

**C.9.8 Full Repair**

- C.9.8.1 Remedial action using an SI(T).

**C.9.9 SP Category**

- C.9.9.1 A2.

**C.9.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	<p>Functional risk is mitigated by systems redundancy. Failure of CSDU would result in loss of one generator (mitigated by FRC iaw AP101B-0503-14A Issue 3 Card 20). Three further generators are available.</p> <p>Fire and explosion risk present. Damage occurred in a Fire Zone that is protected by a fire detection and suppression system.</p> <p>Re-categorised as A1.</p>
<b>Mitigating action</b>	<p>RTI/Nimrod/278 was issued on 17 Oct 08 to inspect the fleet for pipe clearance and reinstate the clearance, if required. The RTI had a 28-day timescale for completion for those aircraft in Forward. Returns for 14 aircraft have been received, three of which required rectification work. The remaining aircraft will be complete the RTI during scheduled maintenance.</p>
<b>Post-mitigation assessment</b>	<p>With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.</p>

**C.9.11 IFR mitigation status**

C.9.11.1 Nimrod IPT mitigation in place and all Fleet aircraft have been satisfied, no further action required.

**C.10 IFR 014 - Oxygen pipe chafing**

**C.10.1 Location**

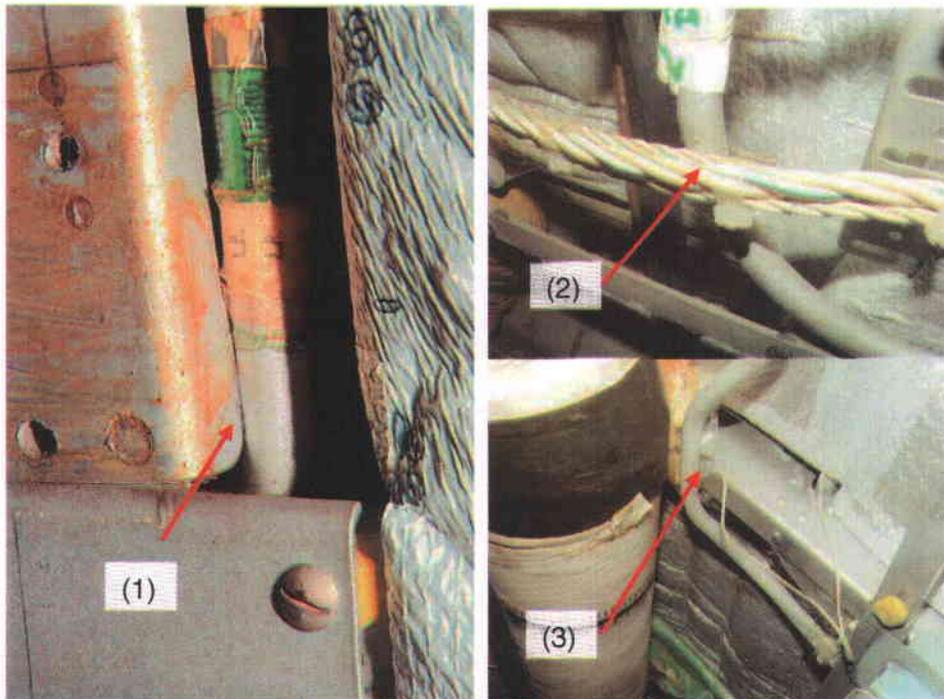
C.10.1.1 Zone 247 - Ordnance compartment, Port.

**C.10.2 System**

C.10.2.1 Oxygen.

**C.10.3 Part Number**

C.10.3.1 Pipe Assy 6M4S6187/ND & 6M4S10101/ND.



**C.10.4 Reference**

C.10.4.1 AP101B-0503-3A, Chap 25-20, Fig 2, Item 32.

C.10.4.2 AP101B-0503-31, Chap 25-20, Fig 1, Item 07.

**C.10.5 F700 Review**

C.10.5.1 No F704 entry had been raised for this item.

**C.10.6 Assessment**

C.10.6.1 Oxygen ring main pipe (1) chafing at frame 43 at the mic tel connection bracket and in contact with a cable loom also at frame 43(2). Oxygen ring main pipe resting on and chafing against frame 50 (3).

**C.10.7 Proposed Recovery Action**

- C.10.7.1 Examine pipes and replace as necessary, ensuring adequate clearance is achieved. This zone is surveyed at Major Maintenance during zonal survey. It is recommended that the IPT consider rescheduling the zonal survey with trim panels removed to a more regular frequency, or carrying out a zonal survey using SI(T) as a vehicle.
- C.10.7.2 MOD F704 entry required if damage assessed as acceptable until next scheduled maintenance activity.

**C.10.8 Full Repair**

- C.10.8.1 Consider examination and remedial action using SI(T).

**C.10.9 SP Category**

- C.10.9.1 A(Inv).

**C.10.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	<p>Functional risk is mitigated ability of by Flight Engineer to get warning of low pressure (40psi) in the system, allowing the opportunity to isolate the system (AP101B-0503-14A, Card 24).</p> <p>A fire and explosion hazard would require presence of an accelerant and a coincident electrical fault, in proximity to a oxygen leak. While there are possible sources of electrical ignition, there are no obvious sources of accelerant in this zone.</p>
<b>Mitigating action</b>	<p>Investigation of similar occurrences of oxygen system pipe chafing against structure was carried out by the IPT in Dec 08. Following the discovery of similar occurrences on XW664, NAEDIT have been tasked to draft an RTI to inspect Oxygen system pipe-work for signs of chafing. The target date for issue of the RTI is 21 Feb 09.</p>
<b>Post-mitigation assessment</b>	<p>This hazard will be re assessed following analysis of the results of the RTI.</p>

**C.10.11 IFR mitigation status**

- C.10.11.1 Appropriate IPT mitigation planned, the Fleet will be satisfied during ongoing IPT management process.

## **C.11 IFR 015 - Fuel pipe chafing on fuel cock flange**

### **C.11.1 Location**

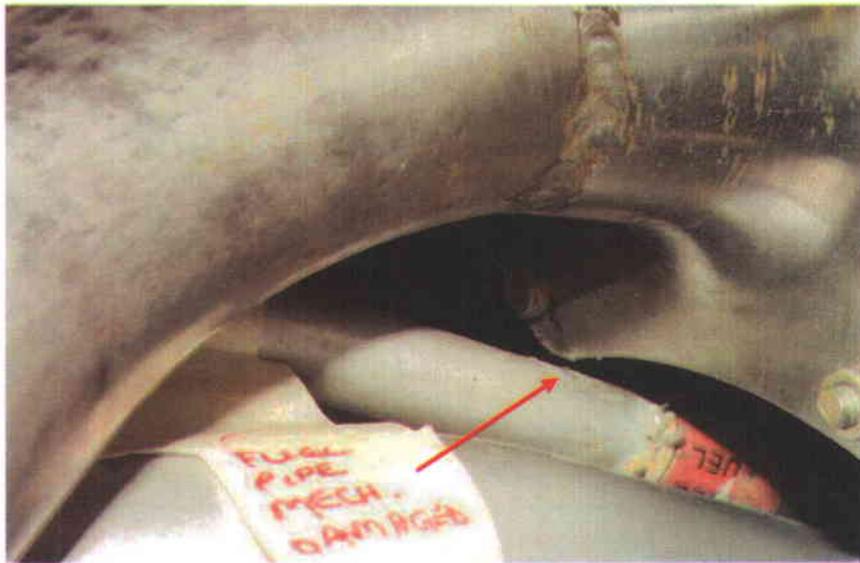
C.11.1.1 Zone 423 - No.2 engine compartment.

### **C.11.2 System**

C.11.2.1 Fuel System Feed.

### **C.11.3 Part Number**

C.11.3.1 Flange Special 6M4P533/ND.



### **C.11.4 Reference**

C.11.4.1 AP101B-0503-3A Chap 41-20, Fig 4, Item 50.

### **C.11.5 F700 Review**

C.11.5.1 No F704 entry had been raised for this item.

### **C.11.6 Assessment**

C.11.6.1 Fuel pipe flange appears to have caused mechanical damage to adjacent APU fuel feed pipe. Suspect cause may be attributed to difficulties encountered during installation.

### **C.11.7 Proposed Recovery Action**

C.11.7.1 Assess damage, replace or defer to earliest maintenance opportunity.

C.11.7.2 MOD F704 entry if required.

**C.11.8 Full Repair**

C.11.8.1 Replace pipe and review installation procedure to include awareness of possible damage to APU fuel pipe.

**C.11.9 SP Category**

C.11.9.1 A2.

**C.11.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	<p>The APU is used on the ground only. Isolation of the fuel feed by the LP solenoid and LP fuel pump switch means that the fuel feed pipe is not pressurized in the air.</p> <p>Fire and explosion risk is mitigated by presence of ground crew with fire extinguisher during APU running.</p>
<b>Mitigating action</b>	<p>RTI/Nimrod/300 to carry out fleet inspection of APU fuel feed pipe was issued on 15 Jan 09. The RTI is to be satisfied within 30 days.</p> <p>To date, five aircraft have had the RTI carried out with one aircraft requiring rectification.</p>
<b>Post-mitigation assessment</b>	<p>With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.</p> <p>Re-categorised as A1.</p>

**C.11.11 IFR mitigation status**

C.11.11.1 Appropriate IPT mitigation planned, the Fleet will be satisfied during ongoing IPT management process.

## **C.12 IFR 016 - Hydraulic pipe damage Zone 135**

### **C.12.1 Location**

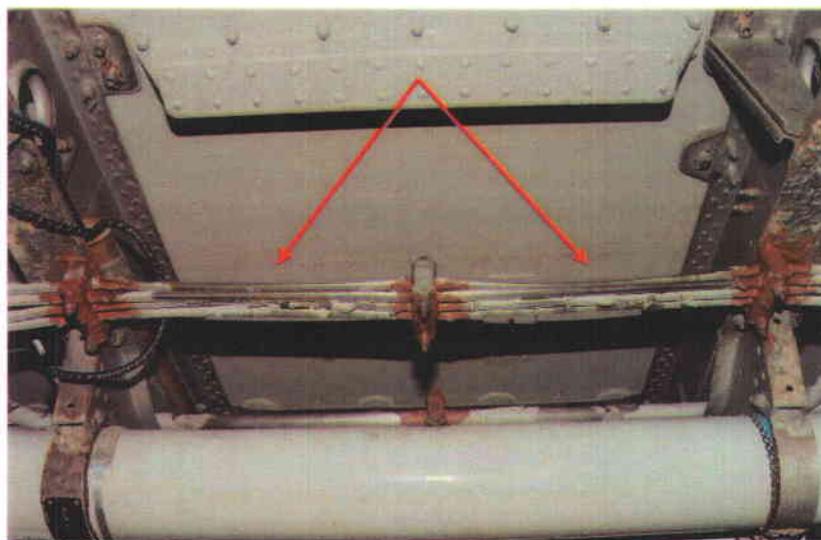
C.12.1.1 Zone 135 & 136 - Hydraulic equipment compartments.

### **C.12.2 System**

C.12.2.1 Hydraulics.

### **C.12.3 Part Number**

C.12.3.1 6-4BS747/ND, 6-4B1843/ND & 6-4BS1847/ND.



### **C.12.4 Reference**

C.12.4.1 AP101B-0503-3A, Chap 21-20, Fig 5, Items 9, 10 & 11.

### **C.12.5 F700 Review**

C.12.5.1 No F704 entry had been raised for this item.

### **C.12.6 Assessment**

C.12.6.1 Hydraulic pipes in the roof of the hydraulic bay exhibit distortion. The likely cause is the use of the pipes as a grab handle to help tradesmen manoeuvre around the hydraulic bay.

### **C.12.7 Proposed Recovery Action**

C.12.7.1 The distorted pipes should be examined, particularly for cracks and replaced as necessary.

C.12.7.2 MOD F704 entry required if damage assessed as acceptable until next available maintenance activity.

**C.12.8 Full Repair**

C.12.8.1 Protect pipes or introduce a suitable grab handle within the main hydraulic bay.

**C.12.9 SP Category**

C.12.9.1 A(Inv).

**C.12.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	<p>Nitrogen pipes feed accumulators for red, green and blue hydraulic systems. Functional risk from degradation and subsequent failure of a hydraulic system. Loss of individual hydraulic system mitigated by FRC drill (AP101B-0503-14A Card 31).</p> <p>No fire and explosion risk as pipes contain nitrogen, an inert gas.</p>
<b>Mitigating action</b>	<p>Zone surveyed during ALTI/Kin/Husbandry/0408, dated 2 Sep 08, and ALTI/Wad/Husbandry/0108, dated 15 Sep 08, with no similar instances of damage to pipe-work found.</p> <p>However, an RTI to inspect for pipe distortion is being drafted and will be released no later than 28 Feb 09.</p> <p>A letter to the Stations will be sent raising awareness of inadvertent damage caused during maintenance will be issued by 28 Feb 09.</p>
<b>Post-mitigation assessment</b>	<p>With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.</p>

**C.12.11 IFR mitigation status**

C.12.11.1 Appropriate IPT mitigation planned, the Fleet will be satisfied during ongoing IPT management process.

## **C.13 IFR 017 - Fuel feed pipe damage Zone 154**

### **C.13.1 Location**

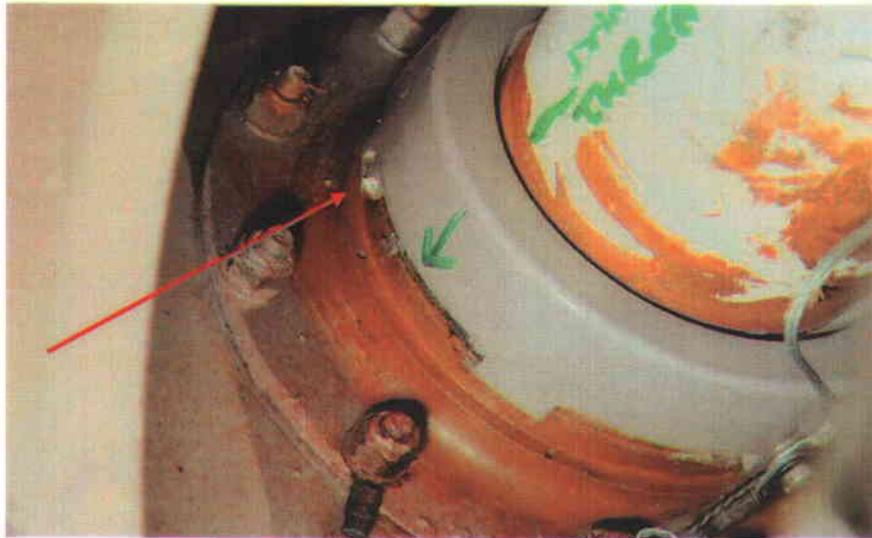
C.13.1.1 Zone 154 - Frame 42 to frame 46A, Stbd.

### **C.13.2 System**

C.13.2.1 Fuel System Feed.

### **C.13.3 Part Number**

C.13.3.1 FRS400P.



### **C.13.4 Reference**

C.13.4.1 AP101B-0503-3A Chap 41-20, Fig 16, item 11.

### **C.13.5 F700 Review**

C.13.5.1 No F704 entry had been raised for this item.

### **C.13.6 Assessment**

C.13.6.1 The damage sustained to the threads of the bulkhead connector may have occurred during assembly or check tightening and may be similar across the fleet.

### **C.13.7 Proposed Recovery Action**

C.13.7.1 Dismantle bulkhead connector and examine both male and female ends for damage and replace as necessary.

C.13.7.2 MOD F704 entry required if damage assessed as acceptable until next available maintenance activity.

**C.13.8 Full Repair**

C.13.8.1 Review installation procedure, removal of an adjacent LRU would improve access during assembly of coupling.

**C.13.9 SP Category**

C.13.9.1 A2.

**C.13.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	Further QinetiQ investigation has revealed that the coupling was correctly assembled and the damage was probably caused during the fitment of the coupling. Accordingly, it is assessed that there is no functional or other hazard but there is evidence of potential poor maintenance practice.
<b>Mitigating action</b>	A letter to the Stations will be sent raising awareness of inadvertent damage caused during maintenance activity will be issued by 28 Feb 09.
<b>Post-mitigation assessment</b>	With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.  Re-categorised as M.

**C.13.11 IFR mitigation status**

C.13.11.1 Nimrod IPT mitigation in place and all Fleet aircraft have been satisfied, no further action required.

## C.14 IFR 018 - Electrical cable blackening

### C.14.1 Location

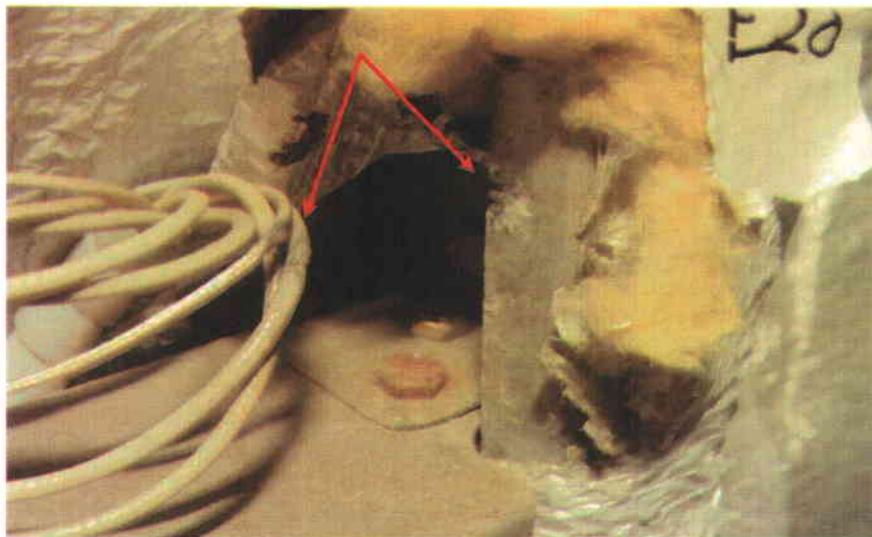
C.14.1.1 Zone 247 - Ordnance compartment, Port.

### C.14.2 System

C.14.2.1 Intercom.

### C.14.3 Part Number

C.14.3.1 Cable Minivin 22 met sheath 6145-99-1934455. Intercom Panel 6M4R14703A/ND (Connector R4922d29 in position 14 and contained in loom 6M4R29267A11.



### C.14.4 Reference

C.14.4.1 AP101B-0503-3A Chap 60-30 Fig 11 item 21.

### C.14.5 F700 Review

C.14.5.1 No F704 entry had been raised for this item.

### C.14.6 Assessment

C.14.6.1 Chafing of the rear mic-tel box cable on Frame 49 has resulted arcing and heat damage to the cables and frame.

### C.14.7 Proposed Recovery Action

C.14.7.1 Inspect and replace cables as necessary. Repair frame.

C.14.7.2 No MOD F704 required.

**C.14.8 Full Repair**

C.14.8.1 Consult DA concerning the routing of the cable to confirm the correct route.

**C.14.9 SP Category**

C.14.9.1 A2.

**C.14.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	<p>No functional risk as failure would affect only the minor intercom positions (relating to mission system operations).</p> <p>The risk from fire or explosion is mitigated by the lack of accelerant being present in the area and the surrounding soundproofing material, introduced via Mod 611, is fire resistant. Note that the damage caused to the soundproofing was caused during the investigation.</p>
<b>Mitigating action</b>	<p>RTI/Nimrod/306 issued on 22 Jan 09 directs an inspection of area for correct cable routing and initiating rectification, if required. RTI is to be complete within 56 days of issue.</p> <p>Both Stations will be informed of this issue in order to raise awareness amongst tradesmen.</p>
<b>Post-mitigation assessment</b>	<p>With the mitigation in place, it has been assessed that the probability of this event leading to a catastrophic loss of an aircraft is incredible.</p>

**C.14.11 IFR mitigation status**

C.14.11.1 Appropriate IPT mitigation planned, the Fleet will be satisfied during ongoing IPT management process.

## **C.15 IFR 019 - Zone 423 fuel feed pipe chafing**

### **C.15.1 Location**

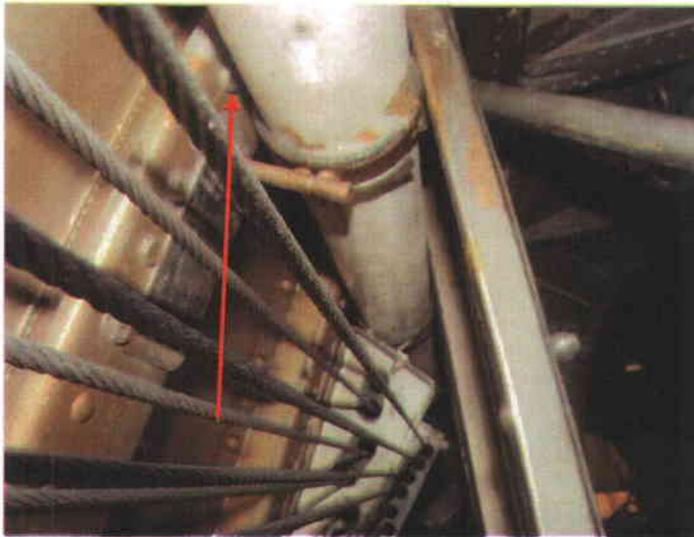
C.15.1.1 Between Zone 423 No2 Engine compartment & 513 - Rib 1 compartment.

### **C.15.2 System**

C.15.2.1 Fuel System Refuelling & Defuelling.

### **C.15.3 Part Number**

C.15.3.1 6E4P2033A/ND.



### **C.15.4 Reference**

C.15.4.1 AP101B-0503-3A Chap 41-40 Fig 17 Item 5.

### **C.15.5 F700 Review**

C.15.5.1 No F704 entry had been raised for this item.

### **C.15.6 Assessment**

C.15.6.1 A fuel pipe within the refuelling and defuelling system was found to be chafing on a stiffener on the inboard face of the firewall behind the engine mounting strut.

### **C.15.7 Proposed Recovery Action**

C.15.7.1 Examine pipe and assess the damage in accordance with the relevant technical publications and repair or replace as necessary. Re-establish clearance between pipe and stiffener.

C.15.7.2 MOD F704 entry required if damage assessed as acceptable until next available maintenance activity.

**C.15.8 Full Repair**

C.15.8.1 Re-establish clearance between pipe and stiffener.

**C.15.9 SP Category**

C.15.9.1 A2.

**C.15.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	<p>There is no functional hazard as the refuel system is not used during flight.</p> <p>The refuel pipe is not pressurised in flight. There is a fire and explosion hazard.</p>
<b>Mitigating action</b>	<p>RTI/Nimrod/172D issued in May 08 and RTI/Nimrod/212 issued on 3 Jul 08 direct inspection for leaks with the system pressurised and the condition of all fuel system pipe work and couplings between Rib 3 Port and Rib 3 Starboard on the aircraft. This area includes Zone 423. RTI/Nimrod/212 is called up and satisfied every 30 days.</p> <p>RTI/Nimrod/297 issued on 15 Dec 08 calls for a purge of the refuel system with Nitrogen following refuelling and prior to flight.</p> <p>However, an RTI is being drafted to be issued by 20 Feb 09 that directs a targeted inspection of this pipe, looking for signs of damage and chaffing and details rectification, were required.</p>
<b>Post-mitigation assessment</b>	<p>With the mitigation in place, it has been assessed that the probability of this event leading to a catastrophic loss of an aircraft is incredible.</p>

**C.15.11 IFR mitigation status**

C.15.11.1 Nimrod IPT mitigation in place and all Fleet aircraft have been satisfied, no further action required.

## **C.16 IFR 020 - Secondary conditioning pack**

### **C.16.1 Location**

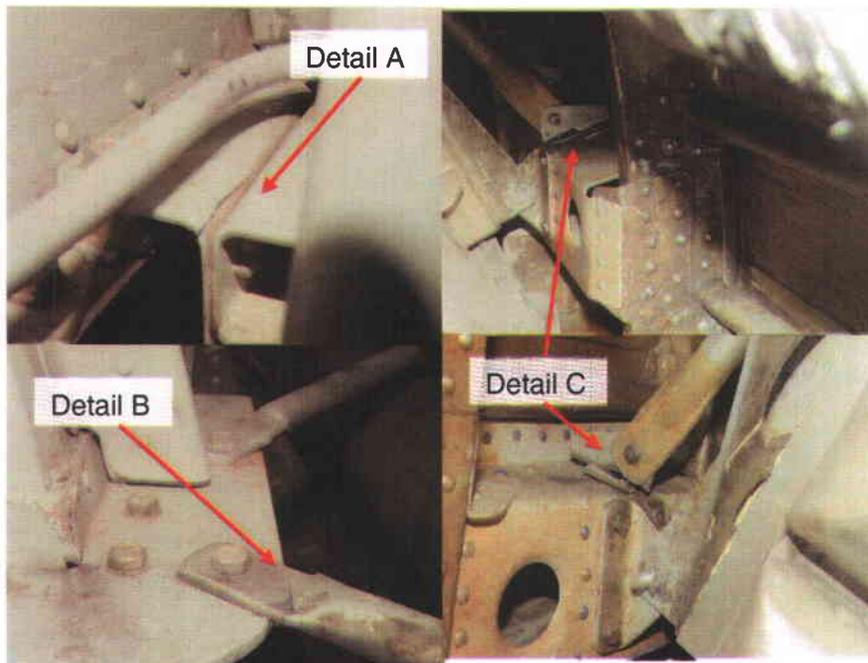
C.16.1.1 Zone 311 - Rear fuselage, Port.

### **C.16.2 System**

C.16.2.1 Air Conditioning.

### **C.16.3 Part Number**

C.16.3.1 Drawing No 6M4V11215 (Various items).



### **C.16.4 Reference**

C.16.4.1 AP101B-0503-3A Chap 23-10 Fig 19 Item Various.

C.16.4.2 AP101B-0503-1BJ Chap 23-12 Page 41, Fig 25, Detail B. Page 42 Fig 26, Detail B. Page 42 Fig 26, Detail C.

### **C.16.5 F700 Review**

C.16.5.1 No F704 entry had been raised for this item.

### **C.16.6 Assessment**

C.16.6.1 Cracked SCP support brackets and struts. Upper rear bracket cracked over 60% of its length (Fig 25, Detail B). Both struts cracked at inboard end (Fig 26, Detail B). Bracket at mounting structure cracked through and parted (Fig 26, Detail C).

**C.16.7 Proposed Recovery Action**

C.16.7.1 Replace all defective parts.

C.16.7.2 No MOD F704 required.

**C.16.8 Full Repair**

C.16.8.1 Due to the risk of failure and detachment of the SCP and the affect on other systems a dedicated inspection is recommended.

**C.16.9 SP Category**

C.16.9.1 A2.

**C.16.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	There is no Functional risk as SCP physically inhibited. There is hazard if the SCP becomes detached.
<b>Mitigating action</b>	RTI/Nimrod/301 to carry out MR2 fleet inspection of the Secondary Conditioning Pack heat exchanger (R1 not affected) issued 15 Jan 09. The RTI is to be satisfied within 30 days.  SCP is secured by multiple anchor points. To date, seven RTI/Nimrod/301 returns have been received with none requiring rectification. Post the receipt of all RTI/Nimrod/301 returns, Nimrod IPT staff will decide whether further action is required.
<b>Post-mitigation assessment</b>	With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.

**C.16.11 IFR mitigation status**

C.16.11.1 Appropriate IPT mitigation planned, the Fleet will be satisfied during ongoing IPT management process.

**C.17 IFR 021 - Capacitance stack connectors**

**C.17.1 Location**

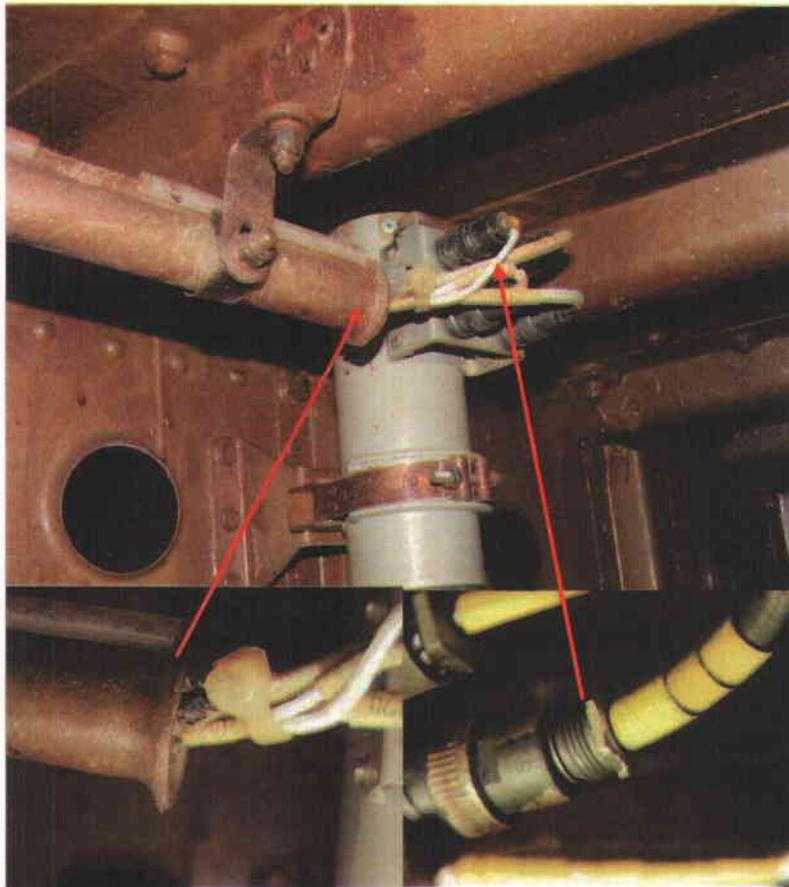
C.17.1.1 Zone 526 - No.3 fuel tank.

**C.17.2 System**

C.17.2.1 Fuel System Indication.

**C.17.3 Part Number**

C.17.3.1 LB115-1 & LB116-1.



**C.17.4 Reference**

C.17.4.1 AP101B-0503-3A Chap 41-60 Fig 40 Items 4 & 5.

**C.17.5 F700 Review**

C.17.5.1 No F704 entry had been raised for this item.

**C.17.6 Assessment**

C.17.6.1 Chafe on cable LJB167 on conduit adjacent to stack LB115-1 were cable exits conduit 6-4N5829, item 68 on fig 40. Cable LJB75 was not fully secured into its housing on stack LB116-1 and became detached when cable was disturbed to read ident label. Additionally, cable LJB75 was found to be cross connected. (5 further instances of cross connection were found in other tanks).

**C.17.7 Proposed Recovery Action**

C.17.7.1 Replace defective cable and rectify cross connections.

C.17.7.2 No MOD F704 required.

**C.17.8 Full Repair**

C.17.8.1 Investigate the impact that cross connections would have on the fuel system gauging.

**C.17.9 SP Category**

C.17.9.1 A2.

**C.17.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	<p>BAE SYSTEMS Report concludes that failure of the system would not provide source of ignition.</p> <p>Irregular fuel dial indications will warn crew of risk of incorrect fuel readings.</p>
<b>Mitigating action</b>	<p>BAE SYSTEMS Report MBU-DEF-R-Nim-AWD430, dated Nov 01, concludes that as the wiring to the components is low voltage, the cable is of coaxial construction and the connectors are sealed to prevent ingress of fuel, the system is intrinsically safe</p> <p>NAEDIT have investigated the apparent cross connection identified in the IFR and determined that the system design does not allow cross connection.</p> <p>The apparent six instances of cross-connection were not faults and posed no airworthiness risk.</p>
<b>Post-mitigation assessment</b>	<p>With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.</p> <p>Re-categorised as E2.</p>

**C.17.11 IFR mitigation status**

C.17.11.1 Nimrod IPT mitigation in place and all Fleet aircraft have been satisfied, no further action required.

**C.18 IFR 022 - Stbd UC accumulator- corrosion**

**C.18.1 Location**

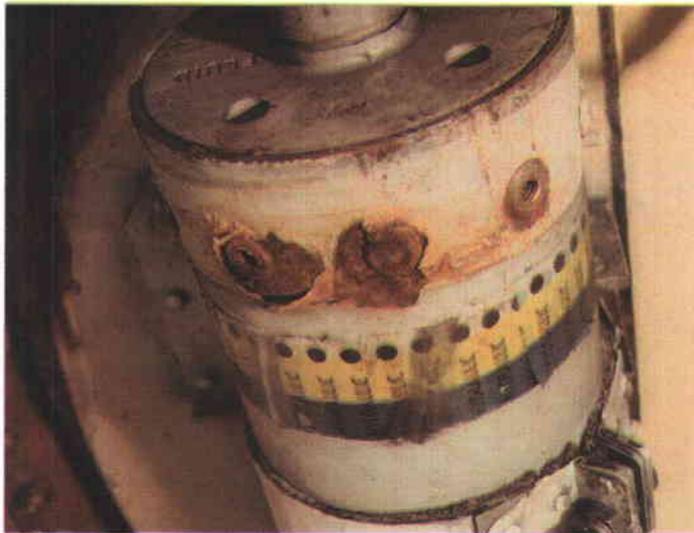
C.18.1.1 Zone 623 - Main gear compartment, Starboard.

**C.18.2 System**

C.18.2.1 Hydraulics.

**C.18.3 Part Number**

C.18.3.1 6M4S2894A/1.



**C.18.4 Reference**

C.18.4.1 AP101B-0503-3A Chap 20-10 Fig 13 Item 7A.

C.18.4.2 AP101B-0503-1BF Chap 20-10 Fig 5 Detail B.

**C.18.5 F700 Review**

C.18.5.1 No F704 entry had been raised for this item.

**C.18.6 Assessment**

C.18.6.1 Severe corrosion to accumulator forward end cap securing fasteners. Discovered when protective tape was removed to investigate ferrous staining from behind the tape.

**C.18.7 Proposed Recovery Action**

C.18.7.1 Replace accumulator.

C.18.7.2 No MOD F704 required.

**C.18.8 Full Repair**

C.18.8.1 Assess effectiveness of tape protecting fasteners.

**C.18.9 SP Category**

C.18.9.1 A2.

**C.18.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	<p>Loss of hydraulic power in a single system should not lead to loss of aircraft, significant system redundancy and emergency blowdown is available.</p> <p>There is no obvious source of ignition present in area should a hydraulic leak occur.</p> <p>There is a hazard from potential non-contained failure of the accumulator.</p> <p>Re-categorised as an A1.</p>
<b>Mitigating action</b>	<p>RTI/Nimrod/302 was issued on 15 Jan 09 to carry out fleet inspection for corrosion of undercarriage accumulators. The RTI is to be complete within 30 days.</p> <p>Additionally, a F760 is being raised to investigate severity of corrosion on the accumulator and a Minor Query was submitted to BAE SYSTEMS by the IPT on 3 Dec 08 for advice on acceptable corrosion limits.</p>
<b>Post-mitigation assessment</b>	<p>This hazard will be re assessed following analysis of the results of the RTI and advice from BAE SYSTEMS.</p>

**C.18.11 IFR mitigation status**

C.18.11.1 Appropriate IPT mitigation planned, the Fleet will be satisfied during ongoing IPT management process.

## **C.19 IFR 023 - Doppler bay cable**

### **C.19.1 Location**

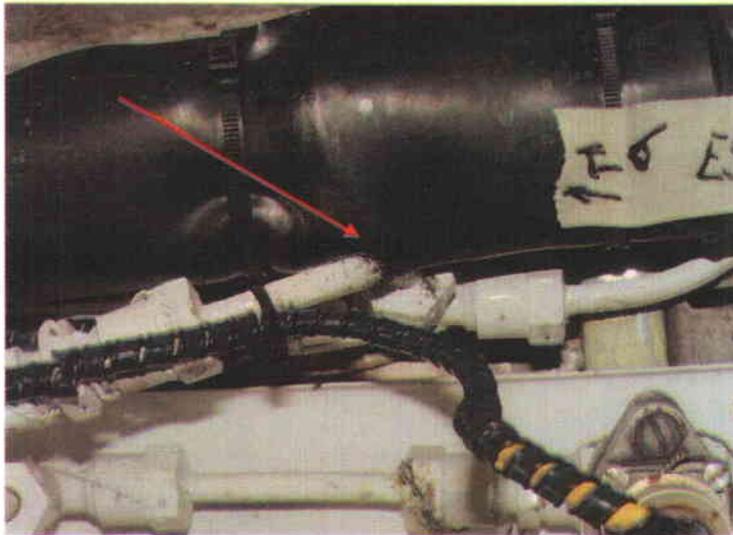
C.19.1.1 Zone 123 & 124 - Doppler compartments.

### **C.19.2 System**

C.19.2.1 Radar.

### **C.19.3 Part Number**

C.19.3.1 RG214/UF.



### **C.19.4 Reference**

C.19.4.1 AP101B-0503 Topic 10 Chapter 77-20-100 Sheet 1A.

C.19.4.2 Searchwater Radar Cables (Chap 77).

C.19.4.3 Sonobuoy Homer System (Chap 77).

C.19.4.4 Ground Intercom System (Chap 60).

C.19.4.5 Doppler System (Chap 76).

### **C.19.5 F700 Review**

C.19.5.1 No F704 entry had been raised for this item.

### **C.19.6 Assessment**

C.19.6.1 Cable bunch resting on Searchwater Radar pressurisation system pipe in the middle and port side of the Doppler bay. In the middle of the bay the pipe union has chafed through

the rubber sheathing and there are witness marks on the flexible conduit. To the port side of the bay there is contact between the cable bunch ty-wrap and pipe resulting in slight fretting wear to the pipe.

**C.19.7 Proposed Recovery Action**

C.19.7.1 Examine the entire cable bunch housed within the Doppler Bay. Repair or replace any damaged cables and ensure clearance is achieved between the cable bunch and components/structure. Examine any areas of contact with the aircraft structure or components for signs of damage and repair/replace as necessary.

C.19.7.2 No MOD F704 required.

**C.19.8 Full Repair**

C.19.8.1 Examine the entire cable bunch housed within the Doppler Bay. Repair or replace any damaged cables and ensure clearance is achieved between the cable bunch and components/structure. Examine any areas of contact with the aircraft structure or components for signs of damage and repair/replace as necessary.

**C.19.9 SP Category**

C.19.9.1 A2.

**C.19.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	The functional risk is mitigated by the cables being part of the mission system.  Pipe adjacent to damaged area carries nitrogen, an inert gas. The hydraulic pipes in the zone could potentially provide a source of accelerant.
<b>Mitigating action</b>	RTI/Nimrod/303 issued 26 Jan 09 to examine and rectify the cable, as required.
<b>Post-mitigation assessment</b>	With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.  Re-categorised as E2.

**C.19.11 IFR mitigation status**

C.19.11.1 Appropriate IPT mitigation planned, the Fleet will be satisfied during ongoing IPT management process.

**C.20 IFR 024 - Fuel feed pipe dented and distorted**

**C.20.1 Location**

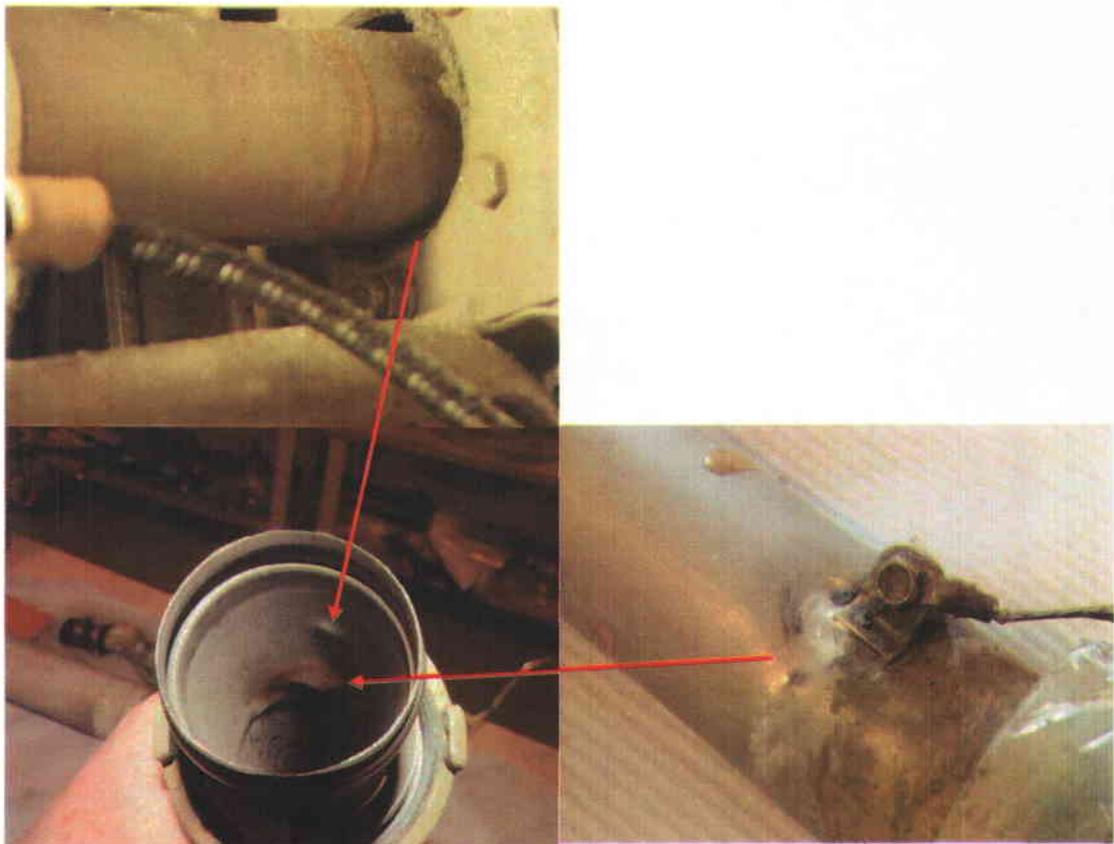
C.20.1.1 Zone 512 - Intake compartments.

**C.20.2 System**

C.20.2.1 Fuel System Feed.

**C.20.3 Part Number**

C.20.3.1 Feed Pipe item 47, 6M4P1287A/ND, Detail A, item 58 Seal 6M4P7511, Item 59 Ring Clamping 6-4P1337.



**C.20.4 Reference**

C.20.4.1 AP101B-0503-3A, Chap 41-20, Fig 2, Items 47, 57 & 58.

C.20.4.2 AP101B-0503-1DK, Chap 41-20, Para 2.8.

**C.20.5 F700 Review**

C.20.5.1 No F704 entry had been raised for this item.

**C.20.6 Assessment**

C.20.6.1 Fuel feed pipe to No2 Engine LP Cock chafing on bulkhead clamping ring. Biscuit seal worn through to clamping ring thus allowing metal to metal contact. Fuel feed pipe shows a degree of material deformation, particularly around the soldered bonding clip. Deformation on the inside of the pipe clearly shows sharp dents and discoloration beneath the area of the bonding clip.

**C.20.7 Proposed Recovery Action**

C.20.7.1 Replace the pipe, biscuit seal and clamping ring, ensuring adequate clearance is achieved between pipe and clamping ring assembly.

C.20.7.2 No MOD F704 required.

**C.20.8 Full Repair**

C.20.8.1 Replace the pipe, biscuit seal and clamping ring, ensuring adequate clearance is achieved between pipe and clamping ring assembly. Additionally, distortion of tube wall may be caused by attachment of the bonding lead to the tag or feeding tag through the 'biscuit seal'. Use of a bonding clip fitted to the pipe after being fed through the firewall may reduce the risk of distortion.

**C.20.9 SP Category**

C.20.9.1 A2.

**C.20.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	There is a fire and explosion hazard.
<b>Mitigating action</b>	RTI/Nimrod/172D issued in May 08 and RTI/Nimrod/212 issued on 3 July 08 direct inspection for condition and leaks of all fuel system pipe work and couplings between Rib 3 Port and Rib 3 Starboard on the aircraft. These RTIs include an inspection of this pipe. RTI/Nimrod/212 is to be satisfied every 30 days.  Evidence from this IFR has shown that this area is difficult to inspect in-situ. An RTI will be issued by 28 Feb 09 that directs a targeted inspection of pipes in this area.
<b>Post-mitigation assessment</b>	Once the mitigation is in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.

**C.20.11 IFR mitigation status**

C.20.11.1 Appropriate IPT mitigation planned, the Fleet will be satisfied during ongoing IPT management process.

## **C.21 IFR 025 - Interspace drain hose trapped**

### **C.21.1 Location**

C.21.1.1 Zone 155 - Rear fixed fairing compartment.

### **C.21.2 System**

C.21.2.1 Fuel System Feed.

### **C.21.3 Part Number**

C.21.3.1 Drain Hose 6M4P7201/ND.



### **C.21.4 Reference**

C.21.4.1 AP101B-0503-3A, Chap 41-20, Fig 16, Item 45.

### **C.21.5 F700 Review**

C.21.5.1 No F704 entry had been raised for this item.

### **C.21.6 Assessment**

C.21.6.1 Fuel interspace drains pipe trapped between the rear fixed fairing and the aircraft fuselage lower skin. Damage sustained to the flexible hose where the pipe comes in contact with the rivets on the fuselage skin and the 6 tank pump access panel edge.

### **C.21.7 Proposed Recovery Action**

C.21.7.1 Replace the pipe. No MOD F704 required.

**C.21.8 Full Repair**

C.21.8.1 Whilst the pipe is attached at one end with a swaged fitting, the other end is secured to a 'T' piece with a jubilee clip a simple solution to alleviate the trap would be to insert a section of rigid pipe secured by jubilee clips at the point at which it passes through the frame.

**C.21.9 SP Category**

C.21.9.1 A(Inv).

**C.21.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	Damage incurred by pipe was negligible and did not threaten the integrity of the pipe.
<b>Mitigating action</b>	Investigation was carried out by IPT. BAE SYSTEMS advice regarding correct assembly and routing of hose sought under Minor Query submitted by the IPT on 19 Dec 08.  The design and construction of the drain pipe is such that it will resist this type of abrasion.
<b>Post-mitigation assessment</b>	With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.  Re-classified as an M.

**C.21.11 IFR mitigation status**

C.21.11.1 Nimrod IPT mitigation in place and all Fleet aircraft have been satisfied, no further action required.

## D Observation Reports from the Previous Report [1]

### D.1 Observation number 4

#### D.1.1 Location

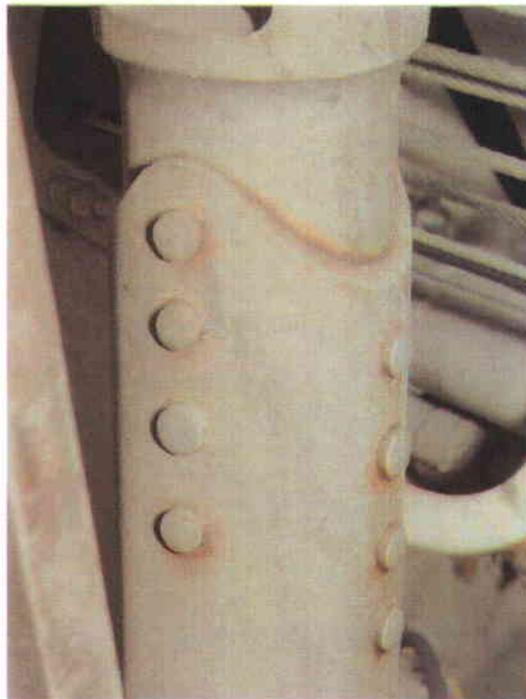
D.1.1.1 Zone 514 – Port wing root.

#### D.1.2 System

D.1.2.1 Mainplane, stub wing and centre section.

#### D.1.3 Part number

D.1.3.1 6-4 BG137A/1 (Tube Assembly), 6-4 BG139 (Fork End (2 off)), Strut – suspect corrosion deposits.



#### D.1.4 References

D.1.4.1 AP101B-0502/0503-5V, Figure 39.

D.1.4.2 AP101B-0503-3A.

D.1.4.3 AP101B-0503-1.

D.1.4.4 AP119A-0200-1, Corrosion Manual, Chapter 3-1-1.

D.1.4.5 E-mail Centre Section Tube Assy Corrosion.doc 10 October 2008. x x x x x x x x x

**D.1.5 F700 review**

D.1.5.1 No MOD F704/704A/704D entry had been raised for this fault.

**D.1.6 Assessment**

D.1.6.1 The strut is a structural element of the stub wing/centre section. Reference A identifies the strut as Structurally Significant Item (SSI) 072.1 and 072.2. This item could not be identified in Chapter 16-10, Figure 2, Items 38, 39 & 40.

D.1.6.2 The strut displayed a discolouration of the surface finish resembling ferrous oxide. The discolouration may be rubbed off revealing no disruption of the surface finish. This may be a resin deposit caused by various oils, greases and corrosion inhibitors. However, corrosion cannot be discounted.

**D.1.7 Proposed recovery action**

D.1.7.1 In accordance with advice received from the Design Organisation (DO) no immediate action is considered necessary. The strut should be disassembled for detailed inspection in accordance with DO advice.

D.1.7.2 MOD F704 and MOD F727C entries will be required.

**D.1.8 Full repair**

D.1.8.1 To be advised by the DO.

**D.1.9 Category**

D.1.9.1 A(Inv).

**D.1.10 Nimrod IPT action**

Nimrod IPT actions	
<b>Pre-mitigation assessment</b>	Not supplied
<b>Mitigating action</b>	BAE SYSTEMS advice sought through Minor Query submitted on 1 Dec 08. Suspected external corrosion assessed at QinetiQ as residual PX32. Suspected internal corrosion to be assessed by QinetiQ in due course.
<b>Post-mitigation assessment</b>	With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.

**D.1.11 Observation mitigation status**

- D.1.11.1 Nimrod IPT mitigation in place and all Fleet aircraft have been satisfied, no further action required.

## **D.2 Observation number 5**

### **D.2.1 Location**

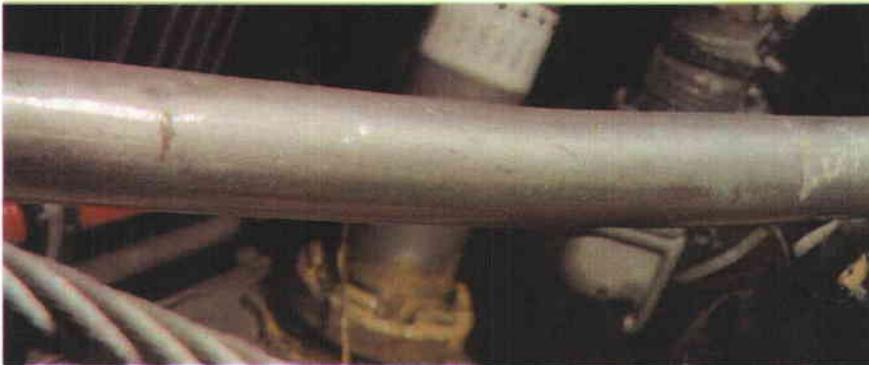
D.2.1.1 Zone 514 – Port wing root.

### **D.2.2 System**

D.2.2.1 Fuel system, No 7 tank defuel pipe.

### **D.2.3 Part number**

D.2.3.1 6M4P707AND, No 7 tank defuel pipe – in-service impact damage.



### **D.2.4 References**

D.2.4.1 AP101B-0503-3A, Chapter 41-20, Figure 8, Item 16

D.2.4.2 AP101B-0503-1DK, Chapter 41-20, Page 5

D.2.4.3 AP101B-0501/0503-6A, Chapter 14-21-04 Ducts and Pipes, Repair Procedures

### **D.2.5 F700 review**

D.2.5.1 No MOD F704/704A/704D entry had been raised for this fault.

### **D.2.6 Assessment**

D.2.6.1 The pipe is the port No 7 tank defuel pipe (Reference A shows the detail). The GCS inspection confirmed no evidence of leakage or cracking; however, the two areas of impact damage were measured and were both 0.15" long x 0.1" wide x 0.05" deep. Separation between the damage was 0.25". This is beyond the limits specified (The pipe (from Table 4) is 24 swg which is 0.559mm / 0.022in. So any damage greater than 0.002in is greater than negligible and requires the pipe to be replaced).

D.2.6.2 A temporary repair is not appropriate and the pipe should be replaced.

D.2.6.3 Should replacement parts not be available, the pipe could be removed and subject to a DO-approved Non-Destructive Testing process with a view to obtaining a concession for continued use of the component. If this process is adopted, an appropriate F704 entry should be raised.

D.2.6.4 It is noted that RTI/NIM/212A directs an inspection of the fuel system pipe work and couplings in Zone 514 as part of a wider check of the fuel system between Rib 3 Port and Rib 3 Starboard every 30 days.

**D.2.7 Full repair**

D.2.7.1 The pipe assembly should be replaced.

**D.2.8 Category**

D.2.8.1 A2.

**D.2.9 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	Not supplied.
<b>Mitigating action</b>	RTI/Nimrod/212 issued in Jul 08 to inspect fuel systems pipe across the fleet from Rib 3 to Rib 3, leak check No 3 tank 4-way trunking, integrity check of refuel pipes and check of electrical wiring every 30 days.  To date, four aircraft have failed RTI/Nimrod/212 and required rectification.
<b>Post-mitigation assessment</b>	With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.

**D.2.10 Observation mitigation status**

D.2.10.1 Appropriate IPT mitigation planned, the Fleet will be satisfied during ongoing IPT management process.

### **D.3 Observation number 9**

#### **D.3.1 Location**

D.3.1.1 Zone 147/148 – Bomb bay.

#### **D.3.2 System**

D.3.2.1 No 6 Tank fuel feed pipe – lack of clearance from hot air pipe.

#### **D.3.3 Part number**

D.3.3.1 6M4P5525ND, No 6 tank fuel feed pipe – lack of clearance between fuel feed pipe and hot air pipe.



#### **D.3.4 References**

D.3.4.1 AP101B-0503-3A, Chapter 41-20, Figure 17, Item 4.

D.3.4.2 AP101B-0503-1DM, Chapter 41-20, Page 7.

D.3.4.3 AP101B-0503-3A, Chapter 23-10, Figure 6, Item 36.

D.3.4.4 AP101B-0503-1BJ, Chapter 23-00.

#### **D.3.5 F700 review**

D.3.5.1 No MOD F704/704A/704D entry had been raised for this fault.

**D.3.6 Assessment**

- D.3.6.1 This fuel pipe is the No 6 tank fuel feed pipe (Figure 17 Item 11). The hot air pipe is an engine starting cross feed pipe (Figure 6 Item 36), used to cross feed hot air for engine start on the ground. Use of the cross feed in the air is prohibited.
- D.3.6.2 Inspection of the clearance between the refraisal shroud at the pipe joint and the fuel feed pipe was assessed at 4 mm minimum (starboard side of the bomb bay). Standard practice specifies a minimum clearance of 13 mm.
- D.3.6.3 It is noted that this refraisal shroud is removed, the area cleaned and the shroud refitted between flights.
- D.3.6.4 It is noted that in-flight engine restarts are prohibited in the Release to Service.

**D.3.7 Proposed recovery action**

- D.3.7.1 The reduced clearance between the refraisal shroud at the pipe joint and the fuel feed pipe does not give rise to a hazard given that the cross feed pipe is not used in-flight. As long as the shroud and fuel pipe show no evidence of contact then, given the limitation noted at paragraph B.9.6.4, the aircraft may be released for flight without further restriction.
- D.3.7.2 No MOD F704/704A/704D entry had been raised for this fault.

**D.3.8 Full repair**

- D.3.8.1 DO advice has been sought as to the acceptability of the reduced clearance.

**D.3.9 Category**

- D.3.9.1 A2.

**D.3.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	Risk from fuel and hot pipe present.
<b>Mitigating action</b>	BAE SYSTEMS advice sought regarding pipe clearance minima. Clear guidelines on minimum clearances given to units by IPT.
<b>Post-mitigation assessment</b>	With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.

**D.3.11 Observation mitigation status**

- D.3.11.1 Nimrod IPT mitigation in place and all Fleet aircraft have been satisfied, no further action required.

## D.4 Observation number 11

### D.4.1 Location

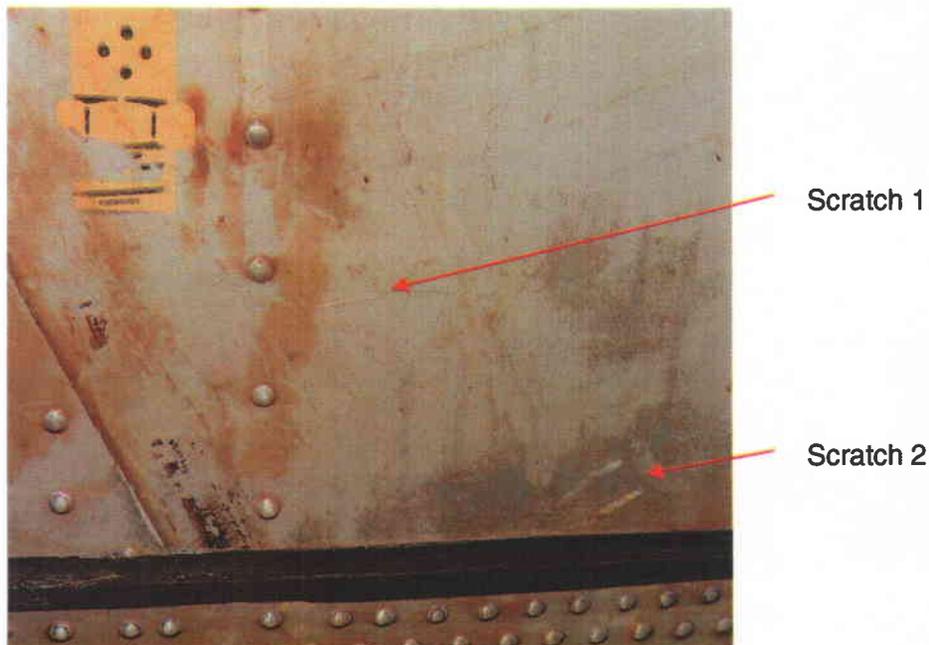
D.4.1.1 Zone 311-312 – Rear face of bulkhead.

### D.4.2 System

D.4.2.1 Rear fuselage pressure bulkhead

### D.4.3 Part number

D.4.3.1 6M4FS2125A, 6M4FS 2129A, 6M4FS 28009 and 6M4FS 28523; fuselage rear pressure bulkhead (viewed from Zone 312 APU access door).



### D.4.4 References

D.4.4.1 AP101B-0503-3A, Chapter 15-10, Figure 26.

D.4.4.2 AP101B-0503-1BA, Chapter 15-10, MP 15-10/3 Page 3, Figure 1.

D.4.4.3 AP101B-0503-6A, Chapter 15-10-03 and 14-20-01.

D.4.4.4 AP119A-0200-1, Corrosion Manual, Chapter 3-1-1.

### D.4.5 F700 review

D.4.5.1 No MOD F704/704A/704D entry had been raised for this fault.

**D.4.6 Assessment**

D.4.6.1 The upper scratch (Scratch 1) identified in the photograph was 1.6" in length and max depth of 0.06"; the lower scratch (Scratch 2) was 1.1" in length and a max depth of 0.06". The minimum distance between the areas of damage was 4.2". There was no evidence of denting or other deformation of the pressure shell as a result of this damage. The damage is located as shown in chapter 15-10, Figure 26 and chapter 15-10, MP 15-10/3 Page 3, Figure 1.

D.4.6.2 Both scratches exceeded the criteria that define negligible damage in accordance with AP101B-0503-6A and, therefore, would need to be addressed before next flight.

**D.4.7 Repair**

D.4.7.1 AP101B-0503-6A provides guidance and procedures for the blending of damage to the pressure bulkhead. Post-blending, a further assessment should be carried out and if the damage is within limits, the surface should be suitably protected. If post-blending the damage exceeds the limits set, then advice should be sought from the DO for an appropriate Non-Destructive Testing process and related concession.

D.4.7.2 A MOD F704 entry will be required. The MOD F746 airframe repair record card will need to be annotated with the repair details.

**D.4.8 Category**

D.4.8.1 A1.

**D.4.9 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	Urgent action required. Designer advice required from BAE SYSTEMS.
<b>Mitigating action</b>	UTI/Nimrod/56 raised on 5 Sep 08 to carry out fleet check for similar occurrences of damage. UTI carried out across the fleet and resulted in one further aircraft failure on XV255. Damage conceded by BAE SYSTEMS. Furthermore, in order to prevent further damage an MP was issued to carry out inspection of bulkhead following rectification work carried out in the surrounding area.
<b>Post-mitigation assessment</b>	With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.

**D.4.10 Observation mitigation status**

D.4.10.1 Nimrod IPT mitigation in place and all Fleet aircraft have been satisfied, no further action required.

## D.5 Observation number 18

### D.5.1 Location

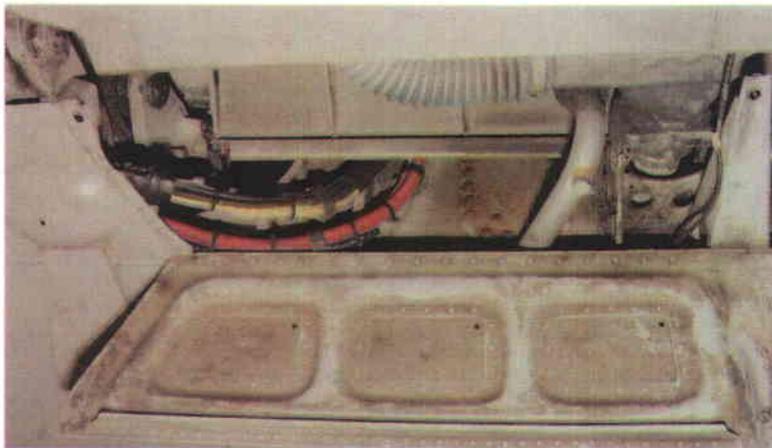
D.5.1.1 Zone 527/627 – Flap shroud compartment.

### D.5.2 System

D.5.2.1 Flying controls, flaps interfacing with a mission system cable loom.

### D.5.3 Part number

D.5.3.1 Not identified; cable rubbed by flap shroud.



### D.5.4 Reference

D.5.4.1 AP101B-0503-3A, Chapter 15-20, Figure 93, Item 29.

### D.5.5 F700 Review

D.5.5.1 No MOD F704/704A/704D entry had been raised for this fault.

### D.5.6 Assessment

- D.5.6.1 The flap shroud compartments port and starboard accommodate cable looms servicing a mission system. Additionally the starboard flap shroud compartment accommodates the cables for the Electro-Optic system. There was a rubbing witness mark on a rubber protective sheet on one of the cable looms in the starboard shroud compartment at Zone 627.
- D.5.6.2 In discussion with the Engineering Authority (EA), the SP was informed that the rubber protective sheet has been fitted as a sacrificial cover to protect the cable looms from a known chaffing problem.

**D.5.7 Proposed recovery action**

D.5.7.1 Cable loom to be inspected every 28 days.

D.5.7.2 A MOD F704 entry will be required.

**D.5.8 Full repair**

D.5.8.1 An investigation has been instigated by the EA to examine potential rerouting of the cable assembly.

**D.5.9 Category**

D.5.9.1 A(Inv).

**D.5.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	No functional risk as damage relates to mission system only.
<b>Mitigating action</b>	RTI/Nimrod/280 issued on 20 Oct 08 to examine the cable and rectify where required. The RTI has a 28 day period for satisfaction at Fwd and 56 days in Depth. 13 aircraft have been inspected so far with one failure which was rectified. The last aircraft will be reported following depth maintenance.
<b>Post-mitigation assessment</b>	With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.

**D.5.11 Observation mitigation status**

D.5.11.1 Nimrod IPT mitigation in place and all Fleet aircraft have been satisfied, no further action required.

**D.6 Observation number 19**

**D.6.1 Location**

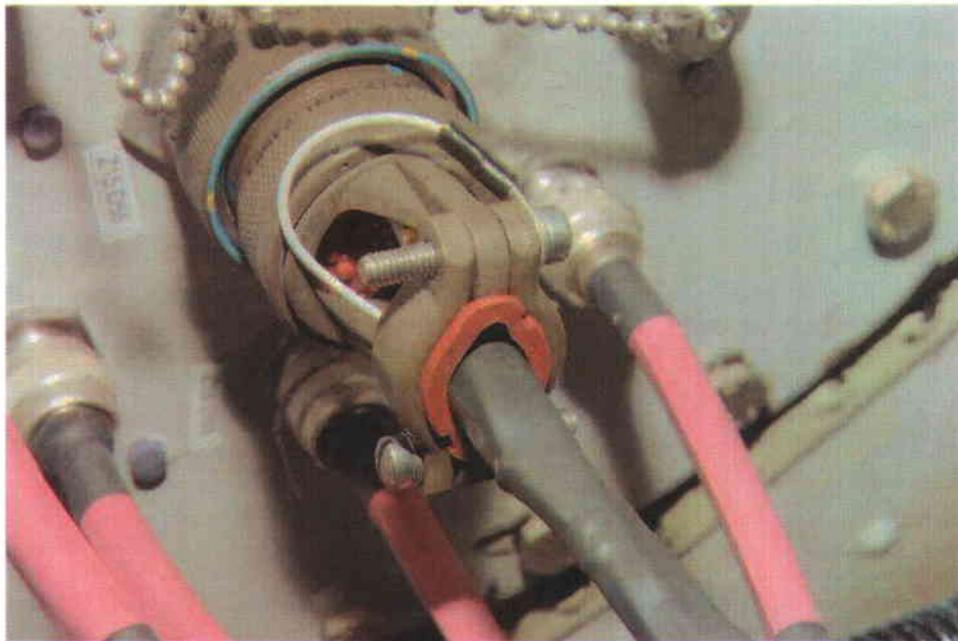
D.6.1.1 Zone 852 – Rear hinge fairing starboard.

**D.6.2 System**

D.6.2.1 Communications – SM/NIM/271 electrical plug.

**D.6.3 Part number**

D.6.3.1 6027/20/41PN (Connector); GS3417-20N (Back Shell); 012-7532-000 (Grommet); unrestrained cable in the main plug for SM/NIM/271.



**D.6.4 Reference**

D.6.4.1 AP101B-0502/0503-2(R)2A.

**D.6.5 F700 review**

D.6.5.1 No MOD F704/704A/704D entry had been raised for this fault.

**D.6.6 Assessment**

D.6.6.1 Although the plug was correctly assembled, the clamp failed to secure the cable. The cable was permitted to move in a longitudinal manner increasing the risk of conductor failure and exposing live conductors presenting a potential source of ignition.

D.6.6.2 It is noted that this observation was raised as an Immediate Fault Report (IFR) from the GCS. On receipt of the IFR, Nimrod IPT initiated action to inspect those aircraft which had been modified to satisfy SM/NIM/271 and confirmed that there were no loose connections that would present a potential source of ignition on any other aircraft. RTI/NIM/266 was raised to direct an inspection and corrective action (see paragraph B.19.8.1).

**D.6.7 Proposed recovery action**

D.6.7.1 Reassemble clamp with additional packing material.

**D.6.8 Full repair**

D.6.8.1 RTI/NIM/266 requires the inspection of all aircraft and, where faults are discovered; make good the clamping of the cable in accordance with SM/NIM/271.

**D.6.9 Category**

D.6.9.1 A1.

**D.6.10 Nimrod IPT action**

<b>Nimrod IPT actions</b>	
<b>Pre-mitigation assessment</b>	No Functional risk as cable supplies data to a mission system.  This type of plug, correctly fitted, ensures a firm and secure cable connection; therefore, the risk of conductor failure due to longitudinal movement is considered unlikely. As no obvious source of accelerant present in this area, the risk from fire and explosion is considered negligible.
<b>Mitigating action</b>	RTI/Nimrod/266 issued on 15 Oct 08 to check connectors across the fleet and rectify as appropriate. This RTI is now fleet satisfied. ALTI/Kin/Husbandry/0408, dated 5 Sep 08, and ALTI/Wad/Husbandry/0108, dated 15 Sep 08, conducted zonal inspections and reported no similar occurrences.  Both Stations will be informed of the issue in order to raise awareness amongst tradesmen.
<b>Post-mitigation assessment</b>	With the mitigation in place, it has been assessed that probability of this event leading to a catastrophic loss of an aircraft is incredible.  Re-categorised as E2.

**D.6.11 Observation mitigation status**

D.6.11.1 Nimrod IPT mitigation in place and all Fleet aircraft have been satisfied, no further action required.

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## Report documentation page

Originator's Report Number		QINETIQ/MS/SES/TR0900165/1	
Originator's Name and Location		X X X X Bldg 499, North Annex A, QinetiQ, MOD Boscombe Down, Salisbury	
Customer Contract Number and Period Covered		NIMES/8052	
Customer Sponsor's Post/Name and Location		X X X Nimrod IPT, RAF Wyton	
Report Protective Marking and any other markings	Date of issue	Pagination	No. of references
RESTRICTED QinetiQ Proprietary	17 Feb 2009	82 + Covers	3
Report Title Nimrod MR Mk2 General Condition Survey Report			
Translation / Conference details (if translation give foreign title / if part of conference then give conference particulars) Enter Translation			
Title Protective Marking		QinetiQ Proprietary	
Authors		X X X X X	
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