Information for FAAM Users

1.1. Aircraft Security Procedures

1.1.1. Introduction

1.1.1.1. The ARA, which is a 4-engined BAe-146-301 jet aeroplane, normally flies with the cockpit door open in order to allow forward view by the mission scientist. For this reason, the following security procedures are in place:

1.1.1.2. Anybody flying on board the ARA must hold a Directflight security pass.

1.1.1.3. Anybody flying on board the jump seat (normally occupied by the mission scientist) must have permission to do so from the aircraft Captain.

1.1.2. Obtaining a Directflight Security Pass.

1.1.2.1. All personnel flying with FAAM must carry a Directflight Security Pass.
For non met-office staff, a Basic Disclosure Scotland report can be used to satisfy some of the requirements for this Pass. Applications for the reports are best made on-line at www.disclosurescotland.co.uk using a PERSONAL credit/debit card and HOME address.

1.1.2.2. Alternatively, non-UK nationals should provide a Criminal Record Check to cover the previous 5 years. (For recent residents of the USA these should be obtained from local area police departments to cover all residential addresses used in the previous 5 years).

1.1.2.3. Original Reports must be sent to Collette How, Directflight, Building 84A, Cranfield University, Cranfield, MK43 0AL, United Kingdom. E-mail: collette.how@directflight.co.uk Tel: (+44/0) 1234 757766 Fax: (+44/0) 1234 758018. A further forms will then be required to provide details of the applicant's last five-year employment record and two character references. **Alternately, anybody holding a MoD/Met Office DVA number (for security clearance) should notify Directflight of this, and streamlined procedures exist in this case.** Most FAAM staff will hold a DVA clearance.

1.1.2.4. Once this information has been returned and checked, Directflight will advise the applicant when their pass can be collected from Directflight's office at Building 84a Only if all flight and science crew or passengers hold a Directflight security pass can the aircraft be operated with the cockpit door open. Any

person without a security pass MUST carry a photo id (normally a passport or driving licence) however such passengers are rarely carried.

1.1.3. Boarding security procedures.

1.1.3.1. All crew must be aware that the following procedures will be carried out (as dictated by Department for Transport regulations) before all flight in the ARA. They will be carried out by DFL staff who have been specifically trained, and who will attempt to keep the process as hassle-free as possible.

1.1.3.2. All personnel (including all flight and science crew) who are departing from the UK on detachment on board the FAAM aircraft will be body searched just prior to departure. The aim is for this procedure to be carried out immediately before boarding the aircraft for the final time before departure (once the aircraft has been cleared and declared a restricted zone). Once they have been searched and have boarded the aircraft, anybody leaving the aircraft / restricted zone will need to be searched again. See Appendix 1 for full details of items which can be taken on board.

1.1.3.3. The search will be similar to that at a commercial airport, and should be treated in the same manner. Everybody will be asked if they give consent to be searched. Whilst the right to refuse exists, it should not be used unreasonably, and personnel can be refused boarding. Personnel may be searched in their normal clothes (without flying suits) and flying suits searched separately. No metal tools may be taken onto the aircraft.

1.1.3.4. If carried, hold luggage may also be searched prior to loading onto the aircraft, and always in the owner's presence. Again, the right to refuse exists, but if this refusal is deemed unreasonable, luggage can be left behind. The search is not undertaken to look for personal effects or to embarrass the owner, it is simply to check for anything that might cause damage to the aircraft or harm to any of the passengers or crew.

1.1.3.5. Hand luggage will be searched at the same time as the body searches are carried out, and again should not leave the aircraft once it has been searched. The same rules apply as with a commercial flight: no knives, scissors, or sharp tools may be carried on board.

1.2. Safety practice on the apron

1.2.1. The aircraft manoeuvring area (also known as ramp or apron), is a busy place of work; when operating on or around the aircraft, the following must be observed:

1.2.1.1. A fluorescent, “High-Viz”, jacket or vest must be worn whilst walking to and from the aircraft, and anytime whilst on the aircraft manoeuvring area (apron). This applies both at Cranfield and away from home base.

1.2.1.2. Smoking is only permitted in designated smoking areas and is not permitted on the apron or onboard the aircraft, or within any FAAM building at any time.

1.2.1.3. Identification must be carried when on the apron, in the hangar, on the aircraft, when airside generally, or in any other restricted area; any individual not known or wearing visible identification in one of these areas should be challenged. If any problems are encountered whilst on the apron, Air Traffic Control must be notified (at Cranfield, extension 4671). Loss of Cranfield or Directflight identification should be immediately reported to both Airfield Security (at Cranfield, extension 2201) and Directflight Operations (Cranfield extension 4870). If on detached operations, the loss must also be reported to the police.

1.2.1.4. Personnel are not to walk under the tail of the aircraft when the APU is running.

1.2.1.5. Where possible, to avoid hazard from venting fluids, personnel should not to walk under the aircraft wing.

1.2.1.6. Mobile phones should not be used on the apron. Exceptionally, whilst at Cranfield, mobile phones may be used on the apron if no aircraft refuelling is taking place within 100m.

1.2.1.7. Personnel should embark and disembark the aircraft via the aircraft’s own air stairs located at the forward left door. In some circumstances, however, it may be necessary to use positioned steps to enter the aircraft; some of these steps may be of open tread or open mesh type. When using steps, personnel should be aware of the following: carrying too much may prevent proper use of the hand rails and cause a loss of balance; steps may be slippery when wet or icy; and narrow heels can become caught in open mesh steps, causing the wearer to fall.

1.2.1.8. Vehicles are a potential source of accidents on the ramp both in terms of personal injury and damage to aircraft. Personnel should pay particular attention to vehicle movements. One may not be able to hear approaching vehicles when wearing hearing protection; never take for granted that a driver has seen you.

1.2.2. Safety practice on board the ARA

1.2.2.1. Flight Crew Members have absolute responsibility for safety on the aircraft and their instructions should always be obeyed. However, all personnel must remain vigilant to safety concerns and report anything unusual or abnormal to (in order of preference) the operating CCM, the Flight Manager, or directly to the flight deck.

1.2.2.2. When on board for flight, stout non-synthetic shoes and where possible fire retardant fabrics must be worn. This last will normally consist of natural fibre clothing under a suitable (normally nomex) flying suit. Flying suits may not have emergency knives fitted. Occasional users are not required to use a flying suit but must still follow the general guidelines, regular users should arrange to have use of a nomex flying suit. Some suppliers (e.g. Transair) sell polycotton flying suits which are not properly flame retardant – these should not be used on board.

1.2.2.3. Anybody on board the aircraft must know the location of the four emergency exits, how they are operated, and the nature of the fluorescent strips either side of the aisle to allow guidance to the exits in poor visibility.

1.2.3. Emergency equipment

1.2.3.1. The following emergency equipment is carried on board the ARA.

a. First aid kit.
b. Medical emergency kit.
c. Two megaphones.
d. Five torches.
e. Fire Axe.
f. Water Glycol fire extinguisher.
g. Three BCF/Halon fire extinguishers.
h. Two smoke hoods.
i. Twenty-one life jackets.
j. Seat emergency oxygen for each person on board.
k. Two portable oxygen bottles.
l. Defibrilator.

1.2.3.2. All FAAM staff holding “FTP” status, which should be most staff at most times, will have received training in the use of all of this. If in doubt as to emergency actions, science crew should follow the instructions first of the CCM (Cabin Crew Manager) and secondly of any FAAM staff on board the aircraft.

1.2.3.3. The seat belt signs must be obeyed at all times. During engine starts and shutdowns, all personnel must be seated so that the aisles remain clear. When operating at altitudes below

5000ft agl, or when the seat belt sign is illuminated, all personnel are to return to their seats and fasten the lap portion of the seat belt. The full harness is to be worn for take off and landing.

1.2.3.4. Instrument operators may stand at their racks if the rack has harness provision and both a harness and a helmet are worn. Below 5000ft but not below 1000ft, the captain may specifically authorise science crew members to leave their seats. During dropsonde operation, all personnel must be fastened to their seat or rack from 3 minutes prior to launch until the ejector is clear, closed and latched.

1.2.3.5. The Mission Scientist's seat must be in the forward and locked position for take off and landing. Additionally, the full fitted safety harness must be worn when the seat is in the forward position.

1.2.3.6. The CCM will be seated at the rear of the cabin for take off and landing. An Able Bodied Passenger (ABP), seated at the forward inboard seat, will be briefed to open the forward right door in an emergency. It should be noted that the left doors are the larger of the aircraft doors.

1.2.3.7. Each rack will be fitted with a safety data sheet including emergency shutdown actions. Anybody working at any rack either in the air or on the ground must familiarise themselves with the contents of this sheet. If the sheet is missing, this will normally prevent flight and on the ground no rack should be powered unless the safely data sheet is available.

1.2.4. Aircraft Refuelling

1.2.4.1. There are occasions when the ARA will be refuelled, either at Cranfield or elsewhere, with personnel on board. On such occasions:

(a) Seatbelts must be unfastened when the aircraft is being refuelled.
(b) Aircraft exits must be kept clear of any obstructions, including persons.
(c) The rear doors must remain closed, armed and guarded by a CCM or FTP, unless steps are in position.
(d) Personnel may only leave the aircraft in an emergency or with the permission of the aircraft Captain.
(e) Mobile telephones may be used on board the aircraft whilst refuelling is taking place but may not be used on the ramp.

1.2.5. Medical considerations

1.2.5.1. The ARA's cabin is noisier during flight than similar conventional passenger aircraft; under Noise at Work Regulations, wearing of ear protection in the aircraft is mandatory for exposures greater than 4 hours. As a result, all personnel should wear the supplied headsets during all stages of flight and, where the wearing of headsets is not realistic, personnel must wear earplugs or ear defenders. Headsets will normally be issued to individuals as personal equipment before flight; the normal science crew headset on the ARA is the Bose-X, with standard civil twin-plugs and a 2xAA battery power supply. Regular users are at-liberty to purchase their own such headsets, although the use of these should be notified to the SCCM before flight.

1.2.5.2. Personnel must not undertake a flight when suffering from a cold or ear infection which may lead to difficulty in clearing the ears, or any air-transportable infectious disease. [Any inability to equalise pressure across the sinus and eardrum can result in severe discomfort and possible, serious and long-term oral-nasal damage.]

1.2.5.3. The nature of some profiles flown by the aircraft is a potential cause of anxiety and motion sickness. The debilitating effects of airsickness should not be underestimated. In the interest of safety, the CCM should be made aware of all instances of any form of sickness. Sick bags are available but the primary means of relief is through changing the aircraft profile being flown. Personnel experiencing discomfort of any kind should be offered support and they should not be expected to continue with their tasks. Any medical or safety related issues must be dealt with and the Captain kept informed.

1.2.5.4. All FTP have received basic first aid training, whilst all CCMs and Flight Managers and some further FAAM staff have undergone enhanced First Aid training; a medical doctor is also on call via SATCOM in the event of a medical emergency. A defibrillator is normally carried on board.

1.2.5.5. To avoid dehydration, all on board should take regular drinks during a flight. Personnel should advise the CCM if they become ill. In particular, the following may indicate an infectious disease that should be reported prior to landing back in the UK after an overseas detachment:

a. Diarrhoea and/or vomiting (especially if accompanied with a rash).

b. Fever (temperature above 37.5°C).

c. Rash or skin lesions.

1.2.6. In the event of suspected infection diseases on board, it is mandatory that the nearest UK Port Health Authority is informed, who must then authorise any disembarkation from the aircraft. Further details are at references [1] and [2].

1.2.7. It is recommended that all personnel carry a European Health Insurance Card when operating overseas. Additionally, on some flights there may also be a requirement to carry specific vaccination certificates (for example, Yellow Fever) and a Passport.

1.3. Pre-flight planning

1.3.1. A Mission Plan is compulsory for all science flights. Unless agreed otherwise with all parties (including DFL) the Mission Scientist must issue their Plan by 1200 local time the previous day and send it to the FAAM Operations Manager (or their acting deputy); receipt must be confirmed and, if the Operations Manager is not available, the Plan must be sent to their authorised deputy. Once received, an overview of the plan should be circulated to all at FAAM and the Operations Coordinator at DFL. The Plan and crew list will normally be published in full on the FAAM website Schedule page. It is necessary for the Mission Scientist to keep FAAM informed of any subsequent developments to the Mission Plan. The Plan must include as a minimum the following:

(a) Flight number.
(b) Project title and assigned code.
(c) Flight objectives.
(d) Location of trial.
(e) Weather requirements and limitations.
(f) Detailed intended flight pattern.
(g) External requirements.
(h) Communications plan.
(i) Scientific instrument requirements.
(j) Personnel requirements

1.3.2. The Mission Scientist must consult with DFL's nominated Captain or his authorised deputy at the earliest opportunity to discuss the profiles to be flown. This must be achieved on the day prior to the flight to enable airspace coordination to take place. Flight crew report for duty 3 hours before the intended take off. The Mission Scientist should review the weather and intended profile such that any updates to the Plan can be discussed with the crew well before the planned brief; this is vitally important if the planned take off time is to be achieved.

1.3.3. Below 5000ft, personnel will be unable to take toilet or refreshment breaks. Below 1000ft, the CCMs will not be able to move

around the cabin. Thus, missions should not normally be planned to take place exclusively at low level; at least 10 minutes with the aircraft operating above 5000ft should be planned.

1.3.4. Pre-flight brief time is normally at take-off minus 2 hours. Everyone intending to fly must be at the brief at the nominated time; non-attendance at the start of the brief may preclude taking part in the mission. During the pre-flight brief and on production of a DFL pass, mission participants will be issued with an aircraft boarding-pass. The brief should include, as a minimum:

1.3.4.1. Essential safety items.

1.3.4.2. The scientific aim.

1.3.4.3. A summary of the Mission Plan.

1.3.4.4. Expected weather.

1.3.4.5. Individual operator and instrument requirements.

1.3.4.6. Expected duration.

1.3.5. Security check is normally at take-off minus 45 mins. A full security search of the aircraft will be carried out by DFL personnel or other trained staff. Additionally, all flying personnel will be required to undergo a baggage and body search before boarding the aircraft.

1.3.6. Final boarding is normally at take-off minus 30 mins.

1.3.7. Post-flight debrief is normally at landing time plus 30 mins.

1.4. Tools

1.4.1. Tool kits

1.4.1.1. There are five sets of tools in use by members of staff and visitors in various departments at FAAM. All these tool kits are similarly in specification and equipped with sufficient tooling to allow work to be carried out by multiple people simultaneously. Each tool kit consist of a compliment of imperial and metric tools, screwdrivers, pliers, ruler's and various other hand tools specific to the work being carried out at each location. These can be found at the following locations in the following configurations.

1.4.1.2. **Hangar Tool Kit**

1.4.1.2.1. The hangar tool kit is stored in a red roll cabinet kept on the hangar floor at Cranfield. The individual draws are foam lined with the tools inset into the foam for optimum storage.

These tools are for scientific equipment use only and are not to be used to alter any part or component on the airframe unless by Avalon engineers. The tools in the hangar tool kit are not to be removed from the boundary of the hangar with the exception of pre-flight activities which are undergone on the ramp immediately outside the hangar doors.

1.4.1.3. Building 125 Laboratory

1.4.1.3.1. The Laboratory tool kit is stored in a red roll cabinet kept in the Laboratory in The FAAM main building (building 125). The individual draws are foam lined with some tool inset into the foam. These tools are not to be removed from the Laboratory in building 125

1.4.1.4. Building 84A laboratory

1.4.1.4.1. The tool Kit in building 84A is in the visiting scientist laboratory and is mounted on the wall in the right hand corner of the room in the form of a shadow board. This tool set has been supplied to augment the tools visitors to FAAM bring with them and is not supplied as a comprehensive tool kit like the hangar and building 125 laboratory tool kits. These tools are not to be removed from this area and used in the controlled area of the hangar

1.4.1.5. Detachment Tool kit

1.4.1.5.1. The detachment tool kit is a comprehensive tool kit kept in a red tool chest. This is located in the bonded storage area in building 84A laboratory. The drawers are foam lined with the tool inset into the foam. This tool kit is only in use when the aircraft is on detachment away from base for long periods. It has been stocked with tools to match the capability of the hangar tool kit.

1.4.1.6. Aircraft science equipment tool kit

1.4.1.6.1. This tool kit is kept locked on board the aircraft and is populated and controlled by Direct Flight. This tool kit becomes available for use only after the duty “pre-flighter,” has checked the hangar tool kit for its contents, and then locks it so no tools can be removed from it and taken onto the aircraft. If any further work is required to be done after this has happened (usually forty five minutes before departure) tools for this can only be gained from the onboard aircraft tool kit access to which is limited to the Cabin Crew Manager (CCM) who will issue tools as required.

1.4.1.7. Personal Tooling held by FAAM staff

1.4.1.7.1. Whilst it is recognised that the detachment tool kit is stocked to be as capable as the hangar tool kit it cannot supply the needs of all the personnel who may wish to use it in between flights. In order to reduce the delay in completion of an individuals work FAAM staff (those that require one) may be issued with a small personal tool kit consisting of a few basic hand tools to augment the detachment tool kit.

1.4.1.8. **Visitor's personal tooling**

1.4.1.8.1. Whilst Cranfield is the home base of operations for the BAe 146-301, where aircraft maintenance and scientific equipment role change along with various other tasks are carried out, it is recognised that the tooling supplied cannot meet the requirements of all the organisations who have access to the aircraft In an instance where visiting personnel have brought with them additional tools not available at FAAM, tool control procedures must be agreed and no tool may be taken onto the aircraft until these are in place.

1.4.2. Tool Control

1.4.2.1. Tool control is essential because tools left on board an aircraft in flight have potential to cause injury or damage, possibly in extremis loss of the aircraft.

1.4.2.2. The hangar tool kit is controlled by a system where by either each tool is signed out from the tool kit by the user and then signed back in when returned to its correct position, or (more normally) similarly a personal tool tag is left in place of the tool. This tool kit is checked at the start of each working day by a member of FAAM staff who will sign for doing so and enter on the chart which if any tools are missing.

1.4.2.3. The hangar tool kit is inspected periodically through the day to ensure that tool logging procedures are being maintained and allowing any discrepancies to be quickly traced and amended. The tool kit is also checked before each flight by the duty "pre flighter," to confirm all tools have been returned prior to departure. A final check is carried out at the end of the day when the tool box is locked and the key signed back into the key press in the front office. For access to the Hangar tool chest outside of office hours Avalon Engineering hold a second key for the hangar tool chest.

1.4.2.4. **Tool Tags**

1.4.2.4.1. Tool tags will be issued in sets of 5, where all tags in a set will carry the same number. People who access the aircraft for the purpose of working on the scientific equipment and who in the course of these activities utilise

the hangar tool kit will first need to be issued with tool tags which they will sign for. Once signed for that particular set of tool tags will be for the sole use of that person. When removing a tool from the hangar or any tool kit a tool tag will be left in its place and removed once the tool is returned. When used, this procedure will negate separate requirements for tools to be signed in and out.

1.4.2.4.2. Non FAAM staff must return their tags at an agreed point – for detachments this is likely to be the end of the detachment, for work at Cranfield this by default would normally be the end of the working day.

1.4.2.5. The loss of any tooling is to be reported immediately to the FAAM instrument technician.

1.4.2.6. **Visitors Additional tool Control**

1.4.2.7. Any and all tooling which is not contained in the hangar tool kit and is intended for use on the aircraft must have their details recorded before they taken onto the aircraft. It will be necessary from time to time for visitors to FAAM working on the scientific equipment to use their own specialised tooling. If this is required, details of this tool must be entered in **red** pen in the signing-out sheet with the aircraft toolbox, both when taken to the aircraft, and once removed from the aircraft. This red pen is not to be used for FAAM tools.

1.5. Arrival at overseas destinations

1.5.1. DFL will ensure that the appropriate immigration procedures are employed and all necessary documentation is carried for any flight to an overseas country. They will also advise on the appropriate personal documentation. If applicable and prior to arrival in an overseas country, Directflight will distribute appropriate landing cards. In the absence of a ground-handling agent, personnel will be escorted to a safe arrivals area by the CCM, if this is required.

1.5.2. Prior to arrival in some countries, the CCM will collect passports and landing cards from all personnel; on arrival, customs and immigration officials collect these and carry out necessary actions before returning passports.

1.6. Insecticide Spraying

1.6.1. Before departing from some countries it may be necessary to spray the aircraft cabin with insecticide. If this may present any personal problems, the CCM should be informed well in advance.

1.6.2. Limited catering will normally be available on board each flight; any person with special dietary requirements should inform the CCM as early as possible.

1.7. Flight time / duty time limitations – Flight Crew

1.7.1. Flight Time Limitations are legal requirements which form the basis under which the aircraft is operated. Whilst they legally apply only to flight crew, for safety reasons, science crews should also aim to operate within these limitations where reasonably possible. The details provided in this section are extracted from the Directflight Operations Manual; however, this handbook may not be fully up to date and the DFL Ops Manual should be regarded as the master document on Flight Time Limitations. Specific advice can be sought from the Directflight Operations team.

1.7.2. No person will act as an aircraft crewmember if there is reason to believe that person is suffering from, or is likely to suffer from, fatigue to the extent that they may endanger the safety of the aeroplane or its occupants. This includes any member of science crew who may be excluded from the aircraft if in the view of the CCM or Flight Manager they are unfit to participate in the flight.

1.7.3. Flight Crew are restricted as follows:

1.7.3.1. Crew must have at-least 12 hours rest, or the length of the preceding duty period (whichever is longer) before each Flight Duty Period (FDP).

1.7.3.2. Crew must have a day off (consisting of at-least 34 hours including two nights) at-least every 7 days (rolling), and at-least 2 days off every 14 days (since last 2 days off). Crew must have at-least 7 days off in each 4 week consecutive period, and an average of at-least 8 days off over an average of 3 4-week periods.

1.7.3.3. Duty hours for pilots may not exceed 55 hours per 7 day period, 95 hours per 14 day period, and 190 hours per 28 day period.

1.7.3.4. Duty hours for cabin crew may not exceed 60 hours per 7 day period, 105 hours per 14 day period, and 210 hours per 28 day period.

1.7.3.5. A crewmember is considered acclimatised after he or she has spent 3 consecutive local nights on the ground within a time zone that is 2 hours wide and is able to take uninterrupted sleep at night. The crewmember will remain acclimatised thereafter until a FDP finishes at a place where local time differs by more than 2 hours from that at the point of departure

1.7.3.6. Maximum lengths of Flight Duty Periods are shown in Figure 1 and Figure 2 below. It should normally be assumed that pilots start their duty period 3 hours before take-off, and finish it 30 minutes after landing.

	Number of flights in the day							
Local start time	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
0600-0759	13:00	12:15	11:30	10:45	10:00	9:30	9:00	9:00
0800-1259	14:00	13:15	12:30	11:45	11:00	10:30	10:00	9:30
1300-1759	13:00	12:15	11:30	10:45	10:00	9:30	9:00	9:00
1800-2159	12:00	11:15	10:30	9:45	9:00	9:00	9:00	9:00
2200-0559	11:00	10:15	9:30	9:00	9:00	9:00	9:00	9:00

Figure 1, maximum flight crew duty time for acclimatised crew

	Number of flights in the day						
Length of preceding rest	**1**	**2**	**3**	**4**	**5**	**6**	**7**
<18 hrs, or >30hrs	13:00	12:15	11:30	10:45	10:00	9:15	9:00
18-30 hrs	11:30	11:00	10:30	9:45	9:00	9:00	9:00

Figure 2, maximum flight crew duty time, non-acclimatised crew

1.8. Working time limits – science crew

1.8.1. Whilst the flight time limitations shown in section 1.7 above are only advisory for science crew, the requirements of the European Working Time Directive [See references [3], [4], [5]] must be considered to be mandatory. The basic requirements of this are detailed below, although any enacting UK legislation will always take precedence in the case of contradiction.

1.8.2. Everybody is entitled to 11 hours rest between working days.

1.8.3. Break periods of at-least 20 minutes must be available within any working day greater than 6 hours – the length and time of these breaks is however subject to agreement and expediency.

1.8.4. Everybody is entitled to a complete 24 hour rest period in every 7 days, in addition to the 11 hour rest periods described in paragraph 1.8.2 above.

1.8.5. The average working time per week must not be required to exceed 48 hours – although individual working weeks may exceed this. For

FAAM purposes, this should be calculated over a reference period of 3 months.

1.8.6. Night work which involves special physical or mental strain (this is considered to include flying duties) may not exceed 8 hours in 24.

1.8.7. FAAM will always endeavour to ensure that these conditions are available to its own staff, and asks that all visiting workers and scientists also adhere to these limitations, particularly when on detachment when workload on individuals can be particularly severe, as can be the safety and health implications of exhaustion or overwork.

1.9. Access to Data

1.9.1. In flight, real-time data displays are available to the Mission Scientists and networked computers in the cabin.

1.9.2. Immediately post-flight, the Flight Manager can provide 'as-seen', unvalidated 1Hz ASCII format data for many parameters. This is termed 'Quicklook data' and the user needs to request the parameters required from the Flight Manager.

1.9.3. Validated core data is distributed by the BADC (http://badc.nerc.ac.uk/) in netCDF format and should be available within 2 working days of the flight. Where calibration of any data requires amendment, the revision state of uploaded data will be amended and known users of this data informed as soon as possible.

1.9.4. Non-core data is provided by the instrument owners. Users need to make their own arrangements to receive it, which will not automatically be available.

Appendix 1 – Dangerous Goods Carry-on list

Medical Necessities	Carry-on baggage	Checked (hold) baggage	On one's person	Operator approval required
Gaseous oxygen or air cylinders required for medical use. Each cylinder must not exceed 5 kg gross mass. Cylinders, valves and regulators, where fitted, must be protected from damage which could cause inadvertent release of the contents. **Note 1:** Liquid oxygen systems are forbidden. **Note 2:** Air cylinders for other purposes, such as scuba diving, may only be carried if "empty".	✓	✓	✓	✓
Cylinders of a non-flammable, non-toxic gas, worn for the operation of mechanical limbs, also spare cylinders of a similar size if required to ensure an adequate supply for the duration of the journey.	✓	✓	✓	✘
Non-radioactive medicines (including aerosols). The total net quantity of each single article must not exceed 0.5 kg or 0.5 L. Release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release of the contents. **Note:** The total net quantity of medicines, toiletry articles and aerosols for sporting or home use must not exceed 2 kg or 2 L (e.g. four aerosol cans of 500 mL each) for each person.	✓	✓	✓	✘
Small medical or clinical thermometer which contains mercury, one only, for personal use when in its protective case.	✓	✓	✓	✘
Radioisotopic cardiac pacemakers or other devices, including those powered by lithium batteries, implanted into a person, or radio-pharmaceuticals contained within the body of a person as the result of medical treatment.	✘	✘	✓	✘
Battery-powered wheelchairs or other similiar mobility aids for use by passengers whose mobility is restricted by either a disability, their health or age, or a temporary mobility problem [e.g. broken leg] with non-spillable batteries, which comply with Special Provision A67 or the vibration and pressure differential tests of Packing Instruction 806. The battery must be securely attached to the wheelchair and terminals must be protected from short circuits. Additionally, the wheelchair controls should be protected and	✘	✓	N/A	✓

protected from: a) **inadvertent operation** – there are a variety of ways a wheelchair can be protected, and in the first instance the passenger should be asked how this can be achieved; generally this will involve certain actions being taken with the joystick, but may also be as simple as removing a key or turning a deactivation switch. If the latter, care must be taken during loading to ensure that the switch cannot be activated by adjacent baggage. **Note:** Application of the brake is not sufficient; unless the motor is rendered inoperative the motor can still be activated and overheat; b) **short circuit of the battery** – this does not necessarily require disconnection, since this is often very difficult to do, and if not done properly can increase the risk of a fire. Adequate protection may already be afforded by the battery being contained in a battery box fitted to the mobility aid. Consequently, only if deactivation cannot be achieved should disconnection be considered, following which it must be ensured that the battery terminals are protected against short circuit, e.g. by the effective insulation of exposed terminals; and c) **damage** – including to associated wiring, by the movement of baggage, mail, stores or other cargo. **Note:** SPECIFIC TECHNICAL SPECIFICATIONS APPLY – SEE BELOW.				
Battery-powered wheelchairs or other similar mobility aids for use by passengers whose mobility is restricted by either a disability, their health or age, or a temporary mobility problem [e.g. broken leg] with spillable batteries, provided that the wheelchair or mobility aid can be loaded, stowed, secured and unloaded always in an upright position and that the battery terminals are protected from short circuits, e.g. by being enclosed within a battery container and the battery is securely attached to the wheelchair or mobility aid. Operators must ensure that wheelchairs or other battery-powered mobility aids are carried in such a manner so as to prevent unintentional operation and that the wheelchair/mobility aid is protected from being damaged by the movement of baggage, mail, stores or cargo. **Note:** If the wheelchair or mobility aid cannot be loaded, stowed, secured and unloaded always in an upright position (which will depend upon the type of aircraft and the type of the mobility aid), the battery must be removed and the wheelchair or mobility aid may then be carried as checked baggage without	✘	✓	**N/A**	✓

restriction. A removed spillable battery may only be carried by air if packed, marked and labelled as specified within the ICAO Technical Instructions.				
Wheelchairs/Mobility Aids with Lithium Batteries. Lithium-ion battery powered wheelchairs or other similar mobility aids for use by passengers whose mobility is restricted by either a disability, their health or age, or a temporary mobility problem [e.g. broken leg] subject to the following conditions: [a] the batteries must be of a type which meets the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, section 38.3; [b] battery terminals are protected from short circuits, e.g. by being enclosed within a battery container, and the battery is securely attached to the wheelchair or mobility aid; [c] the operators(s) must ensure that such mobility aids are carried in a manner so as to prevent unintentional activation and that they are protected from being damaged by movement of baggage, mail, stores or other cargo; and [d] the pilot-in-command must be informed of the location of the mobility aid.	✘	✓	**N/A**	✓

Articles Used in Dressing or Grooming n Dressing or Grooming	**Carry-on baggage**	**Checked (hold) baggage**	**On one's person**	**Operator approval required**
Toiletry articles (including aerosols). The total net quantity of each single article must not exceed 0.5 kg or 0.5 L. Release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release of the contents. The term "toiletry articles (including aerosols)" is intended to include such items as hair sprays, perfumes and colognes.	✓	✓	✓	✘

Note: The total net quantity of medicines, toiletry articles and aerosols for sporting or home use must not exceed 2 kg or 2 L (e.g. four aerosol cans of 500 mL each) for each person.				
Hair curlers containing hydrocarbon gas, no more than one per person, provided that the safety cover is securely fitted over the heating element. **Note:** Gas refills for such curlers must not be carried.	✓	✓	✓	✘

Consumer Articles				
Alcoholic beverages, containing more than 24% but not more than 70% alcohol by volume, when in retail packagings in receptacles not exceeding 5 L, with a maximum total net quantity per person of 5 L for such beverages. **Note:** Alcoholic beverages containing not more than 24% alcohol by volume are not subject to any restrictions. Alcoholic beverages with more than 70% alcohol by volume are not permitted.	✓	✓	✓	✘
Aerosols (non-flammable, non-toxic) with no subsidiary risk, for sporting or home use. Permitted in checked baggage only. The total net quantity of each single article must not exceed 0.5 kg or 0.5 L. Release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release of the contents. **Note:** The total net quantity of medicines, toiletry articles and aerosols for sporting or home use must not exceed 2 kg or 2 L (e.g. four aerosol cans of 500 mL each) for each person.	✘	✓	✘	✘
Ammunition (cartridges for weapons) securely packed in quantities not exceeding 5 kg gross mass per person for that person's own use. Allowances for more than one person must not be combined into one or more packages. **Note:** Only ammunition classified as UN0012 or UN0014 within Division 1.4S may be carried in baggage. If the classification is unknown, this information should be obtained from the ammunition manufacturer/supplier.	✘	✓	✘	✓

One small packet of safety matches or a single cigarette lighter (that does not contain unabsorbed liquid fuel, other than liquefied gas), intended for use by an individual. **Note 1:** Lighter fuel and lighter refills are not permitted on one's person or in checked or carry-on luggage. **Note 2:** 'Strike anywhere' matches are forbidden for air transport. **Note 3:** 'Blue flame' or 'Cigar' lighters are not permitted on one's person, carry-on or checked baggage.	✘	✘	✓	✘
Consumer electronic devices containing lithium or lithium ion cells or batteries (watches, calculating machines, cameras, cellular phones, laptop computers, camcorders, etc.) when carried by passengers or crew for personal use. Each installed or spare battery must not exceed the following: - for lithium metal or lithium alloy batteries, a lithium content of not more than 2 grams; or - for lithium ion batteries, a watt-hour rating of not more than 100 Wh. **Note:** Carriage should be as carry-on baggage.	✓	**See Note**	**See Note**	✘
Spare lithium or lithium ion cells or batteries must be individually protected so as to prevent short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch) and carried in carry-on baggage only. Each spare battery must not exceed the following: - for lithium metal or lithium alloy batteries, a lithium content of not more than 2 grams; or - for lithium ion batteries, a watt-hour rating of not more than 100 Wh.	✓	✘	✘	✘
Consumer electronic devices containing lithium ion batteries exceeding a watt-hour rating of 100 Wh but not exceeding 160 Wh in equipment may be carried in either checked or carry-on baggage.	✓	✓	✘	✓
Spare lithium ion batteries exceeding a watt-hour rating of 100 Wh but not exceeding 160 Wh may be carried in carry-on baggage. Each lithium ion cell or battery must be individually protected so as to prevent short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch). No more than two	✓	✘	✘	✓

individually protected spare batteries per person may be carried.				
Portable electronic devices powered by fuel cell systems, and up to two spare fuel cartridges (cameras, mobile phones, laptop computers, camcorders, etc). Fuel cell cartridges may only contain flammable liquids, corrosive substances, liquefied flammable gas, water reactive substances or hydrogen in metal hydride. Fuel cell cartridges must not be refillable by the user. Refuelling of fuel cell systems is not permitted except that the installation of a spare cartridge is allowed. Fuel cell cartridges which are used to refill fuel cell systems but which are not designed or intended to remain installed (fuel cell refills) are not permitted to be carried. **Note:** SPECIFIC TECHNICAL SPECIFICATIONS APPLY – SEE BELOW.	✓	✘	✘	✘

Consumer Articles	Carry-on baggage	Checked (hold) baggage	On one's person	Operator approval required
Portable electronic devices powered by fuel cell systems, and up to two spare fuel cartridges (cameras, mobile phones, laptop computers, camcorders, etc). Fuel cell cartridges may only contain flammable liquids, corrosive substances, liquefied flammable gas, water reactive substances or hydrogen in metal hydride. Fuel cell cartridges must not be refillable by the user. Refuelling of fuel cell systems is not permitted except that the installation of a spare cartridge is allowed. Fuel cell cartridges which are used to refill fuel cell systems but which are not designed or intended to remain installed (fuel cell refills) are not permitted to be carried. **Note:** SPECIFIC TECHNICAL SPECIFICATIONS APPLY – SEE BELOW.	✓	✘	✘	✘
Self-inflating life-jacket fitted with no more than two small cylinders containing a non-toxic, non-flammable gas, and no more than two spare cylinders.	✓	✓	✓	✓
Avalanche rescue backpack equipped with a pyrotechnic trigger mechanism containing not more than 200 mg net of Division 1.4S and a cylinder of compressed non-toxic, non-flammable gas not exceeding 250 ml. One per person permitted. **Note:** The backpack must be packed in such a manner that it cannot be accidentally activated. The airbags within the backpack must be fitted with pressure relief valves.	✓	✓	✘	✓

Dry ice in quantities not exceeding 2.5 kg per person, when used to pack perishables that are not dangerous goods, provided the package permits the release of carbon dioxide gas. When carried in checked baggage, each package must be marked 'DRY ICE' or 'CARBON DIOXIDE, SOLID' and with the net weight of dry ice or an indication that the net weight is 2.5 kg or less.	✓	✓	✖	✓
Mercurial barometer or mercurial thermometer carried by a representative of a government weather bureau or similar official agency. The barometer or thermometer must be packed in a strong outer packaging, having a sealed inner liner or a bag of strong leak-proof and puncture-resistant material impervious to mercury, which will prevent the escape of mercury from the package irrespective of its position.	✓	✖	✖	✓
Battery-powered equipment capable of generating extreme heat, which could cause a fire if activated (e.g. underwater high intensity lamps) providing that the heat-producing component or the battery is packed separately so as to prevent activation during transport. Any battery which has been removed must be protected against short circuit.	✓	✓	✖	✓
Instruments containing radioactive material not exceeding the activity limits specified in Table 2-12 of the ICAO Technical Instructions (i.e. chemical agent monitor (CAM) and/or rapid alarm and identification device monitor (RAID-M)), securely packed and without lithium batteries, when carried by staff members of the Organization for the Prohibition of Chemical Weapons (OPCW) on official travel.	✓	✖	✖	✓

Amendment Record

Issue	AL	Date	Pages	Notes
1	0	7 July 2009	14	Initial issue
1	1	2 Dec 2009	14	Corrections to errors in tables 1 and 2.
1	2	21Sep 2010	22	Addition of DG list (Appendix 1)
1	3	27 Sept 2011		Revised security pass information, information about safety data sheets, revised information about safety clothing in flight, revised information about tool control; corrections to minor errors in working time limits.

References

[1] http://porthealth.co.uk/port_health_controls_air.html

[2] Association of Port Health Authorities, Code of practice for dealing with infectious diseases on aircraft, available at http://porthealth.co.uk/pdfs/COP_ID_Aircraft.pdf , 1995

[3] http://www.hse.gov.uk/contact/faqs/workingtimedirective.htm

[4] UK Statutory Instrument 2003 No., 1684, The working time (Amendment) Regulations 2003

[5] http://www.direct.gov.uk/en/Employment/Employees/WorkingHoursAndTimeOff/DG_10029451