

Review of Operational Resilience at Heathrow and Gatwick

Workstream 3: Developing CAA Guidance

Final Report

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1 Background and Objectives

Background

- 1.1 As a part of the development of licence conditions for London Heathrow Airport Limited (HAL) and Gatwick Airport Limited (GAL) the CAA has drafted Guidance relating to operational resilience to be followed by the airports.
- 1.2 In its initial proposals, the CAA stated that a licence requirement to provide for operational resilience will “*ensure the availability and continuation of airport operations to further the interests of passengers, particularly during disruption*”. The CAA referred to similar requirements placed on other regulated companies such as Gas and Electricity transmission providers, Royal Mail, Network Rail and NATS’ NERL business.
- 1.3 The issue of operational resilience has received greater focus by industry commentators in the context of disruptions at London Gatwick over the Christmas 2013 period linked to localised flooding and the impact on the availability of essential infrastructure and at Heathrow in early 2013 (and previously in 2009 and 2010) linked to snowfall and at both airports in Autumn 2013 linked to high winds.
- 1.4 The CAA needs to consider the content of the operational resilience conditions in the licences for the two airport and also develop a framework to assess whether the airport’s operational resilience plans - to be submitted in October 2014 - are appropriate and adequate.

Scope of Work and Objectives

- 1.5 The overall scope of work for the Operational Resilience study consists of four workstreams:
 - Workstream 1: Review of McMillan report;
 - Workstream 2: Heathrow capacity allocation and management processes;
 - Workstream 3: Policy guidance for operational resilience; and
 - Workstream 4: Reviewing the October 2014 submitted plans.
- 1.6 This report is our Final Report for Workstream 3. Our report on Workstream 1 was delivered in March and the Workstream 2 report is being delivered in parallel with this report. The Workstream 4 report will be delivered in November.
- 1.7 The objective of Workstream 3 is to assist the CAA in developing policy guidance for operational resilience at the regulated airports drawing on best practice in planning, risk management and stakeholder consultation when reviewing Heathrow’s and Gatwick’s current resilience plans.
- 1.8 The CAA issued Draft Guidance to each airport in the notices proposing to grant the airport licences, issued in January 2014. Therefore this Workstream 3 has the principal objective of advising the CAA on what changes, if any, should be made to this Draft Guidance.

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Structure of Report

1.9 The remainder of the document is structured as follows:

- Chapter 2: Methodology
- Chapter 3: Framework for operational resilience
- Chapter 4: Airport resilience guidance and current practice
- Chapter 5: Airport operational resilience best practice
- Chapter 6: High level assessment of HAL's and GAL's existing operational resilience plans
- Chapter 7: Initial proposals on CAA Guidance.

2 Methodology

Introduction

- 2.1 This chapter summarises the methodology used for the study, this is split into four key areas. The first being desktop research to understand the current guidance and best practice for UK, European and American airports with regards to operational resilience.
- 2.2 Secondly, we undertook a comprehensive consultation with the major stakeholders at Heathrow and Gatwick to understand the current approach to operational resilience at both airports and gather views from across the airport community on this approach.
- 2.3 We also spoke to a number of European airports to understand their approach to operational resilience to understand the difference methods feasible and any industry best practice.
- 2.4 Finally, we also consulted industry experts in the aviation and rail industries, the NHS and the military.

Desk-top Research

- 2.5 To understand the broader guidance and approach to operational resilience in the aviation industry we carried out a desktop review of current guidance and research on the area. Our desktop research covered:
 - A review of the current guidance issued to airports covering operational resilience as well as other relevant Civil Aviation Publications.
 - A review of the current guidance issued in February 2014 by EASA to authorities and aerodromes, covering operational resilience.
 - A review of the relevant sections of the International Civil Aviation Organisation (ICAO) Airport Services Manual and Annex 14 which sets out rules for the management of aerodromes.
 - A review of the Airport Cooperative Research Program (ACRP) publications with regard to irregular operations sponsored by the Federal Aviation Administration in the United States.

Stakeholder Consultation

- 2.6 To understand the current approach to operational resilience at the two airports and gather stakeholder views on this approach we spoke to the key airport risk and contingency planning teams, the largest airlines, the airlines committees and NATS at both airports.
- 2.7 In relation to Heathrow, we spoke to:
 - HAL
 - Heathrow AOC
 - British Airways (BA)
 - Virgin
 - NATS.

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2.8 In relation to Gatwick, we spoke to:

- GAL
- Gatwick ACC
- easyJet
- BA
- Virgin
- NATS.

Other Airports

2.9 Information regarding their approach to operational resilience was sought from:

- FRAPORT AG (FRA/EDDF),
- Flughafen München GmbH (MUC/EDDM),
- Flughafen Wien - Schwechat AG (VIE/LOWW) and
- AVINOR AS (OSL/ENGM).

3 Framework for Operational Resilience

- 3.1 This chapter sets out a framework for operational resilience processes generally, taking into account generally accepted principles and the UK application of them as defined by HM Government and the 2004 Civil Contingencies Act. As part of this framework, in addition to principles which are applicable across many organisations, we also consider elements which are more specific to airports.
- 3.2 We also review the application of operational resilience across a number of UK public and private sector organisations (other than airports) to illustrate how principles are applied in practice. We summarise the characteristics of the practices of the different organisations in a table which is based on the framework. The following chapter then looks specifically at the aviation industry in the light of the framework and examples from other industries presented here.

Elements of Operational Resilience Management

- 3.3 The Operational Resilience of an organisation to disruptive events relies on a number of different processes acting over different timescales, as well as on the people, facilities and equipment to carry them out. The processes collectively are described by ICAO and EASA as Operational Services and Emergency Planning. In a more general context these processes can also be described as Business Continuity Management (BCM). In the context of an airport with multiple stakeholders, some form of Joint Business Continuity Management (JBCM), involving these stakeholders in a coherent way, is required.

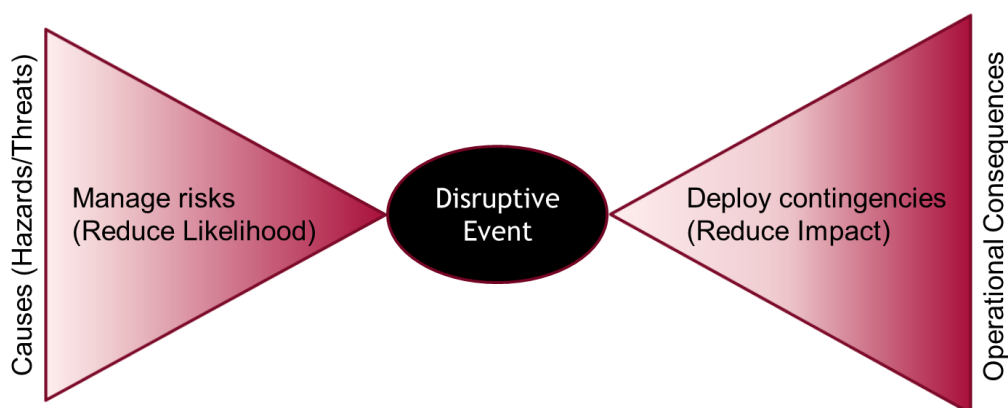
Business Continuity Management

- 3.4 One major element of BCM is identifying, managing and controlling risk. This involves processes to:
- Identify and assess the risk of disruption; and
 - Prevent or reduce the risk of disruption taking place.
- 3.5 In general, these processes are on-going, long-term activities, whose objective is to avoid the risk of disruptive events, or to reduce the frequency and seriousness of those events. In reality, disruptive events cannot be completely avoided, so a further set of contingency processes are required to manage and mitigate the impacts of such events when they do occur. These processes include:
- Developing and implementing Contingency Plans;
 - Command and Control Procedures to be used during disruption;
 - Ensuring staff are suitably trained, qualified and equipped, i.e. competent and capable, to handle disruption situations;
 - Ensuring sufficient staff are rostered so that the necessary trained and qualified staff are available at all times and in recognition of exceptional demand or constraints;
 - Ensuring suitable facilities and equipment are available (and serviceable) to support the Command and Control procedures;

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- Undertaking scenario planning (“table-top exercises”) to test the effectiveness of contingency plans and to identify the need for improvements/alternative plans;
 - Undertaking practice exercises to test the effectiveness of contingency plans, staff training and command and control facilities.
- 3.6 These two sets of processes are often illustrated in the literature by using a “bow-tie” diagram (see Figure 3.1). When used in practice the bow-tie diagram will also include the specific activities intended to reduce likelihood (left hand side) and to mitigate consequences (right hand side) of disruptive events.

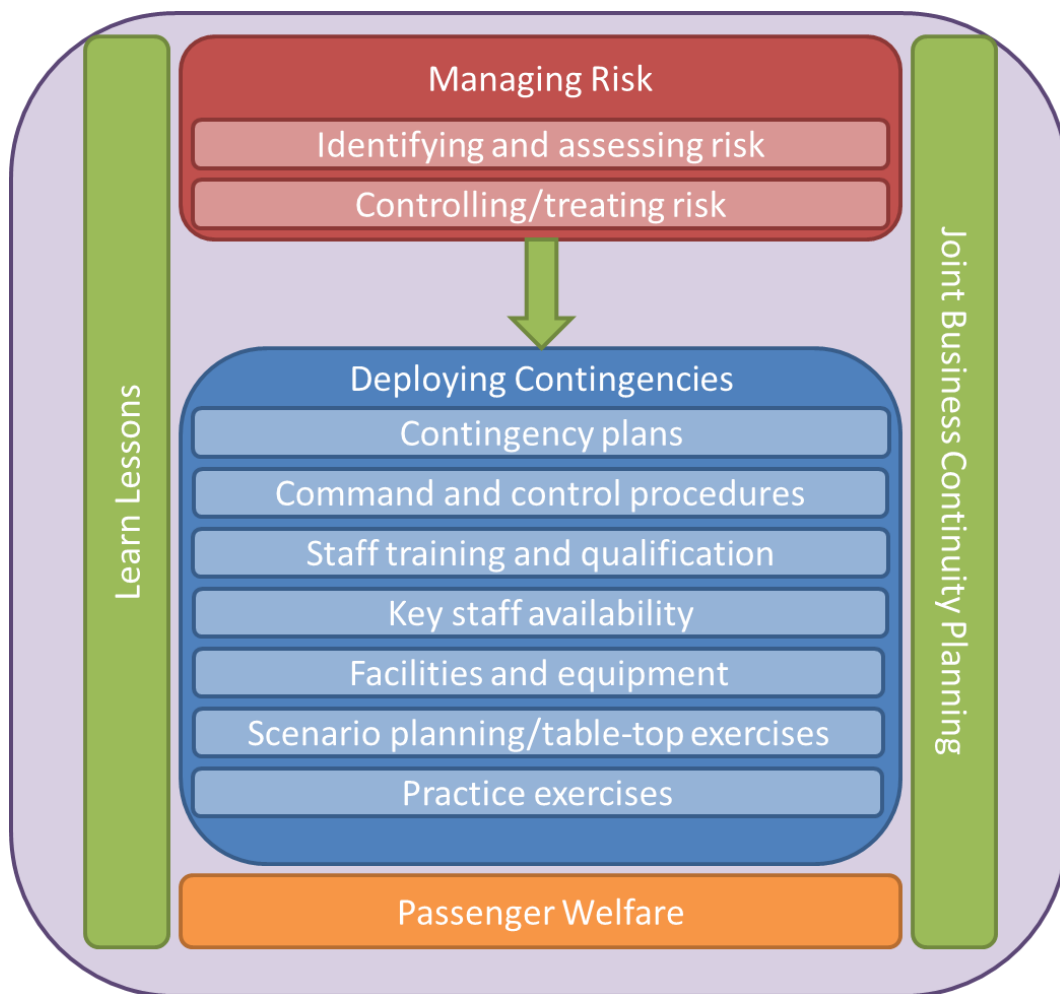
FIGURE 3.1 BOW-TIE DIAGRAM



The airport context

- 3.7 The bow-tie captures a large part of the BCM process. However in the context of a large airport with multiple stakeholders a number of other aspects need to be considered. These are:
- Passenger welfare (including provision of information, physical comfort and onward travel arrangements) - maintaining passenger welfare in circumstances of disruption is a key priority, especially as failures in this area provide much of the motivation for the focus on operational disruption. The different, but sometimes overlapping responsibilities of airlines and airports make this more complicated, but reinforce the need for effective and coordinated procedures.
 - Processes for learning lessons from previous failures in actual disruption events, as well as from practice exercises, including consideration of the potential impact of organisational culture on the effectiveness of responses to disruption.
 - The effectiveness of cooperation between the airport and other major stakeholders, including the airlines, ground handlers and emergency services on all aspects of operational resilience, to achieve effective Joint Business Continuity Management.
- 3.8 The diagram below (Figure 3.2) shows the general business continuity framework broadened to include these airport specific aspects.

FIGURE 3.2 BUSINESS CONTINUITY FRAMEWORK FOR AIRPORTS



Emergency and other operational disruption

3.9 A further point to note is that, while the principles of operational resilience may be the same regardless of the cause of the disruption, in practice the aviation industry has traditionally treated emergency events, such as aircraft accidents, in a different way from other types of disruption, such as severe weather events. This is partly because the relevant legislation and regulations focus specifically on such emergency events. The extent to which the same principles as those used for emergencies could be extended to non-emergency disruptions (e.g. severe weather events) needs to be considered.

Managing Risk

3.10 Although the how, where, when and who of the deployment of contingencies varies greatly by industry and events, there are established cross industry approaches to managing risk. This is outlined below.

3.11 In the UK, the Civil Contingencies Act of 2004 is the primary legislation for managing emergency situations. It provides for Category 1 and Category 2 Responders. Category 1 Responders include Local Authorities and the Emergency Services, while major airports are Category 2 Responders. Category 1 Responders have duties to develop and share plans for emergencies, whereas Category 2

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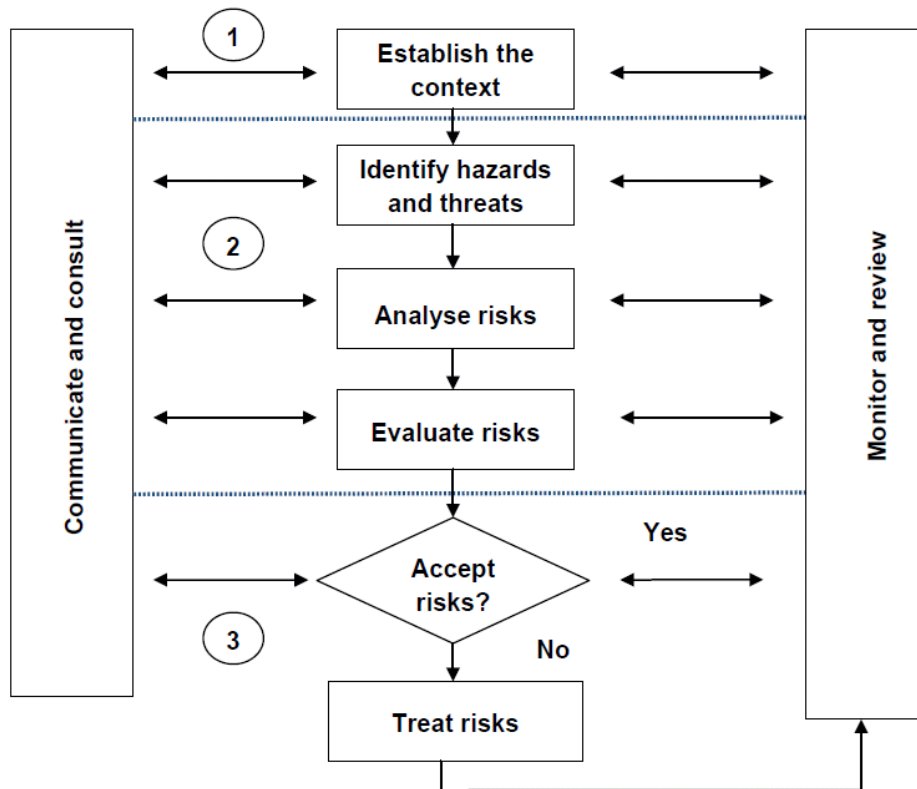
Responders' formal responsibilities are only to cooperate with Category 1 Responders.

3.12 The Cabinet Office has developed guidance in support of the Civil Contingencies Act, including the following:

- **Keeping the Country Running: Natural Hazards and Infrastructure, 2011:** This guidance document aims to improve resilience of critical infrastructure and essential services as part of the National Security Strategy. The document supports further the CCA 2004 guidance Emergency Preparedness updated in 2012.
- **National Risk Register of Civil Emergencies** The National Risk Register of Civil Emergencies 2013 edition is the published element of the National Risk Assessment. The document enables organisations to be informed about the national risk profile over a five year period when conducting local and organisational risk assessments. Additionally Local Resilience Forums publish Community Risk Registers, which consider locally relevant risk assessments.
- **2013 Sector Resilience Plans:** Is a high level document that sets out the Resilience planning in each infrastructure sector in relation to the risks identified in the National Risk Assessment.

3.13 The Emergency Preparedness guidance produced by the Cabinet Office of the UK Government in relation to the Civil Contingencies Act 2004 (CCA) sets out a general risk management process overview in the following diagram (Emergency Preparedness, section 4, figure 4.2).

FIGURE 3.3 EMERGENCY PREPAREDNESS - THE GENERAL RISK MANAGEMENT PROCESS



- 3.14 The approach set out in this diagram broadly corresponds to the left hand side of the “bow-tie” diagram (above), where part 2 of the process relates to identifying and analysing risks and part 3 to controlling, or “treating” risk. In addition, it adds an initial stage (part 1 in diagram above) of setting the context, as well as parallel processes for communication and consultation and for monitoring and review.
- 3.15 Risk assessment (analysis and evaluation in above) is generally undertaken in the context of understanding both the likelihood of an event to occur, and the impact it would have did it occur. While likelihood (measured in terms of probability of an event in a given time period) and impact (measured by the level of harm done) are continuous variables, traditionally a 5x5 matrix is used. Examples of these from the UK National Risk Register of Civil Emergencies (Cabinet Office, 2012 edition, p8) are shown in the diagram below.

FIGURE 3.4 EXAMPLE 5X5 RISK MATRICES FROM NATIONAL RISK REGISTER

Figure 1: Risks of terrorist and other malicious attacks

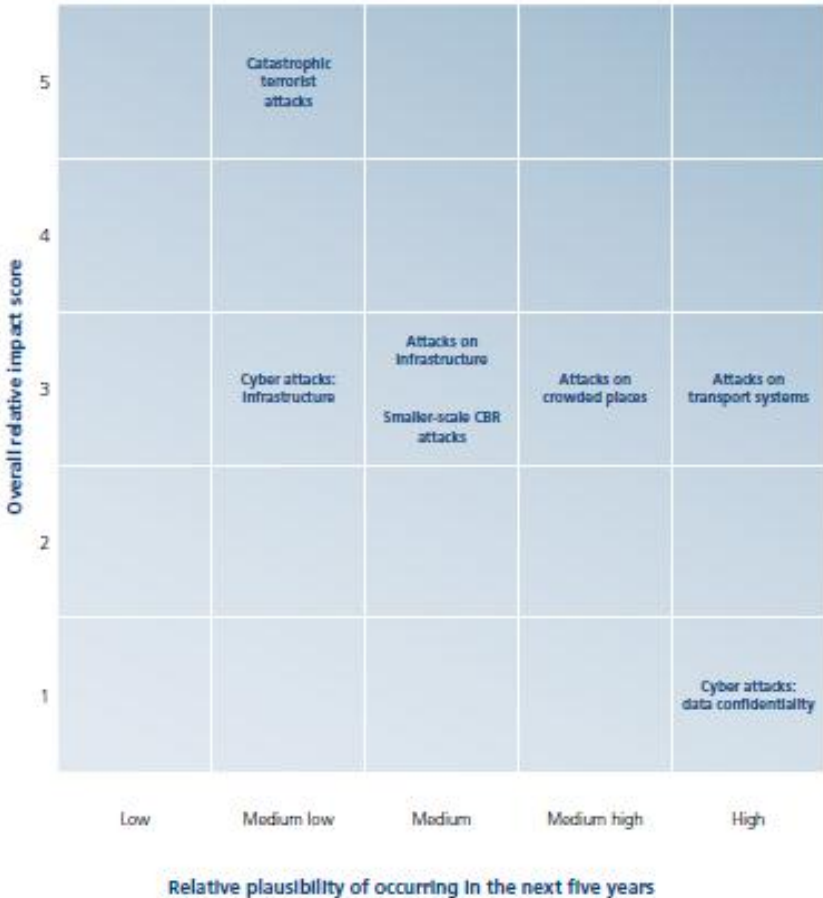
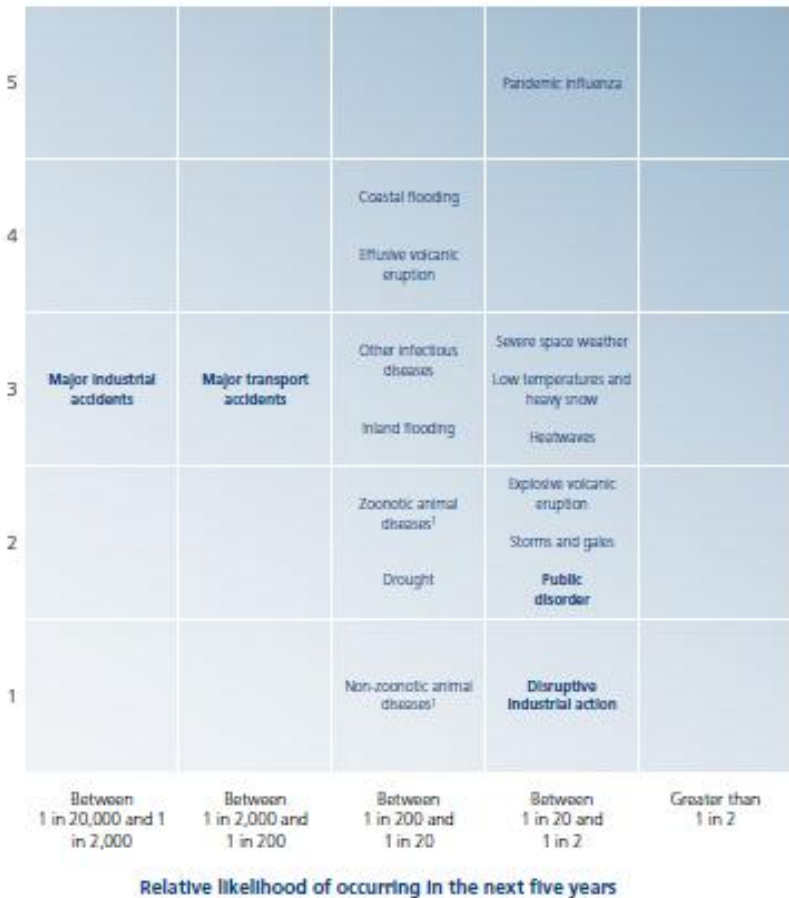


Figure 2: Risks of natural hazards and major accidents



Examples of Other Industry Resilience Practice

- 3.16 This section considers current practice in other industries. First looking at how the risk management process outlined above is used in practice. Then how contingency plans are deployed when an event does occur. A summary of the information by industry is presented at the end of the Chapter.

UK local government contingency planning

- 3.17 Within local government, risk assessments for service disruption are built around Business Impact Assessments which are undertaken for corporate entities and for each service provided. The standard approach to community risk assessments is based on the Civil Contingencies Act 2004 Guidance. Risk managers will look at the corporate risks whereas Emergency Preparedness or Business Continuity staff will focus on civil contingency risks. Consultation is generally extensive within the local authority community with multi agency local risk assessment groups set up. Business Continuity is generally single agency focused however, increasingly shared services, back office functions and informational technology infrastructure require increased joint approaches.
- 3.18 Local government organisations will vary on how many plans they have and what they cover, but London Boroughs can have around 24 based on the Minimum Standards for London. The core plan being a generic corporate emergency plan. Some of these will be published, but this depends on the plan. Generally plans are shared with key partners. There will be an annual review of any plan, with full a review following significant lessons or organisational change. The plans are commonly peer reviewed from partner local authorities and multi-agency expert panels where appropriate.
- 3.19 Standard IEM (Bronze/Silver/Gold) command structures are used. These include possible top-down activation following multi-agency declarations as well as bottom-up activation with escalation likely if multiple local authorities experience impacts from the same event. Most Local Authority coordination is at a Silver level, with minor disruption incident management often completed without a full scale activation and the setting up of a control room. In London, each borough CEO is trained to enable them to go on a rota for London multi agency gold, representing all London local authorities with authorisation to commit significant expenditure.
- 3.20 After an event there will be hot debriefs straight away with internal teams and affected partners. Where a more structured debrief is required these can be single or multi agency and may have an independent chair. There is an open reporting culture with local government and in addition to the operational staff participating in debriefs internally and externally, local authority elected members can conduct public oversight and scrutiny committees. These committees may interview organisations such as the Utility provider (electricity, gas, water service provider) to seek clarification of route cause and future mitigation.

National Health Service

- 3.1 The National Health Service covers thousands of different health care sites across the country ranging from local general practices to large hospital trusts. The NHS and Public Health England are informed by the National Risk Register with around

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24 big risks including flooding, pandemic flu and threats including terrorism. The NHS will also contribute to local community risk groups. The health sector commonly work alongside partners to develop capabilities derived from the National and Local risk outcomes.

- 3.2 Healthcare organisations utilise the standard approach to risk assessments, based on the Civil Contingencies Act 2004 Guidance. Additional specific guidance and resilience focus is also issued by the Department of Health and NHS England. This includes various Health Technical Memorandum and the NHS Emergency Preparedness Resilience and Response (EPRR) Core Standards which outline the expected documents and capabilities for each health sector group. Individual organisations can be audited by commissioners (Clinical Commissioning Groups and NHS England) or the healthcare regulators (Care Quality Commission). Collective 'horizontal' EPRR assurance is a new concept from 2013 and is overseen by strategic level Local Health Resilience Partnerships.
- 3.3 Increasingly templates for contingency plans are issued with the aim of standardising. These generally include contact details, specific actions to take, roles and responsibilities as part of the plan, escalation by degree of incident, communications strategy and governance arrangements. Some plans will be published, but it is a decision for each organisation. Plans are commonly shared with key partners or provided upon request. Annual review of plans is typical as well as a more formal process of organisational assurance to clarify that the required specific plans are in place and fit for purpose, such as winter and surge plans.
- 3.4 The Command and Control structure in the NHS follows the IEM approach. For example: Each A&E department typically has an incident coordination room at bronze level. Silver command is then at the Hospital Trust level and gold is the Trust Executive Board. Where wider NHS impact occurs and requires system coordination and leadership, NHS Gold will be a senior director from NHS England. This individual will coordinate with all affected trusts strategic leadership and represent the NHS at Multi-agency Gold SCG's. A gold command would be called if, for example, a hospital evacuation is necessary with the ambulance service needed to help with the movement of patients or a significant pressure was placed on the NHS resulting from a major incident.
- 3.5 In order to ensure appropriate engagement in required contingency planning. NHS organisations have identified a senior member of staff designated as an Accountable Emergency Officer. Staff undertaking such roles will require core competencies and will have access to relevant training courses. This role requires representation at joint health contingency meetings and leadership in audit and assurance processes.
- 3.6 To learn and improve, there are Public Health England training programs and external specialised courses to train senior staff involved in the implementation of contingency plans. After any event there will be hot debriefs both internally and with affected partners, with structured debriefing as required.

Rail Industry

- 3.7 The UK rail industry is similar to the aviation industry with vertical separation between the infrastructure owners (Network Rail for tracks/stations and airports) and the operators (passenger and freight Train Operating Companies (TOCs) and airlines) and many different stakeholders involved in the operation. With both having extensive interconnected geographical networks an incident on one part of the network can affect the whole system operation. However, they are also very different in that an airport is self-contained with a focus on staff and resources in one area.
- 3.8 In UK rail the approach to contingency planning has been moving from immediate/first order safety and operating risks to more holistic business continuity planning. This risk assessments for this are carried out by multiple industry players with their own approaches and focuses, however Network Rail takes a broader approach given its accountability for cross-industry performance within the regulatory regime. Network Rail engage local stakeholders but this is generally for project or seasonal risks.
- 3.9 Network Rail is accountable through its licence to manage the network and failure to do so could lead to enforcement action. They are therefore incentivised to seek to agree policies, principles and plans with industry stakeholders. The Network Code, which underpins all track access agreements, gives rise to the establishment of the Railway Operational Code. This specifies the procedures and policies which Network Rail and the TOCs should adhere to and this includes communication in disruptive events, emergency timetable procedures, adverse weather preparations and control arrangements.
- 3.10 The number and scope of the rail contingency plans vary across the industry and are stored in control rooms and, where appropriate, signal boxes. Most operational plans are shared between Network Rail and relevant TOCs and focus on the principles which should be followed in managing an incident and consequential disruption rather than the specific instructions. Annual updates to these are standard with any timetable change needing to be reflected in the plans.
- 3.11 Historically there was a practice of "Forward Review" independent assessments undertaken voluntarily across the industry, however now primary oversight comes through the Office of Rail Regulation's (ORR) regulation of Network Rail's provision of network management and resilience.
- 3.12 Over the last 3 years the emphasis has migrated from train punctuality and recovery from incidents to the communication and care for customers who may be, or are, being impacted by disruption. This has manifested itself through a change in the industry's operating licences so that they now include a requirement for a Passenger Information in Disruption (PIDD) plan and its implementation. Failure to implement the PIDD plan can lead to enforcement action including significant fines.
- 3.13 Within UK rail a standard IEM (Bronze/Silver/Gold) Command and Control structure with supporting roles defined, for example Rail Incident Commander, Rail Incident Officer, Train Operator Liaison Officer. There is often pre-emptive implementation of the command structure if risks or the impact of disruption are considered to be material, for example engineering works and major sporting events.

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- 3.14 For the personnel involved in the command structure there is a focus on training to achieve appropriate competence which includes both knowledge of railway operating rules but also the capability to communicate and direct.
- 3.15 The level of emergency exercises varies within the industry, but it would be usual to have an annual exercise of some form and every 2-3 years a full live exercise with multi-agency participation, e.g. a simulated train crash or level crossing accident. Exercises for the evacuation of stations would also be carried out to maintain fire safety certification.
- 3.16 There is no formally mandated review process except for operating irregularities and incidents which would be covered within the organisation's safety management system. The industry does use a Significant Performance Incident Review (SPIR) process for reviewing and communicating lessons. The trigger for enacting the review varies but is often agreed on an incident-by-incident basis and/or there is a default trigger agreed for the train operator involved. The industry also uses a common and confidential reporting system for safety concerns, CIRAS where any member of staff within the rail industry can submit information, a query or accusation and this is then sent to the appropriate organisation for investigation before it is disseminated in a report across the industry.

Summary

- 3.17 Table 3.1 summarises the operational resilience practices used in other industries, based on the framework set out at the start of the chapter.

TABLE 3.1 OTHER INDUSTRIES OPERATIONAL RESILIENCE PRACTICES

Category	Sub-category	Local Government	NHS	Rail
Managing Risk	Identifying and assessing risk	Community Risk Registers developed for civil contingencies risks using 5x5 risk matrix. Business Impact Assessments for corporate entities / each service.	National risk register and community risks considered. Local adaptation as required. Internal risk assessments for disruption use 5x5 risk matrix and Business Impact Assessments	Approaches and focus varied by industry player. Recently more focus on holistic business continuity planning. Use of 5x5 risk matrix
	Controlling/tr eating risk	Investment in capital assets and staff training where required. Operational practices developed to manage risk outcomes.	Investment in capital assets and staff training where required. Operational practices developed to manage risk outcomes.	Investment in capital assets and staff training where required. Operational practices developed to manage risk outcomes.
Deploying Contingen cies	Contingency plans	Vary by organisation. London Boroughs have about 24. All plans work around an overarching generic corporate emergency plan detailing command and control.	Templates for contingency plans. Annual review and formal assurance process. Each Trust will have an overarching emergency plan and a corporate business continuity plan.	Vary by industry player and event covered. Focus on principles in disruption management. Updated annually.
	Command & control procedures	IEM with ability for top-down and bottom up activation	IEM - with Directors with overall responsibility. Wider health coordination with multi-agencies conducted by NHS England	IEM with pre-emptive stand ups if risk or impact likely to be material
	Staff training and qualification	In London, Borough CEO's trained as Local Authority Gold Commander for London multi-agency Gold	Public Health England training programs and specialist Department of Health accredited courses to train senior staff	Accredited training to achieve competence. Smartcard to show competence in safety critical areas
	Key staff availability	Silver Commander always on call.	Duty Director or Accountable Officer. 'On Call Policy'	On call arrangements standard within the industry

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Category	Sub-category	Local Government	NHS	Rail
	Facilities and equipment	Incident rooms and equipment. Plus equipment and arrangements for Rest Centre staffing and transport. Contractor arrangements for emergency support	Incident control rooms established and equipped in NHS organisations where required. Storage of medical equipment in large quantities for emergencies	Significant NR investment in facilities and amenities for incident management. Routine record keeping in control logs.
	Scenario planning and table top exercises	Varied, most exercise at least once a year for desktop exercises. Also will exercise as part of training events.	Varied in their exercise obligations. Good practice for acute hospital trusts and ambulance trusts is to exercise at least annually.	Varies across industry but at least annual exercise as part of their safety management system to ensure capability and competence
	Practice exercises	Command post exercises are commonly held annually. Live exercises are commonly held every three years	Command post exercises are commonly held annually. Live exercises are commonly held every three years	Every 2-3 years a full train crash exercise with multi-agency participation
Passenger Welfare		Local authorities legal responsibility to shelter, feed and accommodate those displaced, by emergencies. Welfare needs are addressed in rest centre plans.	Responsibilities on healthcare organisations for the welfare of patients in their care during disruptions and until they are handed over to another organisation following evacuations	Train Operators lead response which varies by incident. Licencing regimes seeks to ensure passenger needs covered. NR supports at its managed stations
Learning Lessons		Hot debriefs straight after events. Structured debriefs (single or multi agency).	Hot debriefs with affected partners, with structured debriefing as required	Significant Performance Incident Review Process
Joint Business Continuity Planning		Multi-agency risk assessment groups, plan development, training exercises and welfare support. Business Continuity generally single agency	Multi-health partner organisation set strategy objectives and seeks assurances across system	Led by NR as accountable through its licence to manage the network.

4 Airport Resilience Guidance and Current Practice

- 4.1 This chapter describes current airport operational resilience guidance from relevant national and international authorities as well as describing general resilience management practices at UK and non-UK airports.
- 4.2 The guidance discussed has been taken from the following sources:
- UK CAA;
 - The European Aviation Safety Agency (EASA);
 - The International Civil Aviation Organisation (ICAO); and
 - The United States' Airport Cooperative Research Program (ACRP) undertaken by the US Transportation Research Bureau with sponsorship from the FAA.
- 4.3 The evidence in this chapter, alongside the framework and information from other industries in chapter 3 is used to define the airport operational resilience framework best practice, which is set out in chapter 5. The evidence from the airports themselves and their stakeholders is considered against that framework in chapter 6. The implications for the CAA's Guidance is set out in chapter 7.

Airport Industry Resilience Guidance

CAA Guidance and CAPs

CAA operational resilience guidance

- 4.4 The Terms of Reference for our study include Annex A: the Licence Conditions on operational resilience for Heathrow and Gatwick and Annex B: Guidance proposed in the notices proposing to grant the licence in January 2014. The guidance itself is similar for both airports, however, the inclusion in the Licence Conditions differs with Gatwick's listing the Commitments on operational resilience, as set out in the Conditions of Use as they move to a Commitments based economic regulatory approach.
- 4.5 A key objective of the study is to provide advice on this Guidance. It is discussed in more detail in chapter 7.

The CAA's CAP 168 - Licensing of Aerodromes

- 4.6 This document gives guidance to applicants and license holders on the conditions for obtaining and retaining an aerodrome licence. This is in line with the IACO Standards and Recommended Procedures. CAP168 gives technical information about the Aerodrome as well as Emergency Planning guidance. This guidance includes the establishment of Emergency orders detailing lines of communication, provision of medical supplies, roles of supporting services, agreed framework for command and co-ordination, level of testing and exercises and the assessment that the CAA Inspectors will undertake for the aerodrome emergency plan.
- 4.7 This guidance focuses on emergencies including aircraft accidents, weather standby and unlawful acts, but many of the procedures and processes are relevant for any irregular activity. The CAA requires a full aerodrome emergency exercise at intervals not exceeding every two years and a partial emergency exercise in the intervening year.

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EU / EASA Guidance & Rule Making

EASA Annex to ED Decision 2014/012/R - Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Authority, Organisation and Operational Requirements for Aerodromes - Initial Issue 27 February 2014

- 4.8 The EASA Annex to ED Decision 2014/012/R - Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Authority, Organisation and Operational Requirements for Aerodromes, provides, as its title indicates, a nonbinding standardization as well as guidance materials to all parties involved in EU member states, as to how to comply with EU Regulation (EC) No 216/2008. It focuses on the requirements regarding Aerodrome Operator Organisation, Aerodrome Operations, and Aerodrome Authority Oversight. It follows in general the ICAO principles, but stipulates a “burden of proof” on each aerodrome regarding its compliance, especially also concerning the preparation, exercise and testing of emergency plans and preparations. It also stipulates a “burden of proof” on the regulating national authorities to verify and validate this compliance by the overseen airports.

ICAO Airport Services Specification

ICAO Airport Services Manual Part 7

- 4.9 Part 7 of the ICAO Airport Services Manual (ASM) covers Airport Emergency Planning. This covers emergencies involving an aircraft, including accidents and incidents on and off airport as well as emergencies not involving aircraft such as fire, natural disaster and medical emergencies and compound emergencies when two of these emergencies happen together. This gives the ICAO guidance on the responsibility and establishment of an airport emergency plan. This guidance focuses on the roles and responsibilities of the different agencies involved in any emergency, the care of any casualties and the communication procedures.
- 4.10 In addition this guidance gives specific instructions to the operation of an emergency operations centre and the roles for commanders and co-ordinators for the plan. There is a detailed process for organising a full-scale emergency exercise and an instruction for the timing of training exercises:
- Full scale - once every two years;
 - Partial - at least once each year that a full-scale exercise is not held;
 - Table-top - at least once each 6 months, except during that six month period when a full-scale exercise is held.

- 4.11 Finally there are instructions to the evaluation system that should be used for the Airport Emergency Plan with feedback gained from all participating groups.

ICAO Airport Services Manual Part 8

- 4.12 Part 8 of the ICAO Airport Services Manual covers Airport Operational Services. This manual brings together details of the various technical functions that are required to be fulfilled by an airport. It covers the tasks under ‘normal’ operations for example: level of airport surface inspections, control of ground noise, rescue and fire-fighting services. There is a Chapter on the Airport Emergency Plan giving high level guidance only and a Chapter on Adverse Weather Conditions with requirements for the airport to pass on information to the necessary parties in any

adverse weather conditions. This includes making available and publishing a snow plan. The contents of the snow plan is clearly defined and includes methods of communication, nominated snow dumping and melting area, friction test devices and deployment of equipment and tactical approaches to be used.

ICAO Annex 14 - Aerodromes

- 4.13 Annex 14 to the Convention on International Civil Aviation - Aerodromes covers Aerodrome Design and Operations. This Annex contains the Standards and Recommended Practices (specifications) that prescribe the physical characteristics and obstacle limitation surfaces to be provided for aerodromes. This gives highly technical information with includes extensive and specific guidance on the contingency that should be built into the operational systems with secondary power available for some facilities and monitoring systems to check the operational status. There is a section on Aerodrome emergency planning including some recommendations, but this references the details in ASM Part 7. In the Annex the recommendations cover the contents of an emergency plan, the operations centre and command post, the communication system and the periodic testing of any plan.

ICAO Annex 17 - Safeguarding International Civil Aviation against Acts of Unlawful Interference

- 4.14 Annex 17 to the Convention of International Civil Aviation - Safeguarding International Civil Aviation against Acts of Unlawful Interference covers Protection and Reaction against unlawful acts in aviation. It specifies process integration between aviation operators (including airports) and national governments, provides specifications on preventative security measures and protection equipment, as well as outlining responses to unlawful acts, and consolidating the main security relevant aspects, information and recommendations given in other Annexes and Documents of ICAO.

ACRP sponsored by the US Federal Aviation Administration

Report 65 - Guidebook for Airport Irregular Operations (IROPS) Contingency Planning

- 4.15 Report 65 is a practical guidebook for commercial passenger services airports of all sizes of airport to develop, continually evaluate and update their contingency plans for procedures pertaining to IROPS that may cause significant disruptions to customers. This guidebook gives practical steps for developing a new plan or reviewing an existing one including step-by-step templates.

Report 93 - Operational and Business Continuity Planning for Prolonged Airport Disruptions

- 4.16 Report 93 is a guidebook and software tool for airport operators to assist, plan and prepare for disruptive and catastrophic events that have the potential for causing prolonged airport closure resulting in adverse impacts to the airports and to the local, regional, and national economy. This guidebook includes all parts of the Business Continuity Planning process from creating a risk profile and identifying the stakeholders to be involved, to gap analysis and strategy development and plan testing, exercising and maintenance. There is a detailed description of the contents of the Continuity Plan included the report including for each department:

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- The essential functions of the departments, who is responsible internally/externally and their contact details;
- Details of the business recovery team, their roles, and contact information;
- Whether the staff needed to perform each essential function require any specific licences, training, certification, or qualifications;
- A list of all people who must be notified if the essential functions are disrupted;
- A list of files or vital records required, their locations, and recovery priorities;
- Any data control requirements for information used in the functions;
- Identification of audits, validation, or formal approvals required;
- A description of any “manual work-arounds” and who is responsible for them;
- The level of critical materials, equipment, tools, communication devices, IT systems needed for the operation of the department; and
- Details of at least one alternative location for the function in case the primary location is unavailable including facilities, support requirements, security, transportation, number of staff needed.

Report 106 - Being Prepared for IROPS: A Business-Planning and Decision-Making Approach

- 4.17 Report 106 provides a guidebook with a decision-making process for airport management to use in justifying airport planning and funding decisions related to supports IROPS contingency planning. This process included involving stakeholders at the airport and how to assess factors of IROPS events such as frequency, impact and effectiveness of proposed mitigation alternatives. A structured approach is presented to quantifying the lifecycle economic values of proposed IROPS mitigation alternatives through a spreadsheet-based business planning and decision support tool.
- 4.18 The report gives criteria for identifying IROPS events and these are:
- The event should be relatively rare.
 - The event should significantly impact passenger services.
 - The event should, at least in part, fall outside the airport’s normal planning for incidents, accidents, emergencies, and severe weather.
 - The event should generally range in duration from a few hours up to 48 hours.
- 4.19 A comprehensive list of IROPS events is also given. The summary of these is below, with the full list in Appendix B.
- Severe Weather Events
 - Natural Disasters
 - Man-made Disasters
 - Aircraft and Vehicle Accidents/Emergencies
 - Medical Emergency
 - Infectious Diseases
 - Security
 - Construction/Mechanical
 - Airline Operations
 - Labour Disruption

■ Very Important Person (VIP).

UK Airport Industry Practice

- 4.20 This section summarises at a very high level our understanding of airport industry practice in UK, which of course includes Heathrow and Gatwick but also other airports. More specific comments on the approach taken by Heathrow and Gatwick are set out in chapter 6.
- 4.21 In general, risk assessment processes in the context of contingency planning in the UK airport industry focus on the failure of critical assets, whether safety critical or business critical assets. These assessments are the responsibility of asset owners at airports and the degree to which external stakeholders may be involved in this planning varies significantly. In addition, the risks of aircraft accidents and severe weather events, especially snow, are considered. The standard tool for risk assessments is a “five-by-five” matrix to assess the likelihood and impact of each risk. The outcomes of these assessments will be evaluated and a decision taken on the level of mitigation appropriate by each individual organisation.
- 4.22 Airports generally have a relatively small number of major contingency plans to cover the loss of a utility or critical assets. Depending on the plan then there will be a number of procedures that will be triggered by an event and these will include a communication plan to draw in available resources to respond to a problem. Some plans are shared externally with other stakeholders, most notably the snow plan, but many other plans are not shared. The plans should be reviewed annually and depending on the interdependencies consultation with external parties should be included in any resulting update.
- 4.23 The UK standard integrated emergency management (IEM) command and control structure, with Bronze/Silver/Gold levels is adopted across the industry. Within any individual contingency plan there will be a predetermined escalation level that should be called.
- 4.24 There are no formal standards or regulatory requirements for practice exercises for contingency plans, with the important exception that a practice of a full-scale emergency situation must be held every two years in order to maintain the aerodrome licence. Experts in the industry suggest an exercise in the airport terminal (other than a fire evacuation) should also be practiced annually with all staff identified as having a role in a contingency procedure taking part in a table-top exercise quarterly.

Non-UK Airport Practice

- 4.25 FRAPORT, Vienna Airport, Munich Airport and AVINOR AS (Norwegian Airports) were approached for information about their approaches to Operational Resilience and Emergency Planning procedures in Europe. These airports were chosen as they had comparable traffic volumes and weather risks. As noted in chapter 2, the most detailed information was provided by FRAPORT and Vienna Airport.
- 4.26 Due to the confidential nature of the information provided to us we have provided a high level summary of the views and experience of the managers interviewed. Please note these views do not represent the official positions of the airports themselves.

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Overview of Operational & Emergency Planning

- 4.27 All the non-UK airports agreed that this was an essential task for their airports, but there are significantly different ways to approach this depending on the airport's organisational structure. Those with hierarchical and specialised structures tend to have a more formalised planning process, whereas those with a higher level of interdisciplinary experience operate a leaner management structure during crisis events. However, all agreed that emergency and crisis preparation, planning and response is highly dependent on the individuals involved and on their personal approach.
- 4.28 The focus of operational resilience planning is to always provide as continuous and good a service to their users as possible. To provide this they all:
- Identify risks, and use foresight in structuring their preparations;
 - Prepare plans and staff them;
 - Prepare facilities and infrastructure;
 - Train - practice and conduct exercises; and
 - Understand that they must do this in close coordination with other stakeholders.

Emergency and other operations disruption

- 4.29 The interviewees were not familiar with the term "Operational Resilience" which is not defined in international English-language aviation terminology used by ICAO and EASA. ICAO and EASA define both "Emergencies" and "Operations" (but not "Operational Resilience") and the interviewees viewed the recommendations within the ICAO Airport Services Manual Parts 7 and 8 sufficient to cover the preparations for both foreseeable and unexpected events. There was some concern raised by the respondents that the introduction of additional guidance by the UK CAA should follow terminology in keeping with that already provided by ICAO and EASA.

Managing Risks

Identifying and assessing risk

- 4.30 There are a wide range of approaches used for risk identification and evaluation at the airports interviewed.
- 4.31 AVINOR and FRAPORT have both been active in climate change mitigation and preparation activities for at least a decade, and have significantly reassessed their weather and climate-related hazards. This has led to activities moving towards climate neutral energy supplies, redefinition of storm and flood effect hazards, and leadership in the development of new industry standards.
- 4.32 All the airports have well established coordination with government agencies and are in various forms integrated within the emergency response preparations and planning of their regions and countries. From this they also take on risk definitions from these government entities, ranging from standard aviation security issues to new flood safety stipulations of 1 in 200 year storm event safety for critical infrastructure in Germany.
- 4.33 All airports have a practice of monitoring events at locations across the globe in real time to identify developing risks early.

- 4.34 FRAPORT has a formalised risk assessment process that can be activated both in a bottom up and top down fashion. It identifies a risk and then conducts an assessment process. If the assessment comes to the conclusion that action is mandated, then action is initiated.
- 4.35 Vienna has a more direct approach of interdisciplinary experienced and trained management. Risks once identified are acted upon. There is explicitly no risk assessment process, as the approach is:
- *“A risk is identified as real or not! There should be no process that allows the ‘writing down or off’ of a risk, as this would only be a form of ducking the issue.”*
- 4.36 For certain risks e.g. flood protection or fire safety, all airports conduct studies and assessments and reassessments of their technical system status at least with every system reconfiguration / construction modification. FRAPORT has done extensive studies regarding extreme river flood event modelling. AVINOR has reconfigured all storm drainage protection standards to reflect expected larger storm precipitation volumes due to climate change.
- Mitigating / treating risk*
- 4.37 All airport managers described the environment in which they work as a very complex technical facility network which therefore requires finesse and care to enable successful business operations. They emphasised the importance of in-depth technical knowledge within the senior management teams to understand the functionalities of the technical infrastructure and its operational capacities, redundancies and flexibilities and the risks relating to the technical capabilities of the airport infrastructure.
- 4.38 The interviewed managers highlighted that event resilience, risk impact mitigation and risk treatment starts at the concept development of every technical facility part of an airport. For general airport disruption risks the following sequence of safety engineering is followed:
- 1) Avoid dangers & risks where possible.
 - 2) Set risk mitigating technical measures.
 - 3) Set risk mitigating organisational measures.
 - 4) Provide persons with individual protective and welfare measures.
 - 5) Institute / mandate special behaviour rules and regulations.
- 4.39 The effectiveness of this sequence of activities decreases from 1 to 5, but the difficulties of implementation increase. Organisational measures in the form of organisational plans, are at Level 3. Proactive action to be effective in levels 1 and 2 were considered to be the normal approach at the airports.
- Reducing Impacts*
- 4.40 The link between infrastructure development (CAPEX / Maintenance CAPEX) and operational preparedness is achieved at FRAPORT by having regular internal meetings between the technical development divisions and the operational emergency & crisis groups.

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- 4.41 In contrast, Vienna Airport integrates dedicated staff of the operations division that liaise directly into every design and construction project, with their participation in ongoing project progress meetings including the designers, project managers and construction oversight engineers. Technical Maintenance Work is closely coordinated by the Infrastructure Management group with the Technical group and special contractors.
- 4.42 The approach to reducing the impact of disruption events through organisational measures follows the same principles as outlined above under risk mitigation above. In general this includes:
- Formulation, implementation and adaptation of Contingency Plans and their integration in airport operations and staffing. Foremost these are the mandated Emergency Plans, but this includes also all procedures for any non-normal operation.
 - Creation of Crisis Command and Control Structures, designating leadership functions, alert & communication means and facilities and control rooms that allow command levels to function. The approach to this differs from airport to airport, but all integrate into the larger governmental crisis processes and some integrate with the crisis structures of their principal airline clients.
 - Enacting training and exercise schemes and staff education on a continuous basis, to test the envisioned plans, empower the staff expected to act or react, and familiarise them both with the non-normal procedures and equipment and with the surprise / shock / uncertainties of event occurrences.
 - Implementing a rigorous Lessons Learned Review of each real event and all exercises and tests run, to identify items that need improvement as speedily as possible.
 - Creating and managing stockpiles of needed items, and emergency equipment and supplies, including the formulation of an understanding of the supplies and equipment available on the airport with other operators (e.g. food / clothes retailers).
 - Having passenger welfare support personnel and facilities available to assist people affected by an event. This covers the range from terminal managers and their support staff and floor walkers, to airport hospitals and medical stations staffed with doctors and medical staff, to psychologists and spiritual assistance to affected persons.

Contingency Plans & Emergency Plans

- 4.43 All interviewed airports have emergency plans, as prescribed in aviation regulations and other government rules and regulations. Contingency Plans (which are not defined in ICAO/EASA terminology) are considered for this purpose to encompass any procedure and plan, that serves a situation or event that is in any way out of the ordinary smooth operations. In this understanding contingency planning starts with the everyday small problems and interruptions at any airport, and extends to major problems, technical failures or events, which are not defined in the set of the “emergencies”, for which preparations are mandated or sensible.
- 4.44 FRAPORT has over 1,000 contingency plans, as defined on this basis. In contrast, Vienna has integrated a number of procedures into a single airside manual. However, the snow and ice clearing plan alone is about 250 pages long.

- 4.45 Vienna Airport also advised that they take great care to develop long-term employees, who are educated in “*how to run an airport*” in their various operational positions. While they have now consolidated their knowledge into a airside handbook, they see a danger that this cannot ever fully replace operational “know-how” of well-trained key personnel.
- 4.46 Vienna also pointed out, that there is significant benefit in integrating a number of low level “contingency plans” into “normal” operational procedures. If they are properly formulated in an overarching “how-to” structured airport/airside handbook leading to standard action / reaction to an event, instead of listing them as a contingency plan, if the situation arises everybody acts automatically in the right way - nobody waits for the activation of a plan signal - overseeing airside operations staff needs not to control and lead an event, only to check and police normal performance. An example are “high wind procedures” on the apron (aircraft double chocking & no obstacle cone placement). Since these have been integrated into the normal operations procedures - triggered by weather report wind forecasts that are automatically distributed, they are executed automatically by the handling agents - as part of their normal duties. This has led to a significant decrease of high wind FOD and wind turned aircraft situations.
- 4.47 FRAPORT and Vienna both coordinate their plans with the relevant authorities. In the case of Vienna, all plans are coordinated and approved by the authority overseeing the airport as stipulated by Austrian law.

Pre-Detectable Events Planning, Coordination & Preparation

- 4.48 An additional issue of operational resilience needs to be addressed regarding events and situations that are known or can be detected in advance. These are e.g. most weather related events (except tornados), industrial action, construction works, or major scheduled sports, political or other social events.
- 4.49 The interviewed airports all have procedures for coordination and mitigation activities in place regarding foreseeable difficulties from scheduled events or industrial action against themselves or other operators at their facilities. Coordination of mitigating measures starts as advanced as possible, and includes coordinating activities with all impacted companies and authorities, to prepare for special situations.
- 4.50 FRAPORT considers that, as the airport facility owner and operator, it is its responsibility to collect all required parties at or near the airport into the necessary coordination and communication groups for event mitigation. FRAPORT considers that this has enabled it to provide a better experience for passengers during disruption.
- 4.51 Regarding predicted weather situations, both Vienna and FRAPORT have special weather bulletins, which are issued regularly every day between two and ten times (weather dependent). These bulletins in the case of FRAPORT constitute a comprehensive description of the weather situation and the expected forecast development and the impact at the airport. In the case of Vienna this is a translation into readable text of the normal aviation weather report and forecast issued by the responsible authorities, in an agreed format and wording. In addition long period forecasts are procured when required for pre-sign off on planned construction or other known events.

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4.52 Regarding winter services of snow and ice clearing, both FRAPORT and Vienna have contracted outside companies on standby for the tasks of transporting large snow volumes on or off the airport. However the actual clearing from the aerodrome is largely done by the airports' own employees to ensure better problem identification and airport knowledge.

Command and Control

4.53 The Command and Control structures differ from airport to airport and from Country to country. The national rules applicable in Germany and Austria, applicable at FRAPORT and Vienna, respectively, are set out below.

4.54 **Germany:**

- The positions of the Airport Traffic and Operations Manager (*Flugplatz Verkehrs- und Betriebsleiter*), his/her deputy and other duty managers is mandated in the *Luftverkehrs-Zulassungs-Ordnung* (LuftVZO - Aviation Licensing Regulation) in § 45 (4). The persons must be named by the airport. The overseeing authority checks dependability and qualification and must approve each individual.
- In addition in § 45b a Safety & Security Management System is mandated and in § 45c the requirement of a safety & security manager (*Beauftragter für das Sicherheitsmanagementsystem*) is defined and protected against situations in which action contrary to the company interest are required. Again each such individual has to be approved by the overseeing authority.
- It is noteworthy, that this regulation does not limit this safety and security management system in any way other than by defining it: “to regulate the responsibilities, processes and operational sequences and to provide mandates on safeguarding their implementation.”
- Therefore by implication it enforces the system to cover all safety and security issues coming from all legal and operational backgrounds - not just from aviation. It also stipulates that this system is to continuously developed and to be reviewed regularly in a documented manner and documentation to be kept on record for 10 years.
- The normal operating procedures have to be compiled in an airport manual (*Flughplatzhandbuch*) as mandated in § 45a.
- LuftVZO does not stipulate authority approval of either the airport manual or the safety and security management system. However in § 47 the authority has the right to audit and check if both operations and safety and security management are being conducted and continuously developed in good order.

4.55 **Austria:**

- The positions of the Airport Operations Manager (AOM, *Flugplatzbetriebsleiter*), his required number of deputies and Airport Sections Operations Managers and Airport Duty Managers is defined in the Civil Airport Operations Regulation (*Zivilflugplatz-Betriebsordnung* ZFBO) in §2. The person(s) must be named by the airport, be dependable personalities, sufficiently qualified, to be eligible to be approved by the authorities overseeing the airport (see Aviation Law §68 (2) *Luftfahrtgesetz* LFG -). The AOM or one of the deputies must be on the airport at all times of airport operations.

- These are not the company board or directors, but the responsible operations managers. Usually the authorities expect a person named for such a position to have extensive experience working on airports, as well as having had additional specialized training and education in airport operations management. The crisis management team is formed from the pool of these and other division managers at the airport.
- 4.56 From the differing legal definitions of key managers at public transport civil airports, it becomes clear, that crisis management structures need to be different.
- 4.57 In Germany the function of the Safety & Security Manager is specially defined and protected legally to be empowered to make decisions, if needed even consciously knowing these to be detrimental to his employer (the airport company). As this is normally not allowed for either employees or even executive management within the German legal system, the leadership role in a crisis situation devolves to this person, not to the normal airport traffic and operations manager or the airport company executives.
- 4.58 Subsequently the creation of an Emergency Response & Information Centre (ERIC), as a separate unit staffed with specially selected personnel of management and crisis stability quality from all different divisions and parties makes sense, as these then themselves as named crisis managers come under this protective umbrella.
- 4.59 The ERIC at FRAPORT is a overall party integrating facility, which is structured and activated in a modular fashion. It consists of 24 function positions, of which 8 are the core units always activated, and 16 are activated situation dependant. It is led by a tandem leadership of crisis manager and deputy crisis manager of FRAPORT, but it integrates in company units, governmental agencies and other on airport operators into one leadership body. Its decisions are binding for everybody on the airport This is possible due to the full participation of governmental executive and licensing agencies in the ERIC.
- 4.60 In Austria the AOM and deputies are the legal persons with final responsibility for all airport operations. Consequently they must be also the top crisis managers so they cannot designate other crisis command personnel with final decision power. That keeps the crisis command structure closely linked to ongoing operations command structure.
- 4.61 For this reason the approach taken in Austria is to use the normal command and control facilities at the airport also as crisis command and control facilities. As the plans and handbooks of both airports and airlines are coordinated and approved by the same licensing authority, the integration of inter-party plans and the inter-active use of the various crisis facilities by all parties impacted, as suitable for the situation is greatly facilitated.

Staff Training and Qualification

- 4.62 All airport interviewees agreed that the foundation of crisis and event preparedness and resilience is training, cross-training and education of staff, as well as trying to structure staffing to further long term employment. It is clear, that the senior managers interviewed all come to their positions through career paths extending over a long period of employment with the airport and various assignments in diverse operational, technical and finally management divisions /

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functions. Thus they have acquired an in depth understanding of their airport in all facets, and wealth of knowledge on actions - reactions - effects - consequences in this multidimensional technical/organisational network.

- 4.63 Equally all interviewees agreed that ensuring the response and effectiveness of crisis and event preparedness and resilience is a direct function of practice through exercise - exercise - exercise - and exercise again. They also all agreed that it is dependent on the person involved and their ability to practices procedures using cooperative working arrangements in normal and extraordinary situations.
- 4.64 Running exercises at all levels, integrating with government authorities and being part of exercises with others in the vicinity (e.g. other industries close to the airport) is common practice across the airports interviewed. Vienna runs its training and emergency alert exercises as much as possible during the night, to pose the highest level of difficulty to the personnel involved. These alarm response exercises run regularly, about every 2 weeks, always unannounced, always with differing situation scenarios.
- 4.65 FRAPORT points out that it is virtually impossible to keep an exercise secret. So it is extremely important to always validate/qualify how prepared the team is and the reaction speed of the participating units. A point in case was the re-integration of a governmental ministry that had left the exercise pool for some years. Valuable lessons regarding the reality of how well prepared teams were, were gained at that point. Significant changes happened in many of the other participants who, observing a struggling new partner, detected similarities in their structures and setups.
- 4.66 Both FRAPORT and Vienna strive also for long term development of their leadership staff. The prevailing attitude is that airports are so complicated, that employees needs a long time and a varied experience to become a good airport manager and leading crisis manager. Special emphasis is put on the necessity of understanding the technical and the human teamwork system to be a good functional operations manager, both in a commercial and a crisis sense.
- 4.67 Executive commercial management in a crisis situation is not asked to fulfil any non-normal functions at that level. They will participate in the Public Information Process, and they will fulfil their normal communications functions on the executive level to government and other companies. There are special procedures in place and tested to enable immediate availability of extra commercial funds if needed, requiring executive management approval. But both in Vienna and at FRAPORT executives are crisis team assistants not crisis actors and decision makers.

Learning lessons

- 4.68 All airports interviewed describe, that they go through a lessons learned process after each event and each exercise, to immediately identify any potential or need for improvement.
- 4.69 Lessons learned analysis addresses the questions:
- What worked?
 - What didn't work or didn't work as foreseen?

- What was the cause for this?
- Do we need to adapt the planning? - How?
- Do we need to enhance the equipment and facilities? How?
- Do we need to enable and empower organisations and persons? - How?

The answers to these questions then lead to the required action either in organisation, planning or procurement.

Summary

- 4.70 Table 4.1 summarises the operational resilience guidelines and practices in the airports industry, based on the framework and following the same format as that used for practices in other industries set out in chapter 3.

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TABLE 4.1 OPERATIONAL RESILIENCE GUIDELINES AND PRACTICES IN THE AVIATION INDUSTRY

Category	Sub-category	UK Airport Practice	Other European Airports Practice
Managing Risk	Identifying and assessing risk	Critical asset assessment of safety critical and business critical assets. Involvement of external stakeholders in business continuity risks. 5x5 risk matrix used	Mix of formalised risk assessment process to direct risk identification and assessment by trained management
	Controlling/treating risk	Investment in capital assets and staff training where required. Operational practices developed to manage risk outcomes	Investment in capital assets and their maintenance and operational practices. Collaboration between staff involved in capital development and operational and emergency and crisis teams
Deploying Contingencies	Contingency plans	Generally a small number of plans at a high level to cover the loss of key facilities. Below these there may be a number of procedures	FRAPORT has over 1,000 plans whereas Vienna has a single airside manual to cover many procedures with supplementary plans where necessary
	Command & control procedures	IEM - with predetermined escalation triggers.	Mandated and regulated disruption management positions and process
	Staff training and qualification	Differs within the industry, but is generally through the exercising of plans	Staff qualifications are an airport strategic priority and are suitability regulated at operational / crisis leadership level
	Key staff availability	Typically rosters are developed to ensure there is always a crisis team on call.	Initial qualified disruption manager always available on airport. Senior disruption managers are on call in various fashions.
	Facilities and equipment	Vary by event but designated rooms, equipment and facilities to be used by the crisis teams.	Designated rooms and equipment and facilities to be used by the crisis teams - in some cases integrated into the normal command and control

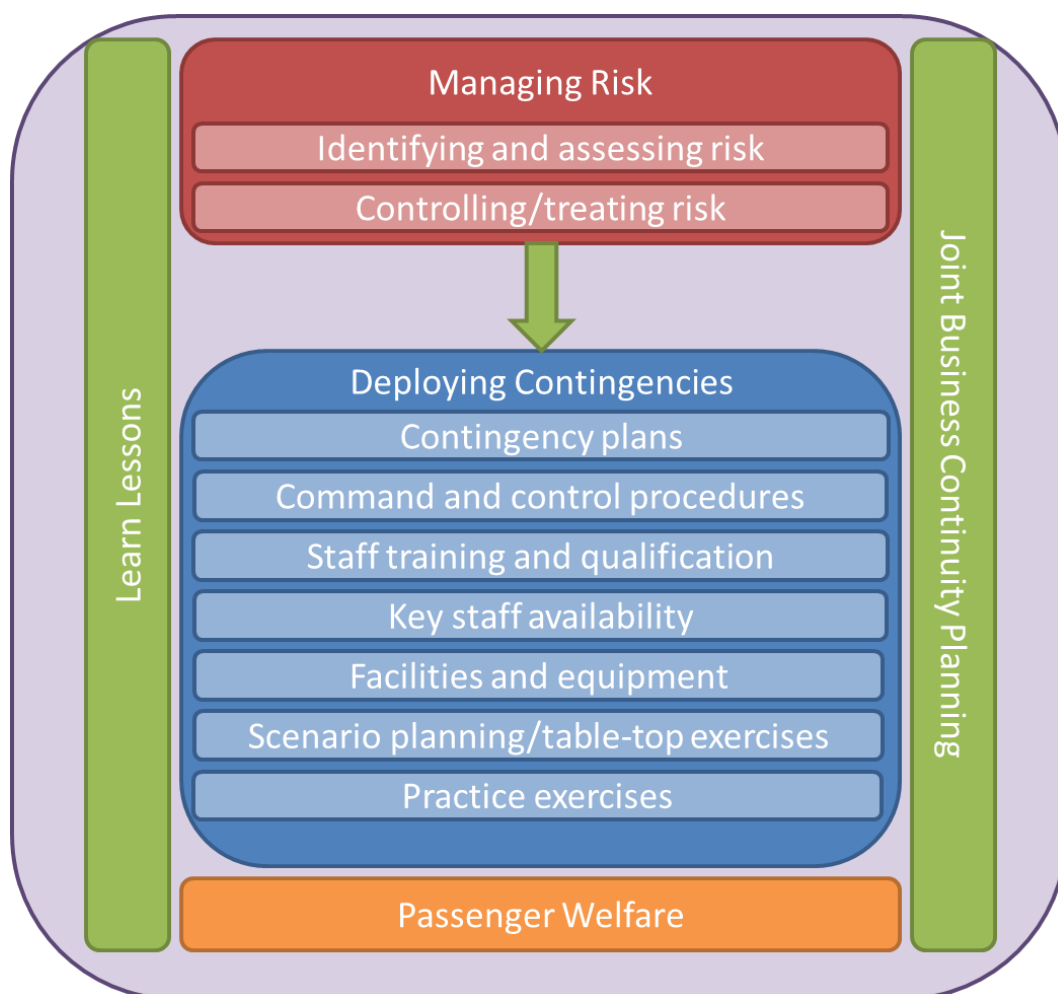
Category	Sub-category	UK Airport Practice	Other European Airports Practice
			facilities.
	Scenario planning and table top exercises	Quarterly for all staff with the Board included in exercises and a variety of scenarios covered	Vienna, alarm exercises run every 2 weeks. Always unannounced. At all airports major exercises are run to ICAO / EASA & other governmental requirements. Reality events are taken into consideration and count as exercises.
	Practice exercises	Full scale emergency exercise to maintain the aerodrome license every 2 years. Annual exercise for terminal events appropriate if no major incidents	At all airports major exercises are run to ICAO / EASA & other governmental requirements. Reality events are taken into consideration and count as exercises.
Passenger Welfare		Provided by the airlines with the airports providing additional support where necessary	Provided by the airlines with airports providing additional support where necessary. Coordination with retail outlets & food vendors is part of the crisis preparedness & sometimes crisis management.
Learning Lessons		“Hot wash up” by incident commander at each level and cold review within three weeks to check learning	Lessons learned process after each event/exercise
Joint Business Continuity Planning		Varied level of multi-agency engagement dependent on the event and the airport	The airports see themselves as the necessary “focal node” and “facilitator” for coordinated business continuity management. Subsequently they take on the responsibility to organise coordination and communication groups for event mitigation

5 Airport Operational Resilience Best Practice

Application of the Resilience Planning Framework to Airports

- 5.1 This chapter draws together the information provided by our desktop research, stakeholder interviews, discussions with other airports and reviews of other industries to develop a specification of best practice for airport operational resilience using the Business Continuity Framework presented in Chapter 3 (reproduced in Figure 5.1).

FIGURE 5.1 BUSINESS CONTINUITY FRAMEWORK FOR AIRPORTS



- 5.2 This chapter presents best practice against the framework, which is then used in chapter 6 to review the current practice of the two airports. It is also used to inform our assessment of and recommendations for the guidance relating to operational resilience which the CAA issues to Heathrow and Gatwick (see chapter 7).
- 5.3 Before considering the application of the framework in detail, we first consider below the different ways in which the airports industry treats emergency and other disruption situations.

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Emergency and other operational disruption

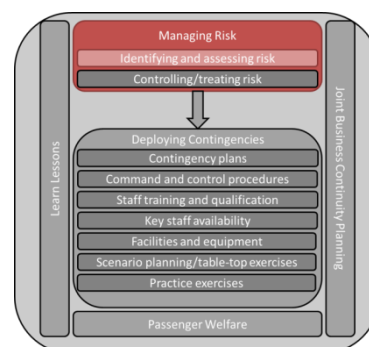
- 5.4 Our review of industry practice and stakeholder discussion has revealed significant differences in the treatment of “true emergencies”, generally involving issues of safety and risk to life, and that of other disruption. Thus, the CAA’s own publication, CAP 168 “Licensing of Aerodromes” specifies requirements for the airport’s “emergency plan” with a compulsory practice exercise regime, but this relates only to true emergencies. Although there is also mention of requirements for handling snow, there is no specification for contingency plans for disruptions from other causes (such as severe weather or industrial action), nor for the compulsory practice and testing of such plans.
- 5.5 In discussions with stakeholders, including airlines, it was clear that the emphasis put on preparations for true emergencies was much greater than on other disruptions. Local Resilience Forums, which include the emergency services as well as the airports, though not necessarily airline representatives, do discuss airport emergencies, but generally do not focus on other airport disruption.
- 5.6 While it is of course right that there is a major focus on true emergencies, for which facilities for the injured, as well as for relatives, need to be provided, many of the knock-on effects on the airport operation are very similar in other disruption situations. These are likely to include delays and cancellations to flights, passenger overcrowding and welfare issues, and problems with airport facilities and surface transport.
- 5.7 Therefore some alignment of the procedures and mandatory requirements for emergencies with those relating to other disruption situations, including severe weather and infrastructure failure events, should be considered. We have therefore developed the operational resilience framework to build on the practices already introduced for Emergency Procedures, but to make them suitable for all airport disruption events.

Managing Risks

- 5.8 This section deals with processes for managing risks. This includes the initial identification and assessment of risks as well as the decisions and actions need to control or treat these risks. They are discussed in the subsections below.

Identifying and assessing risk

- 5.9 Large airports are in continuous operation so that many types of disruption are likely to have been experienced over a period of several years’ operation. Nevertheless, it should not be assumed that all risks are understood, particularly those that have low likelihood of occurring (but whose impact may be significant), while technological and operational changes are likely to generate new risks (e.g. relating to IT problems).
- 5.10 Regular risk identification exercises are necessary given the changes to airport’s activities and context. Evidence from all industries suggests that annual reviews are the norm. Also, given the diversity of sources of risks, and following the approach set out in the Emergency Preparedness document, this exercise should

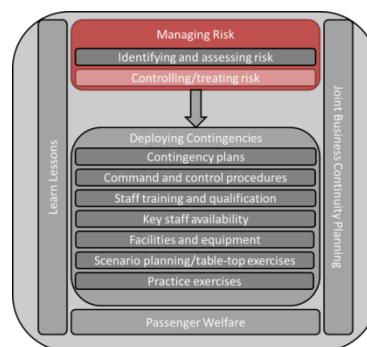


involve all other major stakeholders at the airport, including the emergency services, principal airlines, handling agents, utilities, fuel suppliers and UK Border Force. This requires the airport to lead the exercise, and solicit inputs from other stakeholders as appropriate whilst managing any confidentiality issues (certain identified risks are likely to be sensitive from a security point of view). The airport would then remain responsible for the outputs of the process.

- 5.11 The airport industry already uses the 5x5 risk assessment approach and this feeds into a capital investment programme (see next section). This is a sensible approach and is used in all industries reviewed. However, in line with the overall risk management process, there should be significant communication and consultation with other stakeholders in the risk assessment process and it is less clear to what extent this currently takes place.

Controlling / treating risk

- 5.12 Airports use a number of methods for controlling risks. One important method is through capital investment. This can either be in relation to maintenance capex, which should ensure that assets remain serviceable and safe (to avoid introducing new risks through equipment failure), or through investment in new facilities to reduce existing risks. An example of the former would be maintaining the runway and taxiway pavement to reduce the risk of accidents or damage to aircraft, while an example of the latter would be enhancing the capacity of the airport fuel farm to reduce the likelihood of fuel shortages in the event of supply shortages. A further example, involving only a small investment, would be the installation of bollards at the top/bottom of escalators to prevent bags and buggies going up them, which results in a significant reduction in escalator injuries.



- 5.13 In general, the UK Tier 1 economically regulated airports have consulted extensively with airlines on their capital programmes as part of the constructive engagement process for regulatory review. There is a question as to whether this consultation process should be widened to other stakeholders as well (e.g. to include handling agents in relation to risks associated with airport facilities).
- 5.14 In addition, airports can control risks through operational procedures. This starts at the level of staff training, education and multi-role experience building for operational and crisis leaders and greatly facilitated the effectiveness, situational awareness and responsiveness in event situations. For example, where crowds build up in a terminal, staff may be proactively deployed to ensure that risks are managed - e.g. at the top of escalators or around tracked transit systems etc. Another example would be a well thought out sweeping plan for runways, which can complement the pavement maintenance programme and help to avoid foreign object damage to aircraft.
- 5.15 In certain situations, the integrated emergency management (IEM) command and control structure (with bronze, silver and gold levels) may be “stood up” proactively, i.e. in advance of a disruption situation arising, most likely at the bronze level. This could be appropriate on days which are expected to be busier

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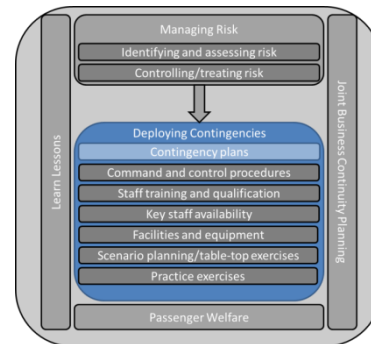
than normal (e.g. due to public holidays, sporting events, etc.), even if the operation is proceeding normally.

Deploying Contingencies

- 5.16 This section deals with processes for mitigating the impacts of disruptive events once they have occurred. These include developing contingency plans, command and control procedures and the staff and facilities needed to make these effective. They are discussed in the subsections below.

Contingency Plans

- 5.17 Based on a combination of long-term experience as well as the risk assessment process described above, the airport management and other stakeholders need to develop suitable contingency plans to manage disruptive events (which include both true emergencies and problems such as severe weather and industrial disputes). Plans can be considered both as pre-existing documents and as a set of processes for managing the contingency on the day. We discuss the plan documentation in this subsection, while the associated processes to make these plans effective are considered below.



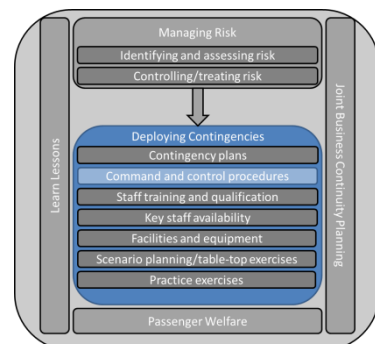
- 5.18 Practice in other industries suggests that it is then appropriate to have an overarching plan for an airport or a major facility of the airport that includes the general principles to be followed when an event occurs. This would be applicable for any consequence and would include, for example the command and control procedures. Within the aviation industry these documents exist for Emergency Orders, but the approach should be extended to cover other disruption events.
- 5.19 Underneath this overarching plan it may be appropriate for there to be a number of contingency plans whose detail will vary depending on the event which they cover. As many different disruptive events are likely to lead to similar consequences, the contingency plans should be focused on managing these consequences. Thus aircraft accidents, weather disruption or infrastructure failure could all lead to cancellations and passenger overcrowding. Contingency plans are required to deal with major sets of “consequences” such as:
- Flight cancellations and associated passenger welfare issues;
 - Flight delays and associated passenger welfare issues.
 - Failure of baggage belts in terminals;
 - Loss of flight information;
 - Loss of terminal power or water supplies;
 - Terminal evacuation;
 - Overcrowding.
- 5.20 In order to ensure the plans to address the consequences to all organisations at the airport the major airport stakeholders, including the airlines, airport fire service, other emergency services, handling agents and UK Border Force should be consulted on every relevant plan.

- 5.21 A number of principles can be set out in relation to the content of these contingency plans. In particular, they should add value during a disruption situation, through providing necessary relevant information on:
- Which people should be involved in managing the situation, their roles and contact details;
 - What checks should be undertaken to understand the extent of the problem;
 - Options for handling the situation (if more than one is available);
 - Key information relevant to any selected option (e.g. location for snow disposal, area for relocating passengers, procedures for coordinating information given to passengers);
 - Rules for interaction with the Command and Control organisation and with other stakeholders;
 - Recovery processes for moving back towards normal operations.
- 5.22 An airport’s contingency plans should therefore be judged on whether:
- There is an overarching plan which covers the general principles and approach to manage disruptive events.
 - The set of plans cover all major “consequences” of disruption events, based on the risk assessment process and general experience;
 - The content of the plans provides necessary information for their recipients;
 - The plans are available to all those needing access either to follow the approach set out or to understand what others will be doing; and
 - The plans are set out clearly and are conducive to use in stressful situations.
- 5.23 In addition to considering the strengths and weaknesses of the plans themselves as they exist at any one time, the processes for developing the plans, including the link to the risk assessment, the involvement of all relevant stakeholders and processes for monitoring, review and improvement should all be considered.
- 5.24 Plans with significant impact on other stakeholders (such as airlines) should be shared with those organisations for information and comment. Plans should be reviewed regularly (at least once every two years and annually for key contingency plans such as for snow events).

Command and Control Procedures

5.25 During a disruption situation, a well-designed set of command and control procedures are required. The typical approach used by the emergency services and other public sector organisations is the integrated emergency management (IEM) command and control structure, a hierarchy of Gold, Silver and Bronze levels:

- Gold Command - the strategic level
- Silver Command - the tactical level
- Bronze Command - the operational level.



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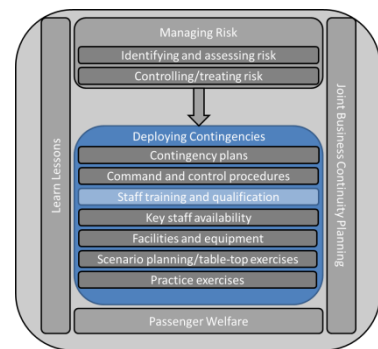
- 5.26 A good description of the generic approach is set out in the National Police Improvement Agency *Guidance on Command and Control*, 2009¹.
- 5.27 The Bronze level deals with situations beyond “business as usual”. The Bronze response is implemented through one or more Incident Response Teams, depending on the situation: for example, there may be different IRTs in each terminal. Bronze command centres can be established either centrally to cover the whole airport, or locally within each terminal, but in either case, appropriate communication protocols must be observed. The Bronze Commander should be a Duty Manager, or equivalent role, in the relevant part of airport.
- 5.28 Silver Command typically provides an overview of the whole airport and is invoked in the context of a major disruption (such as significant snowfall). Each airport has only a single Silver Command operation, whose role is to coordinate the response across the whole airport, giving direction to the operational Bronze Command teams. Silver Command needs to have the capability to monitor all activities on the airport and to communicate with all relevant airport staff and with other stakeholders, including airlines, handlers, emergency services and UK Border Force. The Silver Commander should be a senior member of the airport management team with delegated authority to take significant decisions which may have financial implications.
- 5.29 Gold Command is the strategic level and is invoked in situations whose consequences are very severe, may extend beyond the airport boundary or endure over a long period (e.g. more than a single day). The function of Gold Command is less to direct the management of the incident than to manage the interfaces with other involved parties (e.g. emergency services, government, news organisations) and to take strategic decisions with major consequences for a large number of people and organisations. The Gold Commander should be a member of top management with delegated CEO authority.
- 5.30 As noted above (paragraph 5.15) in some situations it may be appropriate to activate the Command and Control structure pro-actively, i.e. in advance of any disruption situation developing (due to, for example, expected heavy passenger flows or locally relevant severe weather forecast or flood warnings).
- 5.31 Key requirements to make the Command and Control structure work are:
- Appropriately trained and qualified staff available to take the Bronze, Silver and Gold Commander roles;
 - Appropriate levels of delegated authority and empowerment for the different Commander roles to enable decisions taken by the people in best position to make them;
 - Involvement of and communication with other stakeholders built into the process (e.g. with locations for airline representatives in the Command rooms) with live sharing of operational data between stakeholders during disruption events;

¹ <http://www.acpo.police.uk/documents/crime/2009/200907CRICCG01.pdf>

- Dedicated facilities and equipment to support each of the Bronze, Silver and Gold command operations (each should have its own room with appropriate remote monitoring and communication facilities);
- Communications equipment of suitable quality with back-up facilities and contact details of all relevant personnel and for other stakeholders;
- Dedicated administrative support personnel available throughout the period of disruption to support rapid and effective communication during the incident/disruption and to provide information upon which reviews could be taken after the incident for continuous improvement purposes.

Staff Training and Qualification

5.32 We note the comment in the National Police Improvement Agency *Guidance on Command and Control* that: “Gold, Silver, Bronze is a role, rather than rank specific” (p8). It should not be assumed that because a person is sufficiently senior he or she should automatically be able to take the role of Gold, Silver or Bronze Commander, as appropriate. Instead, staff of the appropriate rank need to be trained, tested and then practice the role, before assuming the function in a live situation.



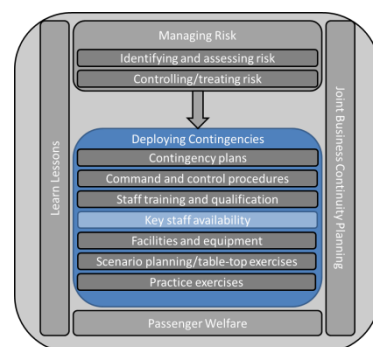
5.33 Thus staff undertaking the Bronze, Silver and Gold Commander (and Deputy Commander) roles need to be suitably trained and qualified. At a minimum, this means that no one should be able to undertake a Commander role until he or she has:

- Been formally trained in the role by a qualified instructor;
- Demonstrated through a formal testing procedure that he or she is aware of the procedures and levels of authority that apply to the role ;
- Shadowed the qualified Bronze, Silver or Gold Commander during a real incident or exercise of the appropriate level;
- Undertaken the Commander role in a further live incident or exercise with support from a more experienced Commander (in addition to shadowing the Commander in a previous event).

5.34 The status of personnel training and experience should be documented and continuously updated. This will allow the airport to understand its level of preparedness and training requirements, and will also highlight the impact of personnel decisions on the preparedness status.

Key staff availability

5.35 Disruptive events can happen at any time, so it is imperative that suitably trained and qualified staff are available to undertake the required Commander role(s). Therefore, qualified senior staff need to be rostered in such a way that a suitable person is always available. In the case of Bronze Commanders this means on the airport site; for Silver and Gold Commanders, this should mean available to reach



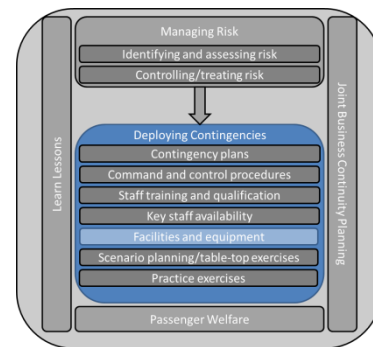
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the airport within a short period of time (maximum two hours). They should be able to communicate and make informed decisions from the point of contact.

- 5.36 In addition, support staff need to be available at very short notice to:
- Provide administrative support - contacting key staff and other stakeholders, taking minutes of meetings and disseminating decisions taken at Command meetings, act as a point of contact at all times during the disruption;
 - Provide technical support to communications and IT systems which are necessary to the successful operation of the Control facility or facilities.

Facilities and equipment

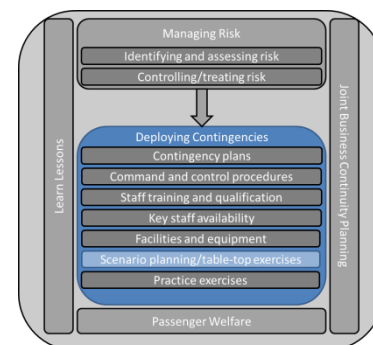
- 5.37 Each level of Command should have a dedicated control room with suitable facilities for monitoring all key major parts of the airport and for communicating with key members of staff and other airport stakeholders, including airlines, handling agents and emergency services. As appropriate, and certainly at the Silver and Gold levels, facilities must be provided for other stakeholders to participate in the Command meetings and to have a facility to communicate directly with their own command and control structures.



- 5.38 Back-up communications and other equipment must be provided to deal with potential loss of capabilities such as mobile phone networks and internet access. A back-up Command facility at each level should also be provided in a distinct location in case the main facility is incapacitated for whatever reason.
- 5.39 There should be a rigorous process to fully test the capabilities of the facilities and equipment regularly (at least annually). Good practice also suggests monthly checks with full power up of IT to enable updates to configure. Equipment tests can be included as part of brief, but frequent response, familiarisation training sessions for small groups.

Scenario Planning / Table-top Exercises

- 5.40 It is generally accepted that, in order to be useful in practice, Contingency Plans need to be regularly tested. This testing can either be through scenario planning “table-top” exercises, or on-the-ground practical exercises (discussed below).
- 5.41 Table-top exercises have the advantage of using far less resource than full scale practices and therefore are a valuable tool which should be used as frequently as practicable without using excessive resource.



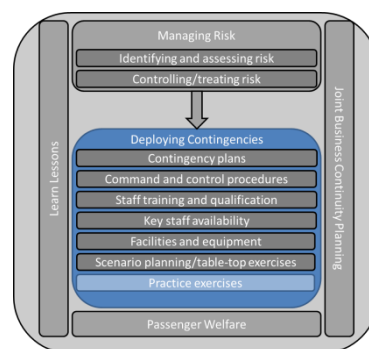
- 5.42 Given the wide variety of different scenarios for disruption, it is necessary to develop a coherent programme of table top exercises to ensure that all major contingencies are tested with a reasonable frequency (e.g. every two years). This is likely to imply at least four major table-top exercises each year. These exercises should involve Board level participation to ensure that the appropriate focus is

brought to bear and to ensure that any lessons emerging are likely to be taken into account. Exercises should cover both “true emergencies” such as aircraft accidents as well as other disruptive events such as severe weather, loss of infrastructure or failure of surface access.

- 5.43 Good practice would be for the programme of table-top exercises should be agreed with the main stakeholders (airlines, handling agents, emergency services) in advance, to ensure that all parties have the opportunity to comment on the suitability of the programme. Relevant stakeholders should also be given the opportunity to contribute to the design of individual exercises as well as taking part in the exercises themselves.
- 5.44 The exercises should be documented both during and afterwards, with a formal “wash-up” session taking place involving all major participants.

Practice Exercises

- 5.45 Despite the value of table top exercises, they are not a substitute for practical exercises to test contingency plans. Airports are obliged under CAP 168 to undertake a full-scale practice of handling an emergency situation (such as an aircraft accident) at least every two years, in order to maintain their aerodrome licence. There is, however, no legal obligation to undertake practices for other disruption events.



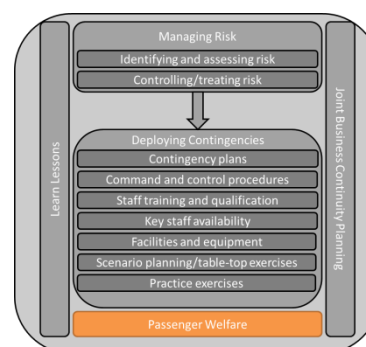
- 5.46 Despite this lack of legal obligation, good practice would be for airports also to undertake major practice exercises² for non-emergency disruptions (such as loss of significant infrastructure). Given the requirement to undertake emergency exercises every other year, it would be appropriate for the non-emergency practices to take place every two years (so that a major practice exercise, whether emergency or other, would be undertaken once per year). Note that such exercises should be in addition to annual snow disruption plan testing.
- 5.47 As with table-top exercises, the programme of practice events should be agreed with the airport’s main stakeholders (airlines, handling agents, emergency services) in advance, to ensure that all parties have the opportunity to comment on the suitability of the programme. Relevant stakeholders should also be given the opportunity to contribute to the design of individual exercises as well as taking part in the exercises themselves.
- 5.48 The exercises should be documented both during and afterwards, with a formal “wash-up” session taking place involving all major participants. Where major stakeholders request, a neutral facilitator should be used to collect the information about the event and establish the conclusions to be drawn.

² A major exercise implies the involvement of multiple stakeholders

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Passenger Welfare

5.49 A key driver for public concern about the operational resilience at airports is the widely reported very poor experiences of passengers in incidents at both Heathrow and Gatwick in recent years (involving long delays, crowding, difficulties in being provided refreshments or, where necessary, overnight accommodation). These experiences also have knock-on effects for those intending but unable to travel, as well as for family members.



5.50 The most important areas where the airport and airlines need to cooperate in the event of significant disruption are in relation to:

- The provision of information to passengers;
- Caring for passengers' physical needs.

5.51 In relation to passenger information, it is the airlines which have the direct contractual link with passengers and who therefore have passengers' contact details, allowing them send very targeted messages relating to, for example, cancellations and rebooking of flights. However, when at the airport, passengers are able to view the airport's flight information displays and hear announcements. It is essential that the messages passengers receive through these different channels are consistent and reflect a strategy for handling the disruption which has been agreed by both airport and airline.

5.52 In relation to passengers' physical needs, a major difficulty is that the boundaries between the responsibilities of airlines, with whom passengers have a commercial relationship, and of airports can be unclear. Airlines have definite responsibilities under EU Regulation 261/2004 covering air passengers' rights, which provides common rules on compensation and assistance to passengers in the event of denied boarding, flight cancellations, or long delays. These responsibilities include, *inter alia*, provision of refreshments after delays of two-four hours, depending on flight distance.

5.53 However, airports also have a duty of care to passengers (and other persons) on their premises and this would include provision of refreshments and accommodation, where not otherwise provided. While airlines have the primary responsibility for passenger welfare, the airport has a "backstop" responsibility to ensure welfare, especially when airlines fail to fulfil their obligations. This can result in confused responses, as well as to situations where airports provide assistance to passengers which they deem to be appropriate and subsequently claim compensation from airlines on the basis that the latter have the legal duty of care under Regulation 261.

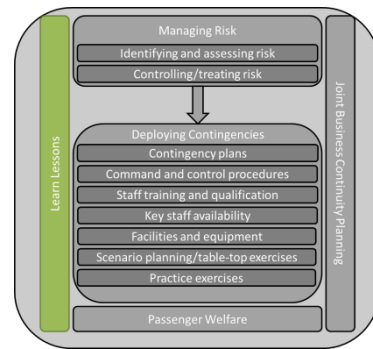
5.54 Airports and airlines must collectively ensure the welfare of passengers in situations of disruption. This is best delivered cooperatively between the organisations and contingency plans and delivery mechanisms must be designed to encourage and facilitate such cooperative behaviours. This would include ensuring both airports and airlines are involved in the Bronze Command and Control process

(assuming this is the appropriate level) with an agreed plan and clear roles agreed in advance and revalidated on the day.

- 5.55 Procedures for dealing with situations where airlines do not fulfil their obligations to passengers should be set out clearly and communicated with airlines. Airlines must be given the opportunity to fulfil their obligations using their own resources before any remedial airport action is implemented.

Learning Lessons

- 5.56 No risk or contingency management process will be flawless, so it is essential that suitable “wash-up sessions” be held after each disruption incident and each practice exercise. Following good practice these wash-up sessions should involve all relevant stakeholders (with stakeholders having the choice to determine whether they consider themselves relevant in each individual case), including front-line staff as well as senior personnel to ensure that the full breadth of experiences are captured.



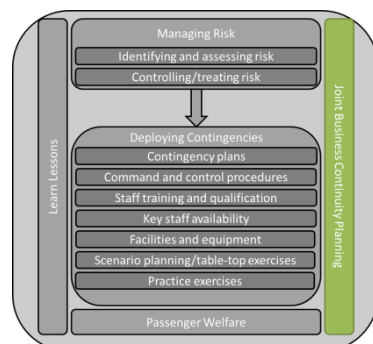
- 5.57 Where major stakeholders request, neutral, qualified moderators should facilitate wash-up sessions, so that an independent view of the successes and failures of the management of the incident or event is established. It would also provide the opportunity for confidential feedback to be provided, which might elicit more, and potentially valuable, information than in an open forum.

- 5.58 In safety critical occupations, various cultural practices have been adopted to reduce long term risk, in particular by encouraging openness about failures so as to avoid their repetition. Thus air crew have access to CHIRP, the UK confidential reporting programme for Aviation and Maritime³, which allows confidential reporting of all incidents. As an alternative, a “no blame culture” can be adopted, where staff are guaranteed not to be penalised for mistakes, on condition that they are reported. The concept of a “Just Culture”⁴ is similar, allowing people to make mistakes, although reckless behaviour is penalised.

- 5.59 Cultural practices should encourage openness about mistakes and help to ensure that these can be reduced in future. Examples of these practices include formally adopting a “Just Culture”, providing facilities for confidential reporting, or running regular (annual) confidential staff surveys which would incorporate questions on managing risk and disruption. The same approach should be adopted in relation to discussions with other stakeholders.

Joint Business Continuity Planning

- 5.60 The various organisations functioning at airports run operations which interact closely, but which are in many ways fundamentally different from each



³ See <https://www.chirp.co.uk/index.asp>

⁴ See <https://www.justculture.org/getting-to-know-just-culture/>

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other. Thus handling agents and the UK Border Force operate a relatively small range of services, airlines operate networks across the world, while airports themselves need to manage the facilities for a very disparate range of operations, as well as handling passengers, staff and other visitors.

- 5.61 It is therefore to be expected that these different organisations will have different approaches to handling disruption. For airlines, dealing with disruption can mean diverting flights or substituting aircraft across their whole networks, but with little interest in parts of the airport which they do not use, whereas the airport is focused on the whole airport estate but does not focus on any network implications for airlines.
- 5.62 For this reason, it does not make sense for risk and contingency management by these very different organisations to be merged - they will continue to need to operate separate processes. However, there is clear value in significant interaction between the different organisations, particularly where:
- There are joint responsibilities, such as for passenger welfare;
 - Problems and potential solutions for one party affect the other (such as infrastructure or aircraft technical problems);
 - There are constraints on capacity which mean that not all planned flights can be accommodated; or
 - The preferred response to a problem differs between the organisations due to having fundamentally different business models.
- 5.63 Recognising these interdependencies, it is important that airports involve their key stakeholders in all stages of the risk and contingency management process. In some cases, some airlines, handling agents or other stakeholders may not wish to participate in particular consultations, practice exercises or other activities, but the important thing is that the opportunity should be provided. This should apply to:
- Identifying and assessing risk;
 - Controlling / treating risk;
 - Agreeing processes for ensuring passenger welfare;
 - Developing and reviewing contingency plans
 - Reviewing, training for and practising command and control procedures;
 - Determining which scenario planning / table top exercises should take place as well as participating in them;
 - Determining which practice exercises should take place as well as participating in them.
- 5.64 In order to achieve this level of involvement, regular formal meetings need to be established. These would include meetings involving top management from the various organisations at least annually, with a supporting working group meeting at least four times per year.

Summary

- 5.65 This chapter has outlined best practice for airport operational resilience following the structure of the Business Continuity Framework developed in chapter 3, based on evidence from the international aviation industry and from other industries. In

Chapter 6 we assess HAL's and GAL's performance against this framework based on our review of the information provided to us by the airports and evidence from stakeholder consultation.

6 High Level Assessment of HAL’s and GAL’s Existing Operational Resilience Plans

Introduction

- 6.1 This chapter reviews the performance of HAL’s and GAL’s operational resilience plans against the best practice for airport operational resilience identified in chapter 5. This is a high-level review based on discussions with the two airports and a review of the documents provided, as well as with discussions with other stakeholders. A detailed review of the contents of all the airports’ contingency plans was outside the scope of work.
- 6.2 The review follows the structure of the framework set out in chapter 3, separately for each airport.

HAL’s Operational Resilience Plans

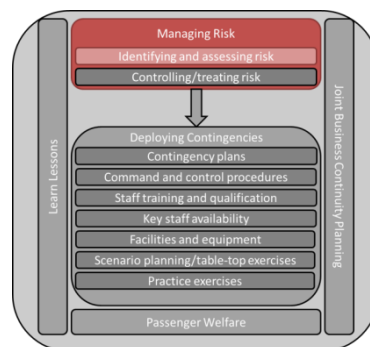
Emergency and other operational disruption

- 6.3 HAL has a detailed set of procedures for Emergency Orders, which deal with full emergency situations such as aircraft accidents. There is an Emergency Operations Group consisting of the airport, airlines, handling agents and emergency services. As required under CAP 168 a full emergency exercise is carried out every two years.
- 6.4 There are also detailed plans for certain other disruption events, in particular for snow disruption and aviation fuel shortages. In addition to these detailed plans, a very large number of other plans of varying levels of detail exist (discussed below at paragraph 6.14).
- 6.5 Stakeholders generally agreed that the emergency plans were well developed and communicated, as was the Snow Plan, for which a suitable practice exercise was undertaken each year in advance of the winter. Airlines considered that there was less emphasis on other operational disruption situations by HAL and airlines had less awareness of the airport’s plans for these contingencies.

Managing Risks

Identifying and assessing risk

- 6.6 The HAL Audit Committee meets twice a year, the Executive meets quarterly and Business Units meet monthly, in order to discuss risks. Business Units are tasked with preventing and planning for risks. A 5x5 risk matrix is created and a risk register kept for every function. These processes are all internal to HAL, but will involve external (and internal) experts in any discussion as relevant. For example, risk assessments relating to baggage systems will involve the relevant contractor. A full review of IT systems is carried out every two years. HAL stated that its risk processes follow the principles of ISO 31000.

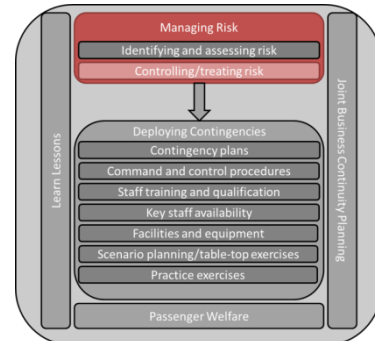


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6.7 Airlines commented that there was a lack of involvement at the risk identification stage and felt that there should be more communication, formalisation and coordination. NATS, which attends the Heathrow Operational Stakeholder Board was satisfied with its involvement.

Controlling/treating risk

6.8 Resilience is designed into new facilities and risks mitigated, using the risk register and risk criticality matrix (likelihood x impact 5x5 matrix) developed in the risk assessment process. This is used to help prioritise investments, alongside other factors. This is reviewed in the Capital Transition Group, which feeds into the Portfolio Assurance Board, which the airlines attend.



6.9 Airport resilience is a specific item in the capital programme for the airport. Any particular project is sponsored and goes through a series of sign-off “gateways”. HAL stated that airlines are able to involved with this programme if they wish.

6.10 When preparing for big events (such as resurfacing a runway), detailed plans are developed, lessons learnt from previous activities and contingency built into the schedule.

6.11 The risk criticality matrix is used for assessing existing infrastructure risks. System testing is carried out and repetitive problems identified, as is the lead time to fix issues identified. A programme to reduce single points of failure in IT systems is underway. The CIOs of HAL and the airlines in an Aviation Industry Special Interest Group on a quarterly basis to discuss threats such as cyber security.

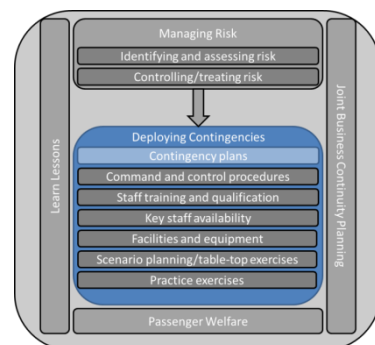
6.12 Stakeholders were aware of the capital plan elements relating to risk mitigation. The AOC noted that £131million had been allowed for in the capex plan for the construction of fuel storage works.

6.13 One stakeholder also considered it a lost opportunity that the temporary terminal built for the Olympics had been dismantled afterwards as this could have provided additional resilience. HAL stated that although the physical structure is no longer in place the power and IT infrastructure remains. Retaining the temporary terminal would have had associated operating and capital costs and given the level of risk, this has not been prioritised within the Q6 budget. BA noted that it used the National Risk Register as a tool for developing its own risk management plans.

Deploying Contingencies

Contingency Plans

6.14 HAL has a stock of over 300 pre-prepared “contingency plans”. We have been provided with a sample of these, which vary in the level of information provided. The Emergency Orders plan is over 300 pages long and deals with true emergencies, such as aircraft accidents. For emergency situations there are plans dealing with arrangements for the Survivors Reception Centre



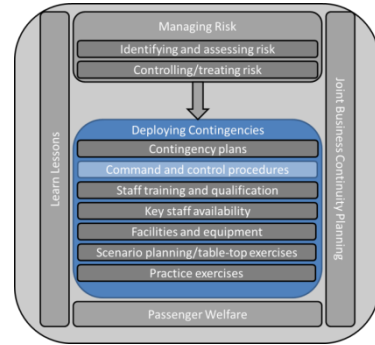
and Friends & Family reception.

- 6.15 In relation to other operational contingencies, we have reviewed detailed plans on:
- The Aerodrome Snow Plan; and
 - The Fuel Contingency Plan.
- 6.16 The Snow Plan sets out detailed plans for clearing the aerodrome in the event of snow, with information on contacts, command and control structures and communications protocols as well as information on the activation process in relation to weather reports, clearance requirements for runways and taxiways, availability of de-icing fluid, locations for disposing of cleared snow, etc. The Fuel Plan provides details on how fuel supplies should be allocated in the event of a disruption to supplies to the airport, as well as the group that will manage this (which includes the airport, airlines AOC, the base carriers and fuel suppliers). Both plans were updated in Autumn 2013.
- 6.17 There are a number of plans with an intermediate level of detail, such as the main road tunnel evacuation and evacuation landside to airside, which contain specific information, such as diagrams and locations for particular activities. The generality of plans, based on our review of a sample provided by HAL relate to the loss of various facilities such as check-in, immigration, utilities, water, public address system, etc., in each terminal (with separate plans for each terminal), together with equivalent plans for landside (roads, car parks, etc.) and non-passenger accessible parts of the airport (engineering, security, etc.). Many of these plans are simply checklists of activities for the various staff responsible for dealing with those situations, and can be regarded as “procedures” rather than full contingency plans. They do not include any contact details or supporting information on helping to address the problem.
- 6.18 In relation to passenger welfare, there are a large number of detailed plans describing the handling of issues from dealing with survivors to problems with transport and catering, as well as setting out roles and responsibilities and the protocols for activating reservists.
- 6.19 Airlines generally felt there was not much collaboration between the airport and airlines outside of the Emergency Orders and Snow Plans (which were considered to be very good since their modification in the light of snow events of recent years). More involvement was considered desirable, particular on plans for which coordination between airlines and airports was required.
- 6.20 NATS felt that it had the right level of involvement in plan development and had clarity about likely responses.
- 6.21 The process for managing loss of airport capacity is considered under Workstream 2 of this study and so is not discussed here.

Workstream 3: Developing CAA Guidance

Command and Control Procedures

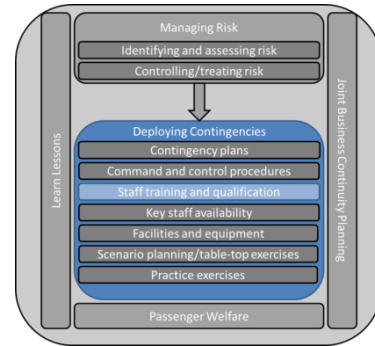
HAL uses the standard integrated emergency management (IEM) command and control structure (hierarchy of Gold, Silver and Bronze levels). It has fully equipped dedicated facilities for the Bronze and Silver command functions, with Gold being set up in the Board Room in the Compass Centre. Back-up facilities are available at different locations on the airport.



- 6.22 HAL is investing in a new airport control centre, APOC, which will be operational later this year.
- 6.23 Detailed handbooks for Gold, Silver and Bronze Commanders exist, containing information on procedures, checklists, roles, levels of authority (and levels of spend authorisation), as well as contact details for key personnel.
- 6.24 NATS and the airlines consulted were happy with the command and control procedures in place.

Staff Training and Qualification

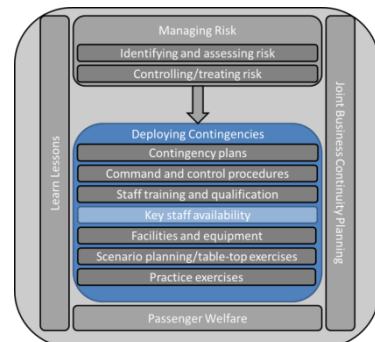
- 6.25 We did not receive any detailed information on training for airport staff, nor for the qualification process required for staff to take on Commander roles. The airlines stated that they do not have visibility of the training offered by HAL to its Bronze, Silver and Gold Commanders and noted that some HAL Commanders, while senior personnel, may not have operational experience. Subsequently HAL has informed us that commanders at all levels undergo a sign off process before they are added to the roster and that all Bronze commanders are Operational Directors.



- 6.26 BA noted that in its own command and control procedures it had developed in-house Behavioural Training to ensure those that attend command meetings are comfortable and able to make sensible decisions in a high pressure environment.
- 6.27 The AOC noted that there were training programmes and joint running initiatives run by HAL but felt that further investment in training was needed to increase knowledge and confidence.
- 6.28 NATS thought there could be better training. They considered that the Snow plan exercising was good but HAL could do more in other areas.

Key staff availability

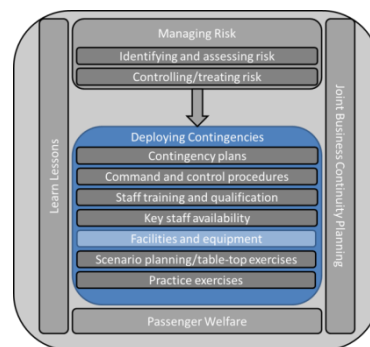
- 6.29 Staff are rostered so that a command and control commander at each level is always available. We have not reviewed these rosters, nor qualifications of the staff rostered to those roles.



Facilities and equipment

6.30 As noted above, HAL has dedicated facilities, with backup locations, for each of the Bronze, Silver and Gold command levels. Based on our visit, these appeared to be well equipped.

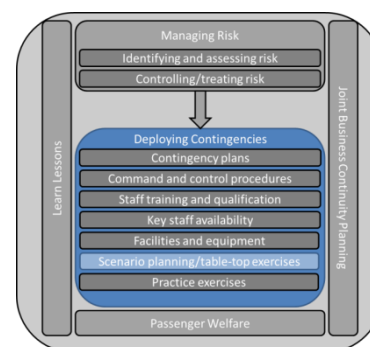
6.31 The Bronze and Silver control room has facilities for airline representatives to attend and HAL provides induction to airline employees who may attend Silver command meetings. The facilities are considered good by airlines, who are generally happy with the communication and organisation of the command and control processes.



Scenario planning, table-top exercises

6.32 HAL stated that all contingency plans are exercised, with the Business Resilience team overseeing two exercises each quarter and the exercises chosen varying according to the facility concerned.

6.33 The airlines did not feel aware of what dry run and table top exercises were taking place. Generally, the airlines felt there should be more practice exercises and that there should be more experience of working together (i.e. airlines and the airport). The airlines do not get involved in selecting the exercises to undertake and would like to see a wider variety beyond the normal aircraft accident and severe weather (generally snow) exercises of which they are aware (for example on power outages). However, HAL has informed us that within the Emergency Operations Group the airlines and handlers are asked to nominate exercise scenarios.

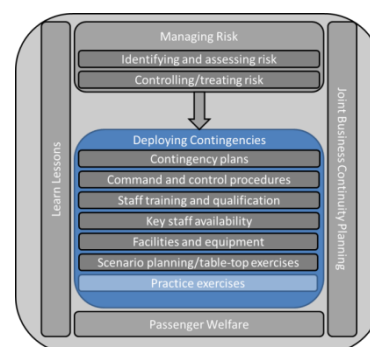


6.34 NATS said that there was regular, monthly, testing of the snow plan involving them.

Practice exercises

6.35 The CAA emergency exercise required under CAP 168 takes place every two years. In addition HAL also carries out an airfield exercise, a reception centre exercise and other exercises involving airlines, handlers and the emergency services.

6.36 BA stated that it was always involved in the licensing exercise and regular testing. While BA undertook its own winter resilience training, there was no combined exercise. However, HAL has informed us that the airport was involved in BA's winter and Command and Control exercises. The AOC noted that there were practice exercises for sweeping the runway and dummy de-icing processes as part of the snow plan preparations. It considered that practices need to be recurrent to bring the roles, responsibilities etc. to the forefront of people's minds.



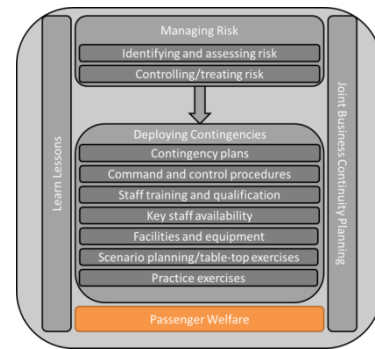
Workstream 3: Developing CAA Guidance

Passenger Welfare

6.37 As noted above, HAL has a detailed set of procedures for passenger welfare. It maintains a team of volunteers from the public who are used on busy days but not crisis events. They are trained and deployed once a month for familiarisation, from 1-200 people). HAL employees can volunteer to act as reservists whilst Command and Control teams are on call on a 1-in-6 or 1-in-3 rota.

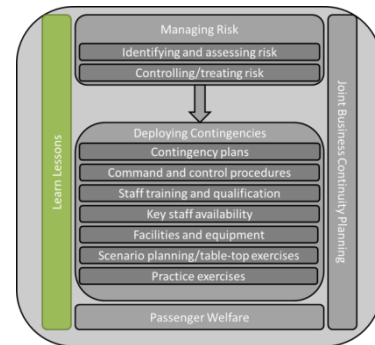
6.38 The formal welfare team consists of 50 people set up following the Begg Report. HAL has a mobile welfare team in the terminals. The people used in crisis teams are taken from Compass Centre based staff.

6.39 The AOC acknowledged that HAL has a huge welfare plan and was aware of the volunteers. However, BA stated that it would like to engage more with HAL on this.



Learning Lessons.

6.40 HAL runs internal wash ups and police wash ups after certain events (for example the BA 764 accident in 2013). The timing of these are dependent on the event, and after a practice exercise there may be a hot wash up (1 hour afterwards) and a cold wash up (1 day - 1 month after an event). For example the multi-agency Reception Centre wash-up for the BA 762 incident took place on the 18th June even though the incident took place on the 25th May.



6.41 The Heathrow Resilience Partnership, which involves the airport and airlines and which meets quarterly is an opportunity for discussion and feeding learning into plans.

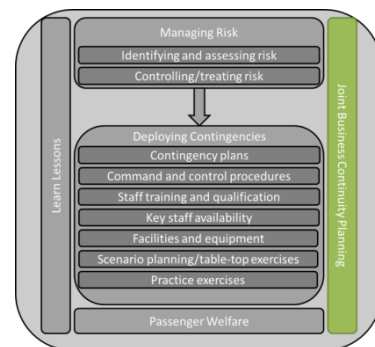
6.42 The AOC noted that in addition to the airlines, the involvement of handling agents is critical to capturing learning from both practices and actual incidents.

Joint Business Continuity Planning

6.43 HAL stated that Joint continuity planning was easier in Terminal 5, where it only had a single airline, BA, to work with. There is a monthly meeting on resilience planning involving the BA and HAL resilience teams. This was more difficult in other terminals.

6.44 The AOC would like to see a joined up system providing “a single version of the truth” with appropriate behavioural rules.

6.45 While keen to work with the airport, airlines generally wanted HAL to act as a coordinator rather than enforcing its views of contingency planning on the airlines. BA in particular was against the airport Conditions of Use being used as a way of enforcing any compliance on airlines.



GAL's Operational Resilience Plans

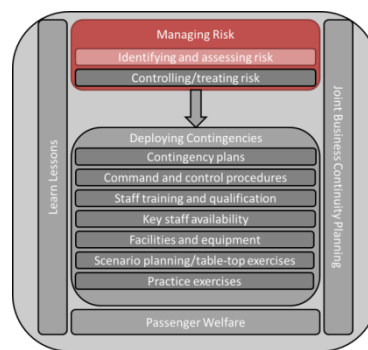
Emergency and other operational disruption

- 6.1 GAL maintains Emergency Orders procedures, which cover procedures for aircraft accidents and is focused on the emergency services, a reception centre for survivors and handling relatives. A relicensing exercise is undertaken every 18 months (alternating nighttime and daytime exercises), conforming to the requirements of CAP 168.
- 6.2 In addition, there are detailed plans for a number of disruption events, including snow disruption, terminal evacuation, terminal overcrowding and disruption to traffic access to the airport and local area.
- 6.3 Stakeholders were generally familiar with and content with the emergency procedures and with the snow plans, but had less knowledge of the other plans.

Managing Risks

Identifying and assessing risk

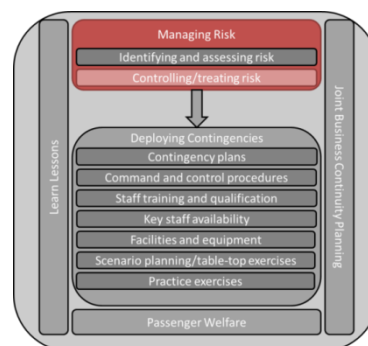
- 6.4 GAL has a framework for risk management - covering both strategic and operational risks. There is a company risk register that is developed both top down and bottom up and each department has its own register. There are twice yearly reviews of the risk register by the Executive, Board and Audit Committee. The main airport functions meet twice a year to challenge the content of the risk register and review mitigation measures, with new and emerging risks also being identified.



- 6.5 The airlines did not feel they had much involvement in the risk identification stage of the process. Some airlines felt there should be an annual review of risks jointly with the airport, while others only wanted to be involved on issues such as fuel supply and de-icing capability risks.
- 6.6 NATS stated that it was involved in forums to assess risk and was engaged with this process which it felt was adequate.

Controlling/treating risk

- 6.7 GAL hosts a regular Gatwick Resilience Planning Group, which is a sub-group of the Sussex Resilience Forum. This generally involves local councils, NATS and the emergency services and while airlines can have an input, GAL felt they generally had a “low appetite” to do so. This forum looks at wider risks and sets the agenda for the year, including the programme for practice exercises over the year (generally for security-focused issues).



- 6.8 In response to the disruption due to flooding on 24th December 2013 and the recommendations of the McMillan report on the incident, the airport intends to work more closely with airlines to manage operational resilience, including risk mitigation. A presentation of the planned approach was made to the AOC on 25th

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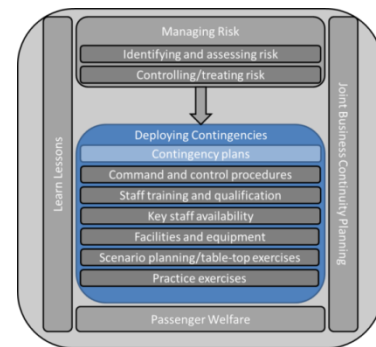
April. The views of those in attendance are that they will require more detail of the level of involvement needed and there were some initial concerns over the planned timescales for this.

- 6.9 Asset renewals form an important part of the airport’s capital programme and contribute to risk reduction and, conversely, when new risks are identified this triggers a review of the capital investment programme. The airlines have been involved in the definition of this programme as part of the Constructive Engagement process in the regulatory process and take part in an annual capital expenditure review.

Deploying Contingencies

Contingency Plans

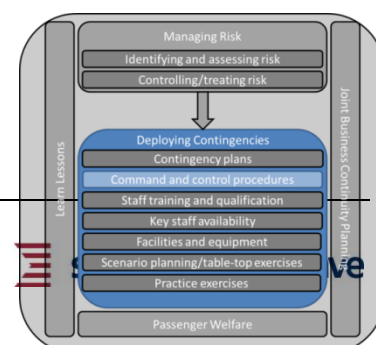
- 6.10 GAL has a stock of over 100 pre-prepared “contingency plans”. We have been provided with a sample of the most important of these. In addition to those noted above (snow disruption, terminal evacuation, terminal overcrowding and disruption to traffic access), other plans cover eventualities such as a general airport-wide disruption plan, a general facilities disruption plan, fire alarm system failure, flood emergency response and the loss of utilities. There is a passenger welfare plan to deal with the situation when airlines do not provide the support they should to passengers during disruption.



- 6.11 The general level of detail in the plans we reviewed appeared to be appropriate, with the processes to follow, people to be involved and their contact details and supporting information to help with decision making generally provided.
- 6.12 As noted in our review of the 24th December flooding event, there is no plan specifically covering the mass transfer of passengers between the terminals.
- 6.13 GAL stated that plans were shared with airlines through the AOC. The Airport Airline Group (AAG), formerly the Joint Steering Group, meets regularly and could be used for discussions on resilience issues. GAL works closely with its two largest airlines, BA and EasyJet.
- 6.14 The airlines were aware of the detail of the snow plan, but not generally of other plans of common interest, such as a failure of the track transit system (inter-terminal shuttle) or terminal power outages. Generally the airlines would welcome more involvement in collaborating on contingency planning (and also felt that handling agents should be involved given their large role at the airport).
- 6.15 The airlines felt the AOC would be a good forum to share contingency plans and the AAG a suitable forum for more strategic cooperation on managing resilience and for defining the practice exercise programme.

Command and Control Procedures

- 6.16 GAL uses the standard integrated emergency management (IEM) command and control structure (hierarchy of Gold, Silver and Bronze levels). It has

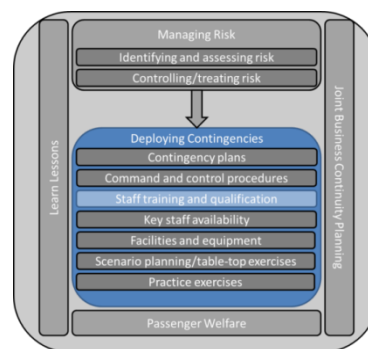


fully equipped dedicated facilities for the Bronze and Silver command functions. We did not see the Gold facilities. There are backup locations for the command functions off-airport.

- 6.17 The approach to the command and control process is set out in an Incident and Crisis Management (ICM) Manual, which sets out the roles and processes associated with each tier of the command and control structure.
- 6.18 It was clear from our review of the 24th December flooding event (and of the McMillan Report) that there are concerns from the airline community about the clarity and criteria for invoking the different levels of command and control, and about the levels of authority invested in the Commander at each level. In addition there was a concern that the command and control groups were not always provided with sufficient administrative support. GAL has committed to implement the recommendations of the McMillan Report, which should therefore include addressing these issues.

Staff Training and Qualification

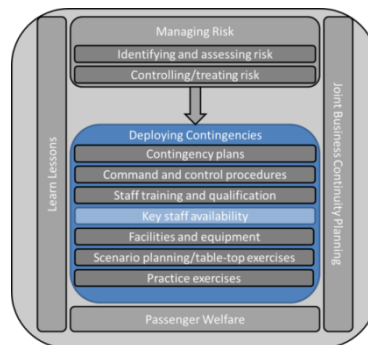
- 6.19 GAL stated that training was provided for Gold, Silver and Bronze commanders, people who log issues and facilitators. There are pre-requisite training and refresher training courses. Training for the silver level is through participation in exercises, while Bronze meets so frequently that an induction is not considered to be needed.



- 6.20 The airlines were not aware of any formal training or induction for the Command and Control process (except via participation in practice exercises and real incidents).

Key staff availability

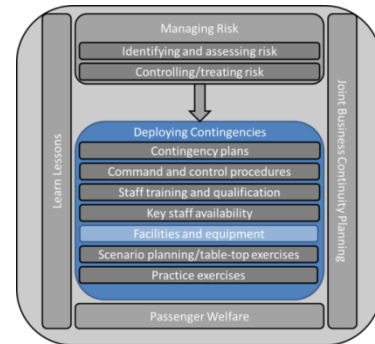
- 6.21 While staff are rostered to be available for the different command and control levels. It is not clear what criteria are used to determine whether staff have the necessary experience and expertise to undertake the tier Commander roles. For example GAL recently brought the Head of Retail into the Duty Senior Manager (Silver Commander) population, although it is not clear that this role implies a depth of operational experience.



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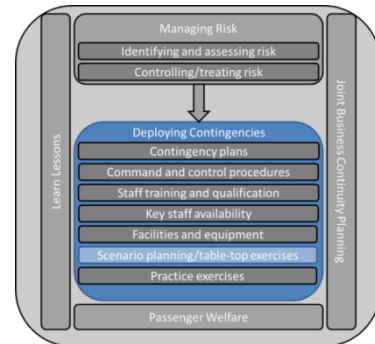
Facilities and equipment

- 6.22 While the equipment and facilities in the control suites appears adequate, as noted in the McMillan Report, more administrative support is needed to record events and disseminate decisions. The sound quality of the links to the Silver Suite was sometimes found to be poor during the disruption on 24th December.



Scenario planning/ table-top exercises

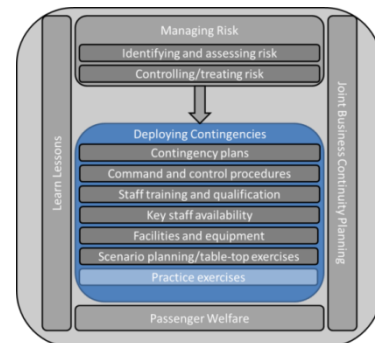
- 6.23 GAL has a programme of specific contingency plan testing. The airport uses external consultants to run this and undertakes one major and one minor training exercise for the crisis management team per annum. The team is then scored on a red/amber/green scale against its objectives.



- 6.24 The airlines generally feel that there are insufficient table-top exercises and that they are not well informed about these. They would like to be involved in the process of determining which exercises are undertaken and would like to participate in more such events. They also believe that the ground handlers at the airport should be involved. NATS stated that they were involved in a regular desktop exercise for the winter resilience plan.

Practice exercises

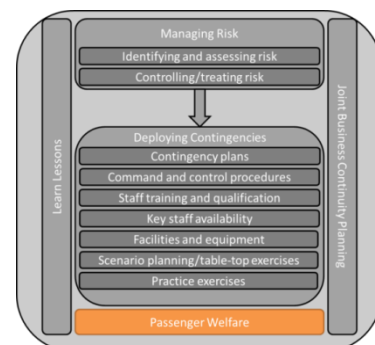
- 6.25 GAL provided information on the various practice exercises involving the airlines and/or handling agents undertaken in recent years. This indicated that there was one exercise in 2010, two in 2011, one in 2012 and three in 2013. GAL stated that the airlines had never expressed concerns about the types of exercises undertaken.



- 6.26 Stakeholders stated that they were keen to be involved in more practice exercises as well as in the selection of the exercises to be undertaken. This would be consistent with best practice, but may require additional resource from stakeholders, so will be dependent on their active cooperation to be achieved. The use of an umpire to evaluate events was considered helpful.

Passenger Welfare

- 6.27 During the flooding event on 24th December 2013, passenger welfare suffered badly with poor coordination between the airport and airlines, as was noted in the McMillan Report. GAL has accepted McMillan's recommendation that the airport appoint a "Passenger Captain" for each terminal to look after passengers' interests during disruption situations. It is not clear if this has yet



taken place.

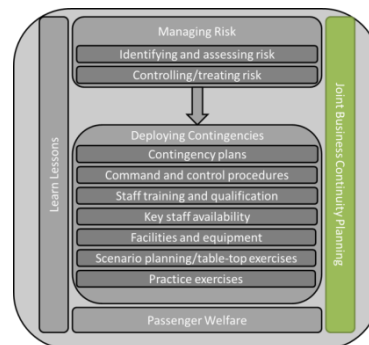
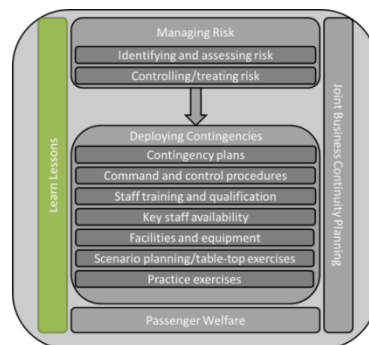
- 6.28 The airlines are keen to engage with GAL on this, but consider that GAL’s role should be to facilitate, with the airlines retaining the primary role in supporting their passengers in disruption situations.
- 6.29 An example of where the airport and airlines could cooperate is in identifying relevant facilities around the airport campus to help passengers, in particular rooms and other hotel facilities when passengers suffer significant delays or cancellations.

Learning Lessons

- 6.30 The McMillan Report identified a number of important lessons from the events of 24th December, which GAL has committed to implement. As noted above, the airport intends to work more closely with the airlines on operational resilience issues, although discussions on how this will work are only just getting underway.

Joint Business Continuity Planning

- 6.31 As noted above, the airport intends to cooperate more closely with airlines on operational resilience in future. The AOC and the AAG have been suggested as forums where this could take place. However, it should be noted that the involvement of NATS and handling agents, as well as of other organisations such as the emergency services and UK Border Force, who do not participate in these forums, was also considered to be important, so this may not be sufficient.



- 6.32 An initial meeting has been held between the airport and airline representatives to foster closer cooperation, at which GAL presented its initial proposals for this process. The airlines’ view was that further work will be required to define roles and that considerable additional work was needed to make this process effective.

Summary Assessment

- 6.33 Based on the review of different aspects of the airports’ resilience plans and associated processes above, as well as on the best practice airport operational resilience planning set out in chapter 5, we set out below a summary assessment of the plans, highlighting strengths and weaknesses. In general, because the positive aspects and the areas where improvements appear most desirable are similar for the two airports, the summary considers both airports together, but highlights instances where there are differences in emphasis between them. Where we identify areas for improvements, we also make suggestions for better ways of working.

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Strengths

Emergency and other operational disruption

- 6.34 The airports have well developed plans for dealing with emergency situations, with suitable arrangements for dealing with the incident (e.g. aircraft accident) itself, as well as for handling survivors and relatives of involved passengers. The plans for such incidents are properly exercised and airport stakeholders are involved in this process and have confidence in the procedures. Both airports satisfy the requirements of CAP 168 (and corresponding international regulations) in this respect.
- 6.35 The airports have effective plans for dealing with snow disruption and other stakeholders, including the airlines, have confidence in their effectiveness. In recent years the plans have been exercised regularly.

Managing risks

- 6.36 The airports have structured processes for identifying and assessing risks following accepted principles (such as use of 5x5 likelihood vs. impact matrices) with regular internal reviews at appropriately senior levels.
- 6.37 The capital programmes at each airport includes elements specifically designed to reduce risk through maintenance capital expenditure and new developments to improve resilience. The airlines are involved in formal discussions on the elements included in these capital programmes.

Deploying Contingencies

- 6.38 The airports each have a stock of pre-developed contingency plans to deal with a wide range of plausible consequences of potential disruption event (such as accidents, severe weather, loss of utility services, terminal evacuation). These plans all set out checklists of actions to follow by responsible personnel and some contain considerably more detail to support decision making and mitigating actions (e.g. locations to dump cleared snow or to hold evacuated passengers).
- 6.39 The airports each operate the standard integrated emergency management (IEM) command and control structure (hierarchy of Gold, Silver and Bronze levels), and have suitable facilities and equipment to support these processes. The Command facilities allow for effective communications with the emergency services, NATS, airlines and handling agents.

Passenger welfare

- 6.40 The airports take passenger welfare very seriously. In the case of Heathrow, a large organisation has been created with detailed plans for a number of contingency events and with regular practice events, and with back-up stores and equipment. This is recognised by the airlines as being effective. In the case of Gatwick, the airline has set up teams of volunteer staff, and facilities to back up airlines' support for passengers suffering delays or cancellations. The airport is intending to establish "Passenger Captains" for each terminal as suggested in the McMillan Report.

Learning Lessons

- 6.41 The airports have processes for capturing feedback from incidents and practice exercises.

Joint Business Continuity Planning

- 6.42 The airports both have forums for discussing risk and contingency management with airlines. These are perceived by the airlines to work well in a number of areas, in particular emergency planning, developing the capital programme and the snow disruption plan processes.

Areas for improvement

Emergency and other operational disruption

- 6.43 While the emergency exercises are carried out at the frequency specified in CAP 168, there could be a case for ensuring at least one operational disruption exercise is undertaken annually.

Managing risks

- 6.44 The airlines at the two airports did not feel they were sufficiently involved in the risk identification and assessment processes undertaken by the airport.
- The airports should establish formal processes to discuss risks and how they might be avoided or mitigated with other stakeholders. These should include at least annual meetings at a senior level, with additional discussions more frequently at the working level. Major airlines, in particular, should be strongly encouraged to support these processes, although cannot be compelled to do so. The airports' obligations would be deemed to be fulfilled through providing the opportunity for engagement.

Deploying Contingencies

- 6.45 Concern was expressed by airlines about the level of operational experience, the level of experience of managing disruptions and the effective level of delegated authority of the integrated emergency management processes, especially at the Silver and Gold Commander levels.
- Formal training, practices and testing of Commanders needs to be put in place to ensure that all stakeholders have full confidence in the Commanders.
 - Levels of delegated authority for Commanders should be appropriate, and should allow significant decisions to be taken, including committing of expenditure, by the Commanders to allow the person in charge at the airport to manage the situation effectively.
- 6.46 While joint scenario planning and table top exercises, as well as practical exercises, are undertaken with airlines and other stakeholders, these are relatively infrequent and there is little opportunity for stakeholders to feed into the specification of the exercises undertaken.
- Increasing involvement and collaboration between airport stakeholders in the specification of exercises undertaken
- 6.47 Whilst Gatwick has a Crisis Management Manual and Heathrow has a similar document to cover Emergency Orders there remains scope for an overarching contingency plan document that includes all the principles to be followed when a disruptive event occurs.

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- Heathrow should develop an overarching contingency plan document and both airports should consult with airlines and other stakeholders to validate the existing documents.

6.48 Some of the pre-prepared contingency plans appear to be simple check-lists, rather than containing much information on how to resolve the problem encountered.

- It might be appropriate to have a smaller number of plans, each covering a wider range of situations and containing more information, including contact details for key personnel.

Passenger welfare

6.49 The processes for managing this need to be improved at Gatwick, as recognised by the airport following the McMillan Report. At both airports, formal arrangements should be enhanced to ensure coordination of responses with airlines in disruption situations, to ensure a seamless service to passengers and to avoid disputes over responsibility and liability under Regulation 261/2004.

Learning lessons

6.50 While the airports have internal processes for learning from incidents and practice exercises, there do not appear to be formal joint review processes involving other stakeholders.

6.51 Unlike the situation at airline and Air Navigation Service Providers, it is not clear that airport operators actively employ processes which encourage full and open feedback from personnel.

- The airports should establish, or more strongly promote existing internal systems to allow confidential reporting and establish a no-blame or “just culture” in which reporting of honest mistakes does not lead to sanctions or career damage. A confidential internal staff survey, including questions on the handling of disruption, should be carried out annually by a reputable external organisation. Equivalent procedures should be adopted in relation to communications with other stakeholders.

Joint Business Continuity Planning

6.52 While the airports do work with airlines on some aspects of operational resilience, cooperation does not take place throughout the process, in particular in risk assessment, determining the plans for table-top and exercises and learning lessons after the event.

- Cooperation should be formalised throughout the operational resilience management process.

Summary of Recommendations for Airports

- 6.53 The following summarises our recommendations for improvements to the two airports' resilience planning processes (which are generally applicable to both, though with different emphases):
- Establish formal processes to discuss risks and how they might be avoided or mitigated with other stakeholders. The airports' obligations would be deemed to be fulfilled through providing the opportunity for engagement.
 - Formal training, practices and testing of Commanders.
 - Levels of delegated authority for Commanders to be made appropriate.
 - Increasing the involvement and collaboration between airport stakeholders in the specification of exercises undertaken.
 - Development of an overarching contingency plan document that includes all the principles to be followed when a disruptive event occurs.
 - Development of a smaller number of plans, each covering a wider range of situations and containing more information, including contact details for key personnel.
 - The airports should establish, or more strongly promote existing internal systems to allow confidential reporting and establish a no-blame or "just culture"
 - Joint Business Continuity Planning Cooperation should be formalised throughout the operational resilience management process.

7 Initial Proposals on CAA Guidance

- 7.1 In its notices proposing to grant licences to Heathrow and Gatwick Airports, published in January 2014, the CAA set out draft Guidance on operational resilience to each airport. Essentially this Guidance is the same for the two airports, although the relationship of the Guidance to the Licence Conditions for each airport is different (because of the different ways in which the Licence Conditions are implemented).
- 7.2 A key objective of this study is to provide advice to the CAA on what should be included in this guidance, highlighting where this is not covered in the draft guidance issued in January.
- 7.3 The next section sets out the scope and content of the draft guidance. This is followed by a brief summary of recommendations on resilience made by the McMillan Report and by the Transport Select Committee. Later sections cover of view of what modifications we propose and how the adherence to the requirements should be monitored.

CAA Draft Guidance on Operational Resilience Planning

- 7.4 The scope of the guidance relates to resilience plans for the activities for which the airport is directly responsible, including:
- access to key infrastructure at the airport (such as the terminals, runway or airfield);
 - IT systems;
 - key suppliers; or
 - key staff.
- 7.5 Where key infrastructure is not operated by the airport (e.g. the fuel farm), the scope does not include the continuous provision of supply of services provided by those facilities, but would include plans to deal with the effect of disruption of the service on the airport's own operations.
- 7.6 The draft guidance includes requirements to:
- Undertake risk assessments for the infrastructure under its control and for the services it offers at the airport;
 - Have in place clear management processes and clear communication plans in place for remedying and dealing with the impacts of the loss of that infrastructure or service;
 - Provide for passenger welfare, including dissemination of information and acting as a backstop to airlines where the latter are unable to fulfil their obligations; and
 - Maintain solid day-to-day working relations, possibly through the development of formal business continuity models and to liaise with stakeholders about each other's continuity plans, focusing on key stakeholders such as the larger airlines, police, UK Border Force and local authorities.

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- 7.7 We consider that the scope and requirements of the Draft Guidance are generally appropriate, covering the large majority of areas of concern. However, we consider that the requirements need to be strengthened, based on the framework for operational resilience developed in chapters 3 to 5 and on our assessment of HAL's and GAL's resilience plans in Chapter 6.
- 7.8 We also consider that the airports' conformity with the guidance is likely to be open to a considerable breadth of interpretation and that it is therefore necessary for a monitoring process to be put in place. This relates to the question raised in the Terms of Reference about the extent to which the CAA should audit the resilience plans, and is discussed below following our proposed modifications to the Draft Guidance.

McMillan and Transport Select Committee Recommendations on Resilience Planning

- 7.9 We set out below some of the most relevant conclusions of the McMillan and Transport Select Committee reports on the events of 24th December at Gatwick Airport. These are taken into account in our proposed modifications to the CAA's Draft Guidance.

McMillan Report

- 7.10 The McMillan Report made a number of recommendations relevant to the CAA Guidance on resilience planning.
- 7.11 In relation to crisis management, McMillan recommended that:
- Industry norms for the invocation of the Bronze, Silver and Gold levels be adopted;
 - Rosters should ensure that airport executive management team member with suitable operational experience is always present; and
 - Sufficient resources should be made available to ensure decisions were captured and effectively communicated.
- 7.12 McMillan recommended that there should be a greater focus on passenger welfare, including:
- The appointment of Passenger Captains for each terminal to focus on passengers' needs;
 - Agreement between airport and airlines on protocols for communicating with passengers.
- 7.13 In relation to contingency plans, he recommended that:
- The Airport's Contingency Plans should be reviewed, in close collaboration with airlines and ground handlers;
 - All plans should be made available to the entire airport community; and
 - Joint contingency plans should be agreed between GAL and airlines, providing for "open book" style information and joint decision processes in times of crisis.

Transport Select Committee

7.14 The Transport Select Committee Report also made a number of recommendations.

7.15 In relation to the command and control process, the Committee stated that:

■ “It is basic good practice for meetings to be minuted in such a way as to identify agreed actions and for those minutes to be shared with, and agreed by, participants. We recommend that, as part of its oversight of operational resilience at Heathrow and Gatwick, the Civil Aviation Authority ensure that this good practice is followed in future.”

7.16 In relation to passenger welfare, the Committee endorsed the McMillan Report’s suggestion of the appointment of Passenger Captains. They also stated that:

■ “Passengers [should be]... kept informed during times of disruption and that information provision is consistent across different means of communication.”

7.17 In relation to contingency plans, the Committee expressed concern that the major airlines had not been involved in the development of such plans. They stated that:

■ “Contingency planning at airports should be a collaborative exercise in which airlines, ground handlers and other significant contractors are fully involved. We recommend that the CAA ensure that the airports’ contingency plans have been developed with the airlines and other relevant parties, that the plans are properly tested and widely disseminated.”

Proposed Modifications to the Draft Guidance

Scope

7.18 The scope of the Draft Guidance seems appropriate. However, where key facilities on the airport are provided by other organisations (e.g. the fuel farm), we consider that these facilities should be included in processes for Joint Business Continuity Management, which the airport should coordinate.

Risk management

7.19 The requirement to undertake risk assessments is appropriate. It should be strengthened by requiring the airport to involve other airport stakeholders in the process (or at least to offer effective opportunities for those stakeholders to participate).

7.20 In addition to the requirement to undertake risk assessments, in cooperation with other stakeholders, the airport should also be required undertake a programme of risk mitigation based on those assessments, as applicable, through:

- Its capital programme (both maintenance and development capital expenditure); and
- Improvements to its operational procedures.

7.21 The airports should engage with airlines in particular, and as appropriate, with other stakeholders, to discuss and if possible agree these risk mitigations.

7.22 There should be a formal process to manage risk (both assessments and mitigations) with a senior level meeting taking place at least each year.

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Deploying Contingencies

- 7.23 The requirement to have clear processes and communications to remedy problems is appropriate. It should be strengthened by including requirements to:
- Provide an overarching contingency plan document that includes all the principles to be followed when a disruptive event occurs, with further plans and procedures documented with agreement sought from all relevant airport stakeholders⁵;
 - Establish clear rules for when the different Command levels should be triggered, including pre-emptive activation (i.e. in advance of any disruption) in situations where disruption could be expected, such as at key holiday periods;
 - Provide a formal training, practice and testing regime for Bronze, Silver and Gold Commanders and Deputies, including the requirement for operational experience and experience of managing incidents or practical exercises (this regime to be approved by the CAA);
 - Establish clear levels of authority for each level Commander, including appropriate spending authority, which provides the capability to make decisions at the necessary level;
 - Ensure that staff rosters are established to ensure that trained and qualified Commanders are always available;
 - Ensure that the involvement of key stakeholders, such as airlines, forms an integral part of the Command and Control processes and that there is live sharing of operational information between stakeholders during disruption events;
 - Ensure that facilities and equipment used for the Command and Control operations are tested at least annually;
 - Engage with stakeholders to discuss and if possible agree a programme of table-top and practical exercises to test contingency plans, which should be undertaken so as to cover all major types of contingency every two years, considered to imply at least four major table-top exercises per year, as well as a major practical exercise relating to a non-emergency disruption situation every other year (complementing the mandatory emergency exercise which each airport is required to undertake every other year, so that a major practical exercise of one type or the other would be required once per year); and
 - Ensure that “wash-up” sessions are undertaken for all exercises, involving representatives from all organisations participating in the relevant exercise, and, where major stakeholders request, involving a neutral facilitator to collect the information.

⁵ stakeholders include the major airlines, with other airlines represented by the AOC, ground handling agents, NATS, the emergency services, fuel suppliers, local authorities etc.

Passenger Welfare

- 7.24 The requirement to provide for passenger welfare is appropriate. It should be strengthened by requiring the airport to seek agreement with the airline community (e.g. through the AOC or individually with the larger airlines) on procedures for handling information dissemination and providing “backstop” support.

Learning Lessons

- 7.25 A requirement should be added to the Draft Guidance for reviews of disruption incidents and of practice exercises to be held jointly with other stakeholders, as noted above. The airports should also be required to demonstrate that they have instituted internal procedures to encourage the reporting of honest mistakes by staff and to include questions on the management of disruption in internal staff surveys, which should be confidential and held at least annually by an external organisation. The airport should also be required to attempt to agree procedures for open discussion with other stakeholders on issues arising during disruption.

Joint Business Continuity Planning

- 7.26 The requirement to work with other stakeholders is appropriate. It should be strengthened by requiring the airport to establish a formal process involving all key stakeholders to consider all parts of the Business Continuity Planning process, from risk identification and assessment, through management of incidents on the day, training and exercising schedule for the next year to the lesson learning process. As noted above, this formal process should involve:

- At least one meeting of senior personnel annually;
- Supporting meetings at the working level at least quarterly.

- 7.27 These meetings should be specifically focused on joint business continuity planning, but may use existing forums where appropriate. This level of additional Business Continuity Planning meetings will allow a balance to be found between maximising the operational resilience of the airport with the efficiency of day to day operations. The opportunity to participate should be offered to stakeholders from the following groups:

- Airlines (individually for those with based operations or though the AOC for other airlines);
- Ground handling agents;
- Air Navigations Service Provider (NATS);
- Other airport infrastructure operators (e.g. fuel farm operator);
- Emergency services (both on-airport and off-airport based);
- UK Border Force; and
- Local authorities and other members of the Local Resilience Forum.

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Monitoring of Adherence to Guidance

- 7.28 The Terms of Reference for the study raise the question on the extent to which the CAA should audit resilience plans. Our analysis indicates that the level of monitoring of the airports' conformity to the Guidance should not be set at the individual contingency plan, but rather at the level of the overall process of operational resilience management.
- 7.29 The framework for operational resilience management set out in chapter 3 indicates that effective operational resilience is achieved through a broad range of processes across a number of different timescales, and involving many organisations both on and off the airport. The level of detail involved in these processes, from individual risk assessments for particular functional areas to detailed contingency plans to handle loss of a utility in part of a terminal means that an "audit" of such activities would be extremely onerous and would require large resources.
- 7.30 On the other hand, as our analysis indicates, most of the processes relevant to operational resilience involve, at some stage and some level, engagement with other stakeholders. Further, the majority of deficiencies noted in the airports' procedures relate to lack of effective engagement with those stakeholders for some (though by no means all) of those processes.
- 7.31 We would therefore suggest that the most effective monitoring approach, to ensure the airports conform to the principles set out in the Guidance, would be to require each airport to compile a brief monitoring report covering all aspects of operational resilience planning processes, from risk identification through to lesson learning. This report would be required to be produced on an annual cycle.
- 7.32 The report would follow a structure set out at a high level by the CAA (ideally in compact, possibly presentation format), and the process for developing the report would include receiving formal feedback from key stakeholders, whose verbatim comments would be appended to the report. The report would identify any issues identified as problematic in any part of the operational resilience process, including any issues where there was disagreement between the airport and its stakeholders (or between different stakeholders).
- 7.33 Each airport and its stakeholders would be asked to attend a briefing session with the CAA to present and then discuss the report. As with the report itself, this would be on an annual cycle.
- 7.34 Any issues which the CAA considered to imply non-conformity with the Guidance could be expected to be exposed by this process, allowing the CAA to instigate enforcement action if appropriate.

APPENDIX

A

DATA RECEIVED FROM HAL AND GAL

Documents received from HAL

- Heathrow Airport Command & Control Overview
- Bronze Commander Handbook Nov 2013
- Silver Commander Handbook Nov 2013
- Gold book - December 2013
- Emergency Orders
- Mobilisation Membership
- Early Warning Indicators
- Early Warning Indicators - UKBA
- Red File - welfare response
- Welfare Team and Training
- Passenger Rights Message Audit Results
- ASD Contingency
- March ASM Briefing
- Plan Development
- Contingency Plans:
 - Heathrow Snow Plan Airside Winter 2013-14
 - Heathrow Airport Ltd Fuel Contingency Plan
 - T4 - Loss of Utility - Loss of Electricity Plan
 - T4 - Congestion - Transfers Plan
 - T4 - Loss of Systems - Loss of FIDs Plan
 - T3 - Loss of Resource - Security Officer De-Manning Plan
 - T3 - Loss of Facility - Staff Search Plan
 - T3 - Loss of Utility - Potable Water Plan
 - T5 - Evacuation - Landside to Airside Internal Plan
 - T5 - Loss of Facility - Loss of Check In Departures Landside Plan
- Response to Security Incidents
- Heathrow Operational Systems Diagram
- Highways Agency Contact
- Heathrow Joint Crisis Planning Group:
 - Terms of Reference for Heathrow Resilience Partnership
 - Minutes 23rd May 2013
 - Minutes 27th February 2014
- Gateway Summary

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Documents received from GAL

- Crisis Manual 4C Process
- Gatwick Exercise Participants 2011-2013
- List of Gatwick Incidents
- Screen shots 4C Training
- Disruption Volunteer positions
- Snow Leopard training
- Volunteer Organisational Structure
- Contingency Plans:
 - Surface Transport Landside Snow Plan
 - Airline Divert Coaching Contingency
 - Airport Wide Disruption Plan 2012-13
 - Combined Security Snow Plan 2013-14
 - GCC WEAX Triggers Comms
 - List of Contingency Plans 02_14
 - Facilities Master Disruption Plan 2014-15
 - Fire Alarm System Failure 2013
 - Flood Emergency Response
 - GAL IT Snow Plan
 - Gas Infrastructure failure
 - Gatwick Airport Aerodrome 2013-14 Snow Plan
 - Gatwick Area Access Contingency Plan Edition 3
 - Loss of Utilities
 - Network Rail coaching plan
 - Partial Loss of Electricity
 - Potable Water
 - Prolonged Disruption Contingency
 - Prolonged Evaluation SOP
 - Shuttle Contingency
 - Shuttle Snow Arrangement 2012
 - ST Baggage Reclaim Fire Evacuation
 - Terminal Evacuation Plan 2013
 - Terminal Overcrowding Plan
 - Terminal Snow Plan 2013-14
 - Total Loss of Electricity to the Airport
 - Total Loss of FID Screens
 - Total or Partial Loss of Fire Alarm Systems
- Joint Working with Stakeholders:
 - GAL ICM Exercise Dagenham PXR
 - Airline Meeting 26 Feb 2010
 - Contingency Planning Activity with Airlines
 - Gatwick Exercise Participants 2011-2013
 - Minutes Potential Fuel Tankers Strike Meeting 29/3/12
 - Minutes Potential Strike Meeting 15/3/13

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- Minutes Potential Strike Meeting 23/7/12
- Swissport dispute 2009 Action Status 24/9/09
- ToR for Sussex Local Resilience Forum and Gatwick Resilience Forum
- Virgin Atlantic A330 Incident Multi Agency Debrief

APPENDIX

B

LIST OF AIRPORT IRREGULAR OPERATIONS EVENTS

List of Airport Irregular Operations Events from ACRP

- Severe Weather Events
 - High wind
 - Tornado
 - Hurricane/tropical cyclone
 - Heat wave
 - Extreme cold
 - Dense fog
 - Thunderstorm/heavy rain/flooding
 - Electrical storm
 - Snow/blizzard
 - Damaging hail
 - Ice storm
 - Dust storm
- Natural Disasters
 - Earthquake
 - Volcanic eruption
 - Landslide
 - Dam break
 - Tsunami
 - Wildfire
 - Solar storm
- Man-made Disasters
 - Hazardous materials release
 - Military aircraft/ordnance issue
 - Discovery of explosives
- Aircraft and Vehicle Accidents/Emergencies
 - Aircraft accident
 - Structural fire
 - Access road accident
 - Railway/people mover accident/mechanical problem
- Medical Emergency
 - Aircraft medical emergency
 - Terminal medical emergency
- Infectious Diseases
 - Individual carrier
 - Epidemic
 - Pandemic
- Security
 - Checkpoint security breach
 - Navigation system jamming/spoof

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- Hijacked aircraft
- Laser attack
- Perimeter security breach
- Terrorist attack
- Unattended/suspicious luggage

- Construction/Mechanical
 - Air conditioning failure
 - Damaged cable
 - Damaged pipeline
 - Heat failure
 - Power failure
 - Water line break

- Airline Operations
 - Flight reservation system/IT outage

- Labour Disruption
 - Air traffic control labour disruption
 - Airline labour disruption
 - Airport labour disruption
 - Security/Federal Inspection Services labour disruption

- Very Important Person (VIP)
 - VIP/sports team arrival/departure

CONTROL SHEET

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