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|  | Operations in airspace contaminated with volcanic ash *Ver. 2021-02-15* | |  |
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| Operatör | | | |
|  | | | |
| Tillståndsnummer | | Kontaktperson | |
|  | |  | |
| Transportstyrelsen | | | |
| Ärendenummer | | Handläggare | |
|  | |  | |
| Berörda sektioner/samråd | | | |
| SLot  SLou | | | |
| Information | | | |
|  | | | |
| Denna checklista är avsedd att vara ett stöd i framtagandet av procedur för att operera i luft som är kontaminerad av vulkanisk aska.  Checklistan innehåller relevanta moment från:   * (EU) 965/2012, GM2 ORO.GEN.200 * EASA SIB 2010-17R7 (vissa förtydliganden) * (EU) 923/2012, SERA.12005   Du som operatör ska utarbeta procedurer och ta fram Safety Risk Assessment (SRA) för flygning i kontaminerad luft, i enlighet med ert ledningssystem.  Procedurerna ska innefatta både flygning som planeras i kontaminerad luft (om flygplans- och motortillverkare medger detta) och procedurer som beskriver förfaranden om man befinner sig i kontaminerad luft.  Procedurerna ska vara beskrivna i OM-A kapitel 8.3.8 enligt AMC ORO.MLR.100. Den initiala SRA som ligger till grund för era framtagna procedurer ska godtas av Transportstyrelsen innan operationer i kontaminerad luft kan genomföras.  I vissa moment har texten förkortats, för hela textmassan hänvisas till aktuell version av (EU) 965/2012.   |  | | --- | | Där grönmarkerade rutor förekommer ska relevanta bilagor sändas in. Bilagans nummer ska anges i checklistan. | | | | |

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| ORO.GEN.200(a)(3) | | |
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| (a) The operator shall establish, implement and maintain a management system that includes:  (3) the identification of aviation safety hazards entailed by the activities of the operator, their evaluation and the management of associated risks, including taking actions to mitigate the risk and verify their effectiveness; | | |
| GM2 ORO.GEN.200(a)(3) | | |
| 1. Responsibilities | | |
| The operator is responsible for the safety of its operations, including within an area with known or forecast volcanic ash contamination. | | |
| 1. Procedures | | |
| Procedures should include those for: | | |
|  | Ref i manualverk | TS note |
| flight crew, |  |  |
|  | Ref i manualverk | TS note |
| Flight planners, |  |  |
|  | Ref i manualverk | TS note |
| Dispatchers, |  |  |
|  | Ref i manualverk | TS note |
| Operations, |  |  |
|  | Ref i manualverk | TS note |
| Continuing airworthiness personnel,  …such that they are in a position to evaluate correctly the risk of flights into airspace forecast to be contaminated by volcanic ash and to plan accordingly, |  |  |
| 1. Volcanic activity information and operator’s potential response | Bilaga nr | TS note |
| The operator’s risk assessment and mitigating actions need to take account of, and respond appropriately to, the information likely to be available during each phase of the eruptive sequence from pre-eruption through to end of eruptive activity.  Pre-eruption  Start of an eruption  On-going eruption |  |  |

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| SAFETY RISK ASSESSMENT | | |
| 1. Safety Risk Assessment | | |
| When directed specifically at the issue of intended flight into airspace forecast to be or aerodromes/operating sites known to be contaminated with volcanic ash, the process should involve the following: | | |
|  | Ref i manualverk | TS note |
| (1) Identifying the hazards  This GM is referring to volcanic ash contamination since it is the most significant hazard for flight operations in the context of a volcanic eruption. Nevertheless, it might not be the only hazard and therefore the operator should consider additional hazards which could have an adverse effect on aircraft structure or passengers safety such as gases.  Within this generic hazard, the operator should develop its own list of specific hazards taking into account its specific aircraft, experience, knowledge and type of operation, and any other relevant data stemming from previous eruptions. |  |  |
|  | Ref i manualverk | TS note |
| (2) Considering the severity and consequences of the hazard occurring (i.e. the nature and actual level of damage expected to be inflicted on the particular aircraft from exposure to that volcanic ash cloud). |  |  |
|  | Ref i manualverk | TS note |
| (3) Evaluating the likelihood of encountering volcanic ash clouds with characteristics harmful to the safe operation of the aircraft.  For each specific hazard within the generic hazard, the likelihood of adverse consequences should be assessed, either qualitatively or quantitatively. |  |  |
|  | Ref i manualverk | TS note |
| (4) Determining whether the consequent risk is acceptable and within the operator’s risk performance criteria.  At this stage of the process, the safety risks should be classified as acceptable or unacceptable. The assessment of tolerability will be subjective, based on qualitative data and expert judgement, until specific quantitative data are available in respect of a range of parameters. |  |  |
|  | Ref i manualverk | TS note |
| (5) Taking action to reduce the safety risk to a level that is acceptable to the operator’s management.  Appropriate mitigation for each unacceptable risk identified should then be considered in order to reduce the risk to a level acceptable to the operator’s management. |  |  |
| 1. Procedures to be considered when identifying possible mitigations actions | | |
| When conducting a volcanic ash safety risk assessment, the operator should consider the following non-exhaustive list of procedures and processes as mitigation: | | |
|  | Ref i manualverk | TS note |
| 1. Type certificate holders   Obtaining advice from the TCHs and other engineering sources concerning operations in potentially contaminated airspace and/or aerodromes/operating sites contaminated by volcanic ash. |  |  |
|  | Ref i manualverk | TS note |
| This advice should set out:  (i) the features of the aircraft that are susceptible to airworthiness effects related to volcanic ash; |  |  |
|  | Ref i manualverk | TS note |
| (ii) the nature and severity of these effects; |  |  |
|  | Ref i manualverk | TS note |
| (iii) the effect of volcanic ash on operations to/from contaminated aerodromes/operating sites, including the effect on take-off and landing aircraft performance; |  |  |
|  | Ref i manualverk | TS note |
| (iv) the related pre-flight, in-flight and post-flight precautions to be observed by the operator including any necessary amendments to aircraft operating manuals, aircraft maintenance manuals, master minimum equipment list/dispatch deviation or equivalents; and |  |  |
|  | Ref i manualverk | TS note |
| (v) the recommended inspections associated with operations in volcanic ash potentially contaminated airspace and operations to/from volcanic ash contaminated aerodromes/operating sites; this may take the form of instructions for continuing airworthiness or other advice. |  |  |
|  | Ref i manualverk | TS note |
| 1. Operator/contracted organisations’ personnel   Definition of procedures for flight planning, operations, engineering and maintenance ensuring that:  (i) personnel responsible for flight planning are in a position to evaluate correctly the risk of encountering volcanic ash contaminated airspace, or aerodromes/operating sites, and can plan accordingly; |  |  |
|  | Ref i manualverk | TS note |
| (ii) flight planning and operational procedures enable crews to avoid areas and aerodromes/operating sites with unacceptable volcanic ash contamination; |  |  |
|  | Ref i manualverk | TS note |
| (iii) flight crew are aware of the possible signs of entry into a volcanic ash cloud and execute the associated procedures; |  |  |
|  | Ref i manualverk | TS note |
| (iv) continuing airworthiness personnel are able to assess the need for and to execute any necessary maintenance or other required interventions; and |  |  |
|  | Ref i manualverk | TS note |
| (v) crews are provided with appropriate aircraft performance data when operating to/from aerodromes/operating sites contaminated with volcanic ash. |  |  |
|  | Ref i manualverk | TS note |
| 1. Provision of enhanced flight watch   This should ensure:  (i) close and continuous monitoring of VAA, VAR/AIREP, SIGMET, NOTAM, ASHTAM and other relevant information, and information from crews, concerning the volcanic ash cloud hazard; |  |  |
|  | Ref i manualverk | TS note |
| (ii) access to plots of the affected areas from SIGMETs, NOTAMs and relevant company information for crews and personnel responsible for the management and the supervision of the flight operations; and |  |  |
|  | Ref i manualverk | TS note |
| (iii) communication of the latest information to crews and personnel responsible for the management and the supervision of the flight operations in a timely fashion. |  |  |
|  | Ref i manualverk | TS note |
| 1. Flight planning   Flexibility of the process to allow re-planning at short notice should conditions change. |  |  |
|  | Ref i manualverk | TS note |
| 1. Departure, destination and alternate aerodromes   For the airspace to be traversed, or the aerodromes/operating sites in use, parameters to evaluate and take account of:  (i) the probability of contamination; |  |  |
|  | Ref i manualverk | TS note |
| (ii) any additional aircraft performance requirements; |  |  |
|  | Ref i manualverk | TS note |
| (iii) required maintenance considerations; |  |  |
|  | Ref i manualverk | TS note |
| (iv) fuel requirements for re-routeing and extended holding. |  |  |
|  | Ref i manualverk | TS note |
| 1. Routing policy   Parameters to evaluate and take account of:  (i) the shortest period in and over the forecast contaminated area; |  |  |
|  | Ref i manualverk | TS note |
| 1. Diversion policy   Parameters to evaluate and take account of:  (i) maximum allowed distance from a suitable aerodrome/operating site; |  |  |
|  | Ref i manualverk | TS note |
| (ii) availability of aerodromes/operating sites outside the forecast contaminated area; |  |  |
|  | Ref i manualverk | TS note |
| (iii) diversion policy after an volcanic ash encounter. |  |  |
|  | Ref i manualverk | TS note |
| 1. Minimum equipment list (MEL)   Additional provisions in the MEL for dispatching aircraft with unserviceabilities that might affect the following non-exhaustive list of systems:  (i) air conditioning packs; |  |  |
|  | Ref i manualverk | TS note |
| (ii) engine bleeds; |  |  |
|  | Ref i manualverk | TS note |
| (iii) pressurisation system; |  |  |
|  | Ref i manualverk | TS note |
| (iv) electrical power distribution system; |  |  |
|  | Ref i manualverk | TS note |
| (v) air data system; |  |  |
|  | Ref i manualverk | TS note |
| (vi) standby instruments; |  |  |
|  | Ref i manualverk | TS note |
| (vii) navigation systems; |  |  |
|  | Ref i manualverk | TS note |
| (viii) de-icing systems; |  |  |
|  | Ref i manualverk | TS note |
| (ix) engine-driven generators; |  |  |
|  | Ref i manualverk | TS note |
| (x) auxiliary power unit (APU); |  |  |
|  | Ref i manualverk | TS note |
| (xi) airborne collision avoidance system (ACAS); |  |  |
|  | Ref i manualverk | TS note |
| (xii) terrain awareness warning system (TAWS); |  |  |
|  | Ref i manualverk | TS note |
| (xiii) autoland systems; |  |  |
|  | Ref i manualverk | TS note |
| (xiv) provision of crew oxygen; |  |  |
|  | Ref i manualverk | TS note |
| (xv) supplemental oxygen for passengers. |  |  |
|  | Ref i manualverk | TS note |
| 1. Standard operating procedures   Crew training to ensure they are familiar with normal and abnormal operating procedures and particularly any changes regarding but not limited to:  (i) pre-flight planning; |  |  |
|  | Ref i manualverk | TS note |
| (ii) in-flight monitoring of volcanic ash cloud affected areas and avoidance procedures; |  |  |
|  | Ref i manualverk | TS note |
| (iii) diversion; |  |  |
|  | Ref i manualverk | TS note |
| (iv) communications with ATC; |  |  |
|  | Ref i manualverk | TS note |
| (v) in-flight monitoring of engine and systems potentially affected by volcanic ash cloud contamination; |  |  |
|  | Ref i manualverk | TS note |
| (vi) recognition and detection of volcanic ash clouds and reporting procedures; |  |  |
|  | Ref i manualverk | TS note |
| (vii) in-flight indications of a volcanic ash cloud encounter; |  |  |
|  | Ref i manualverk | TS note |
| (viii) procedures to be followed if a volcanic ash cloud is encountered; |  |  |
|  | Ref i manualverk | TS note |
| (ix) unreliable or erroneous airspeed; |  |  |
|  | Ref i manualverk | TS note |
| (x) non-normal procedures for engines and systems potentially affected by volcanic ash cloud contamination; |  |  |
|  | Ref i manualverk | TS note |
| (xi) engine-out and engine relight; |  |  |
|  | Ref i manualverk | TS note |
| (xii) escape routes; and |  |  |
|  | Ref i manualverk | TS note |
| (xiii) operations to/from aerodromes/operating sites contaminated with volcanic ash. |  |  |
|  | Ref i manualverk | TS note |
| 1. Provision for aircraft technical log   This should ensure:  (i) systematic entry in the aircraft technical log related to any actual or suspected volcanic ash encounter whether in-flight or at an aerodrome/operating site; and |  |  |
|  | Ref i manualverk | TS note |
| (ii) checking, prior to flight, of the completion of maintenance actions related to an entry in the aircraft technical log for a volcanic ash cloud encounter on a previous flight. |  |  |
|  | Ref i manualverk | TS note |
| 1. Incident reporting   Crew requirements for:  (i) reporting an airborne volcanic ash cloud encounter (VAR); |  |  |
|  | Ref i manualverk | TS note |
| (ii) post-flight volcanic ash cloud reporting (VAR); |  |  |
|  | Ref i manualverk | TS note |
| (iii) reporting non-encounters in airspace forecast to be contaminated; and |  |  |
|  | Ref i manualverk | TS note |
| (iv) filing a mandatory occurrence report in accordance with ORO.GEN.160. |  |  |
|  | Ref i manualverk | TS note |
| 1. Continuing airworthiness   procedures  Procedures when operating in or near areas of volcanic ash cloud contamination:  (i) enhancement of vigilance during inspections and regular maintenance and appropriate adjustments to maintenance practices; |  |  |
|  | Ref i manualverk | TS note |
| (ii) definition of a follow-up procedure when a volcanic ash cloud encounter has been reported or suspected; |  |  |
|  | Ref i manualverk | TS note |
| (iii) thorough investigation for any sign of unusual or accelerated abrasions or corrosion or of volcanic ash accumulation; |  |  |
|  | Ref i manualverk | TS note |
| (iv) reporting to TCHs and the relevant authorities observations and experiences from operations in areas of volcanic ash cloud contamination; |  |  |
|  | Ref i manualverk | TS note |
| (v) completion of any additional maintenance recommended by the TCH or by the Competent Authority. |  |  |

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| REPORTING | | |
|  | Ref i manualverk | TS note |
| 1. Reporting   The operator should ensure that reports are immediately submitted to the nearest ATS unit using the VAR/AIREP procedures followed up by a more detailed VAR on landing together with, as applicable, a report, as defined in Commission Regulation (EU) No 996/2010 and Regulation (EU) No 376/2014, and an aircraft technical log entry for:  (1) any incident related to volcanic clouds;  (2) any observation of volcanic ash activity; and  (3) any time that volcanic ash is not encountered in an area where it was forecast to be.  *(Ref. SERA.12005 Special aircraft observations*) |  |  |
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| SIB No 2010-17R7, Flight in Airspace with Contamination of Volcanic Ash | | |
| Airworthiness requirements: | Ref i manualverk | TS note |
| För nya luftfartyg:  CS-25 Amendment 13 (dated 17 June 2013) introduced (for new TC) § CS 25.1593 and related AMC on exposure to volcanic ash hazards.  CS-E Amendment 4 (dated 12 March 2015) introduced (for new TC) a requirement to establish the susceptibility of turbine engines to volcanic cloud hazards. |  |  |
|  | Ref i manualverk | TS note |
| Forecasted presence of volcanic ash should primarily be presented in the form of a zoning system that depicts areas of low, medium and high concentrations in 3 altitude bands.  (Low/Medium and High contamination) |  |  |
|  | Ref i manualverk | TS note |
| Instructions for continued airworthiness developed by aircraft and engine TC holders for operation in airspace contaminated by volcanic ash should be followed.  In case no such instructions are available, appendix A to this SIB provides recommended maintenance inspections when operating in airspace with a low contamination of volcanic ash. |  |  |
|  | Ref i manualverk | TS note |
| In case of encounter with volcanic ash in flight, flight crew should immediately report it to the ATS Unit providing service in that airspace. This real-time information will facilitate providing operational feedback to the VAAC(s) and to Eurocontrol/NM. |  |  |