COMMENT RESPONSE DOCUMENT (CRD) TO ADVANCE NOTICE OF PROPOSED AMENDMENT (A-NPA) 2011-06

'Consultation on the ICAO IVATF paper about the management of flight operations with known or forecast volcanic cloud contamination'

EXECUTIVE SUMMARY

1. A-NPA 2011-06 was issued in May 2011 with the following objectives:

   a. supporting the ICAO International Volcanic Ash Task Force (IVATF) AIR team 04 by contributing to the consultation of the guidance material on management of flight operations with known or forecast volcanic cloud contamination draft version 4; and

   b. collecting stakeholders feedback on the actions that should be implemented by the Agency following the outcome of the ICAO IVATF AIR 04 team work.

2. This CRD 2011-06 is issued to explain stakeholders how those objectives are considered to be met. It contains a summary of the general comments provided by stakeholders and the results of the questionnaire included in A-NPA 2011-06 which identify the need to initiate a rulemaking task in order to transpose the IVATF guidance material into the European regulatory framework.

EXPLANATORY NOTE

I. General

1. The purpose of the Advance Notice of Proposed Amendment (A-NPA) 2011-06, dated 3 May 2011 was to provide European stakeholders with the opportunity to comment on version 4 of the guidance material on management of flight operations with known or forecast volcanic cloud contamination produced by the ICAO International Volcanic Ash Task Force (IVATF) AIR04 team. Additionally, this A-NPA had also the objective to collect stakeholders' advice on the actions that should be implemented by the Agency following the outcome of the ICAO IVATF AIR04 team work, thereby helping to define how the current European regulatory context could benefit from such work.

II. Consultation

2. A-NPA 2011-06 was published on the web site (http://www.easa.europa.eu) on 3 May 2011.

   By the closing date of 30 May 2011, the European Aviation Safety Agency (hereafter referred to as 'the Agency') had received 109 comments from 27 National Aviation Authorities, professional organisations and private companies.

III. Publication of the CRD

3. This CRD has been issued to provide stakeholders with a summary of the general comments received and the answers given to the four questions included in the A-NPA. All the comments received have been replied as 'Noted', to indicate that they have been acknowledged and to reflect the fact that the objective of the A-NPA was to collect feedback to define a future course of action.

IV. Summary of the comments and responses to the Agency's questions

3. A-NPA 2011-06 was issued with two main objectives; the first objective was to collect comments on version 4 of the guidance material on management of flight operations with known or forecast volcanic cloud contamination produced by the ICAO International Volcanic Ash Task Force (IVATF) AIR04 team.

4. To this end, the stakeholders were invited to send their comments on the content of the document, which were consolidated at the end of the A-NPA consultation period and forwarded to the chair of the AIR04 team. These comments were taken into account for the production of version 5 of the guidance material, which was presented by the AIR04 team during the second meeting of the IVATF held at ICAO headquarters 11-15 July 2011.

5. During that meeting, the guidance material was further revised to take into account views expressed by experts attending the meeting. The result of this revision was the production of version 7, which is attached as Appendix A to this CRD. The IVATF considered this version mature and recommended its endorsement by the appropriate ICAO group to be included in an appropriate ICAO publication. The task of the AIR04 team was considered completed.

6. The Agency supports version 7 and considers that this guidance material should be made available to all stakeholders. Thus the Agency has decided to update SIB2010-17 to disseminate version 7 of the guidance material promptly and as a complement to a future rulemaking activity.

7. The second objective was to identify which course of action would be the most adequate in the view of the European stakeholders and which measures should be implemented. To meet this objective the A-NPA proposed three questions with three possible answers each and a fourth question in which stakeholders may include their recommendations to the Agency.

8. The answers to those questions show that stakeholders consider that rulemaking should be initiated in the short term. The following paragraphs provide a summary of the answers selected by the commenters.

Summary of the answers to the questions:

Question 1: Which action do you consider the Agency should take following the conclusion of the work of the ICAO IVATF AIR team 04?

a) No immediate action is required. Wait until ICAO develops an amendment to Standards and Recommended Practices (SARPs) or guidance material.

Seven (7) answers support option A. The commenters expressed the opinion that in order to achieve global harmonisation it is necessary to wait until ICAO has fully developed guidance or other related standards and recommended practices (SARPs). Rulemaking in advance of the ICAO process could create undesirable differences between EU rules and ICAO SARPs and harm operational harmonisation in a global air transportation system.

b) Initiate a rulemaking task to take into account the work of the ICAO IVATF AIR team 04 at European level.

Fourteen (14) answers support option B. The commenters expressed the view that the rulemaking process would be the only way to achieve the necessary harmonisation and common approach at a European level.

c) Other action. (Please go to question 4)

Three (3) answers supported option C.

9. The answers received to question 1 show that stakeholders considered that rulemaking should be initiated at European level to take into account the work of the ICAO IVATF AIR04 team. However, it has to be taken into consideration that there are a relevant number of commenters who remarked the need not to work in advance of ICAO in order to ensure global harmonisation. From these results it could be inferred that the Agency should plan a rulemaking activity and also monitor closely the ICAO actions linked to the guidance material proposed by IVATF AIR04 team.

Question 2: How should Attachment 1 to the ICAO IVATF AIR team 04 Working Paper be implemented in the European regulatory framework?

a) The content of the ICAO IVATF AIR team 04 paper should be included in a Decision and implemented as guidance material to the requirements for operators and National Aviation Authorities.

Six (6) answers support option A. The commenters considered that the IVATF paper should be included in guidance material for operators and National Aviation Authorities.

b) An Opinion should be issued proposing an amendment to include specific requirements in the implementing rules for operators and National Aviation Authorities in line with the content of the ICAO IVATF AIR team 04 paper.

Three (3) answers support option B. The commenters considered that an Opinion should be issued proposing an amendment to include specific requirements in the implementing rules for operators and National Aviation Authorities in line with the content of the ICAO IVATF AIR04 team paper.

c) The content of the ICAO IVATF AIR team 04 paper should be included partly in an Opinion and partly in a Decision. (Please specify in your reply which sections should be part of an Opinion and which should be Guidance Material.)

Eight (8) answers support option C. The commenters consider that part of the content of the IVATF paper should be included in guidance material to the SMS requirements for operators and National Aviation Authorities. Clear responsibilities and obligations should be part of an Opinion to amend implementing rules.

10. The answers received to question 2 show that option A and option C have been selected by a similar number of commenters. This indicates that there is a common view among stakeholders that the IVATF AIR04 document should be included in a decision as guidance material; however the need to issue an opinion is not so extensively supported.

11. Thus, the Agency should propose a decision transposing the content of the IVATF AIR04 mostly as guidance material into the European regulatory system, although during the development of the rulemaking task it should be assessed whether the implementing rules need to be amended and the impacts associated to such amendment.

12. Additionally, some of the commenters have expressed the need to amend the regulatory material applicable to ATM and Air Navigation Service Providers and clarify the responsibilities when managing traffic in ash contaminated areas. This need should be evaluated in future rulemaking.

Question 3: What priority should be given to the proposed rulemaking task?

a) High priority; the task should start immediately after the conclusion of the work of the ICAO IVATF AIR team 04.

Sixteen (16) answers support option A. The commenters consider that the task should be given high priority and start after the conclusion of the work of the ICAO IVATF AIR04 team, in addition some answers suggest following a ‘speedy’ rulemaking process. Some of the commenters claim that the economic impact of another fragmented approach among European States totally justifies the need for immediate actions.

b) Medium priority; the task should start in the next 2 years.

Three (3) answers support option B.

c) Low priority; the commencement of the task could be delayed more than 2 years.

Three (3) answers support option C. The commenters argue that the Agency should wait until ICAO issues SARPS or guidance material thereby ensuring effective harmonisation of requirements.

13. The answers received to question 3 show clearly that stakeholders would like the Agency to give high priority to the rulemaking task in order to ensure that in the event of a

volcanic eruption there is adequate guidance available both to operators and national aviation authorities so that responses are coordinated and the impacts on operations are minimised.

14. Moreover, some commenters have expressed their concerns with regards the duration of the rulemaking process, and they would like an 'accelerated' process. The Agency considers that the transposition of revision 7 of the IVATF AIR04 guidance material into the European regulatory system could be performed as an Agency task reducing therefore the time required producing an outcome.

15. As a complementary action prior to initiation of this rulemaking activity, SIB2010-17 will be updated to include revision 7 of IVATF AIR04 guidance material so that it could be used in the event of a future volcanic eruption.

Question 4: Which action do you consider the Agency should take following the conclusion of the work of the ICAO IVATF AIR team 04? Please explain your recommendation including the priority and timeframe.

Question 4 has received nine (9) answers which provide not only recommendations but also additional comments to be taken into account. Those answers have been summarised as follows:

- One commenter stresses the need to provide guidance for the general aviation community.
- One commenter points out that the work of the IVATF AIR04 team does not provide a complete answer, since there are numerous interdependencies among the different teams within the IVATF. Nevertheless, it is expected that the use of this guidance material by the operators and national aviation authorities would improve the response to volcanic ash events.
- Concerns are expressed about the difficulties to fit into the European regulatory framework the content and construction of the AIR04 Team guidance material.
- Several comments show their support to the use of the SIB 2010-17 as the process to quickly disseminate and promulgate the implementation of the approach proposed by the IVATF AIR04 working paper version.
- Some commenters highlight the need to ensure a better coordination of measurement tools and to improve information management related to volcanic ash at EU level, including include enhanced cooperation between VAAC, better use the information coming from satellites and ground based LIDARs, improved ash dispersion modelling, and development in the communication and information networks.
- Additionally one commenter proposes the evaluation, development and definition of the use flight worthy ash location systems (flight test aircraft, UAV….).
- Several commenters draw attention to the fact that the result of the work of the IVATF AIR04 group is only a proposal and not finalized ICAO guidance or policy. Therefore they suggest the Agency waiting for mature proposals (SARPs, PANS, Guidance Material) emanating from the ICAO process.
- Some comments express the need of Agency's support to the other IVATF activities, specifically susceptibility of aircraft and aircraft engines to volcanic ash.

16. In addition to the comments on the content of the version 4 of the IVATF guidance material and the answers to the four questions, the commenters have also provided general comments, which have been summarised and grouped into the following subjects:

Support to the IVATF AIR04 guidance material

17. The majority of the comments received show that the approach presented in the guidance material produced by the IVATF AIR04 team version 4 based on the concepts that the operator is responsible for the safety of operations and the implementation of a safety risk assessment process are fully supported. However, some concerns are expressed over the lack of clear differentiation between the operator's and the national aviation authority's responsibilities and in particular the need for national aviation authority to approve the safety risk assessment as an independent document.

18. These concerns have been clarified in version 7 of the guidance material, where it is explained that operators should have in place an identifiable safety risk assessment within its safety management system and the competent authority should normally accept this safety risk assessment as part of the operator's safety management system and as part of the normal oversight exercised by the national aviation authorities over operators. This will be further clarified when transposing the material into the EASA framework.

Interdependencies

19. Some comments highlight the interdependency of flight operations in volcanic ash and other factors outside the control of the operator. In particular they point out the need to improve volcanic observation infrastructure in Europe and the methods used for prediction of ash distribution, and the need to assess how the air traffic management and air navigation service providers may be affected by the implementation of this approach.

20. These factors were also identified by IVATF and several tasks are still on-going in order to try to develop a suitable approach.

Global approach

21. Other comments remark the importance of implementing a global rather than regional approach. This means the proposed approach should be valid globally and accepted by any foreign national aviation authority in charge of the airspace.

22. To this end, version 7 of the IVATF AIR04 guidance material introduces the principle of safety risk assessment as an element of the operator's safety management system, thus providing an adequate frame for recognition among aviation authorities.

Harmonisation

23. Some comments point out the need for developing actions at a European level that would ensure a coordinated approach among Member States. These should include the update of the SIB2010-17 to contain the latest version of the IVATF AIR04 guidance material.

The course of action

24. The Agency's rulemaking approach presented during the 'EASA Volcanic Ash operations workshop' in January 2011 consisted of a comprehensive three stage approach with the objectives of:

- supporting and contributing to on-going activities in the ICAO Volcanic Ash Task Force (IVATF);
- developing guidance material specifically for operational risk assessments as part of an SMS;
- defining and standardising airworthiness data required as input into operational risk assessments; and,
- establishing the future need and content of engine ash ingestion standards.

25. This approach is materialised by means of the following rulemaking deliverables:

1) A-NPA 2011-06 which was issued in May 2011 had the objectives to support the ICAO IVATF activities and identify how to benefit of such activities, especially with regards to the management of flight operation within volcanic ash contaminated areas.

2) NPA 2011-17 published for consultation on 22 September 2011. This NPA proposes a new obligation on manufacturers to identify any susceptibility of aircraft features to the effects of volcanic cloud contamination and to ensure that information necessary for safe operation is provided to operators.

3) A-NPA Airworthiness which is expected to be published before the end of 2011 is aimed at building consensus on the need for turbine engine volcanic ash limits and identifying challenges associated with volcanic ash testing.

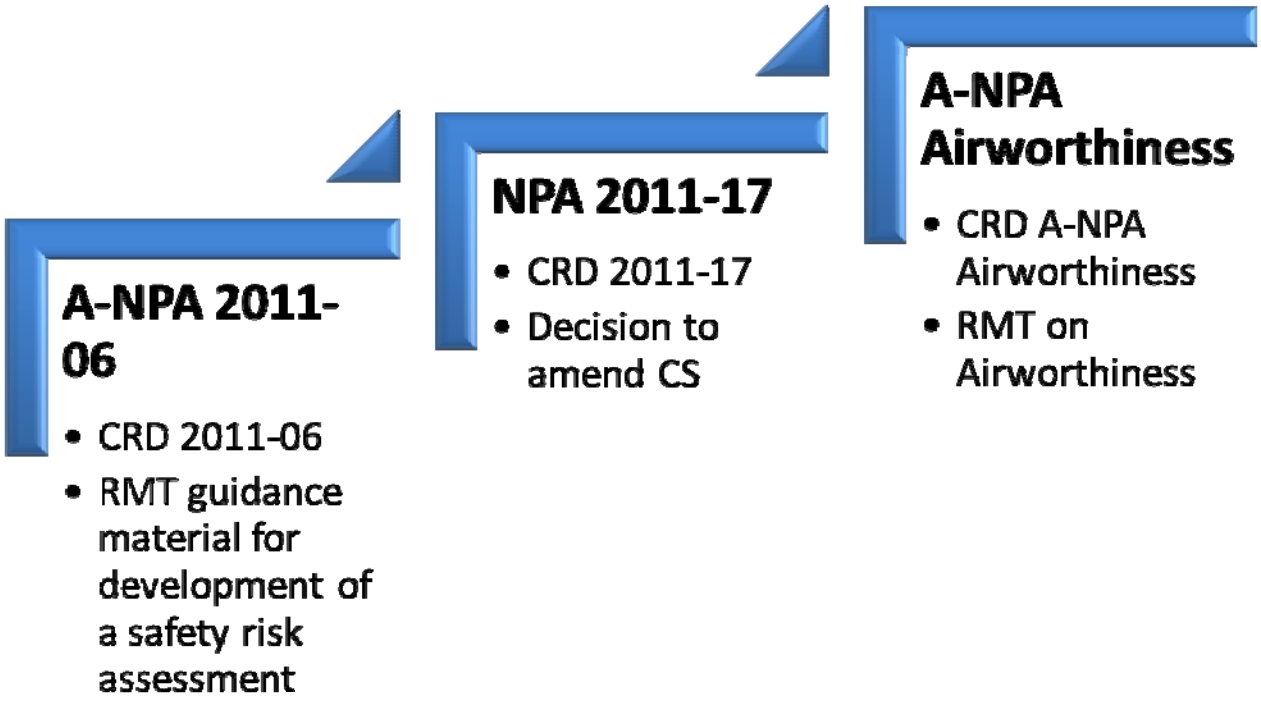
26. This CRD 2011-06 is the conclusion of the first step in the Agency's approach. The objectives initially targeted with A-NPA 2011-06 are considered to be met. On the one hand, A-NPA 2011-06 contributed to the consultation on version 4 of the IVATF AIR04 guidance material on management of flight operations with known or forecast volcanic cloud contamination and the comments received during this consultation helped to develop version 7 of the guidance material.

27. On the other hand, the questionnaire proposed by the Agency in A-NPA 2011-06 helped identifying the need to transpose such guidance material into the European regulatory framework. In order to fulfil this need the Agency is going to initiate a rulemaking task aimed at producing guidance material for operators on the development of a safety risk assessment for the management of flight operations in volcanic ash using the IVATF guidance material version 7.

28. NPA 2011-17 is the second stage in the Agency's rulemaking approach. This NPA arises from the need of operators to have access to adequate information regarding the susceptibility of the aircraft they operate to volcanic cloud related effects and any precautions that need to be taken into account in order to develop their safety risk assessment. This NPA proposes changes to EASA airworthiness codes, CS-23, CS-25, CS-27, CS-29, CS-E, CS-P and CS-APU, and it is open for consultation until 23 December 2011.

29. The third stage of the Agency's rulemaking approach will be reached at the end of 2011 with the issue of A-NPA on Airworthiness. The A-NPA will identify the suitability and practicalities of establishing turbine engine volcanic ash ingestion criteria. As with A-NPA

2011-06, the A-NPA on airworthiness should be a tool to help defining the needs and the actions to be implemented to fulfil such needs.



V. CRD table of comments, responses and resulting text

(General Comments)	-

comment	21	comment by: *Luftfahrt-Bundesamt*
	The LBA has no comments on A-NPA 2011-06.	
response	*Noted*	

comment	22	comment by: *Royal Danish Aeroclub*
	Attachment #1	
	When reading this A-NPA (page 49 H.2 Definitions) it becomes clear, that it concerns the following operators/aircraft: (Aircraft) Operator: In the context of this document, references to the (aircraft) operator refer to those operators subject to ICAO Annex 6 Parts I, II and III being operators of large and turbojet aeroplanes including those involved in international general aviation. [needs to be checked] EASA regulates also General Aviation including balloons, gliders and aeroplanes with piston engines. In some member states, all airspace was closed for weeks for all types of General Aviation following the eruption of the Eyafjallajokull volcano in April 2010. In Denmark information and guidelines for G/A was published initially 21 apr 2011 and in final form 12 jul 2011 as documented in attached AIC B 29/10. (A-NPA) No 2011-06 22. Considering the above, the European stakeholders are requested to reply to the following question: ***Question 1: Which action do you consider the Agency should take following the conclusion of the work of the ICAO IVATF AIR team 04?*** *(a) No immediate action is required. Wait until ICAO develops an amendment to Standards and Recommended Practices (SARPs) or guidance material.* *(b) Initiate a rulemaking task to take into account the work of the ICAO IVATF AIR team 04 at European level.* *(c) Other action. (Please go to question 4)* 23. If your answer to question 1 is option b), then you are requested to answer questions 2 and 3 in order to help identifying the deliverable expected and the priority of the proposed task. Alternatively, if your answer to question 1 is c), you are requested to answer only question 4. 28. As regards the reply provided to question 1, European stakeholders may consider that initiatives other than or in addition to a rulemaking task could be implemented. In that case, they are required to reply to question 4: Royal Danish Aeroclub proposes that information and guidelines for General Aviation be provided in parallel with any action EASA is taking for large and turbojet aeroplanes. The attached AIC B 29/10 could possibly be of use in this context.	

	Attached AIC B 29/10 dated 12 jul 2010
response	*Noted*
	The version 7 of the IVATF AIR04 team guidance material proposes in paragraph 2.2 that the approach set out in the document may also be applied to General Aviation. This should also be considered during the future rulemaking process.

comment	*23*	comment by: *AIRBUS*
	Attachments #2 #3	
	ICCAIA comments are attached.	
response	*Noted*	

comment	*38*	comment by: *SFB*
	General SFB Comment (1) : More solid EASA guidance is needed to avoid another fragmented approach with different Member States applying different safety measures. Safety measures must be proportionate to the risk. Complete ban of operations is unacceptable. There should be clear guidance on what constitutes a danger area and to ensure a harmonized application of the ash contamination levels. In addition, more EU leadership is required to deploy adequate radar / observation infrastructure in Iceland or over Europe to improve the VAAC model input and to have a better coordination of measurement tools. Therefore, the methods used for prediction of ash distribution are verified. It may be from a flight safety point of view, no doubt if an aircraft is in an area of real ashes or not.	
response	*Noted*	
	As a result of the A-NPA, the Agency is going to initiate a rulemaking task with the aim of producing guidance material based on version 7 of the IVATF AIR04 team document. As for the comment referring to the need for more EU leadership in order to improve volcanic observation infrastructure and the methods used for prediction of ash distribution, these were identified by the IVATF as critical issues at a global level after the meeting held in July in Montreal. In order to provide guidance for these issues, ICAO has set up a challenge team with representatives of several States, including European representatives.	

comment	*39*	comment by: *SFB*
	General SFB Comment (2) The draft ICAO document is confusing in some aspects. We agree with the principle that the operator has direct accountability for the safety of operations as defined in ICAO Annex 6 (see paragraph 2.2, page 18). However, this is contradicted by other statements throughout the document which gives the impression that Authorities need to give a formal approval before airlines are allowed to operate through areas with suspected volcanic ash contamination	

	(for example para 3.1 responsibilities, page 21 goes beyond the concept of acceptance and looks more like a formal approval procedure) From the SFB point of view, operators should be responsible for assessing the risk and conducting safe flight as part of their Safety Management System The role of regulators is to approve and oversee the safety management system of the airline, but not to get involved in particular safety cases. There should therefore only be a requirement to make the procedure for Safety Risk Assessment (SRA) available to the National Aviation Authority (= acceptance) but no need for the NAA to formally approve the safety cases or methodology used for a specific safety case. It is therefore important that the draft ICAO document is rephrased to make these different responsibilities of airlines and NAAs crystal clear.
response	*Noted*
	The version 7 of the IVATF AIR 04 guidance material presents the safety risk assessment as part of the operator's safety management system. In paragraph 3.1, responsibilities, the document clarifies that the national aviation authority should normally accept the safety risk assessment as an identifiable part of the operator's safety management system.

comment	*40*	comment by: *SFB*
	General SFB Comment (3) An SRA should be valid globally and should only be made available to the NAA of the state of the operator. There should be no need for separate approvals/acceptance from foreign NAA in charge of the airspace.
response	*Noted*
	The version 7 of the IVATF AIR04 guidance material presents the safety risk assessment as part of the operator's safety management system and explains that the aviation authority should normally accept the safety risk assessment as an identifiable part of the operator's safety management system. However, the document also recognises that until the approach proposed in the guidance material is widely adopted, a State may seek from another State or from a foreign operator confirmation of the implementation of a safety risk assessment. Nevertheless, this comment would be considered during the rulemaking process that should be initiated as a result of this A-NPA.

comment	*46*	comment by: *CAA CZ*
	The CAA CZ welcomes the possibility to comment on the NPA in question and on the ICAO IVATF proposal (version 04). The CAA CZ recommends initiating a rulemaking activity that would result in harmonisation of the requirements relating to the volcanic ash occurrences at EU level. Within this activity the results of the VOLCEX exercises should be considered.
response	*Noted*

comment	61	comment by: *AEA*
	General AEA Comment (1): More solid EASA guidance is needed to avoid another fragmented approach with different Member States applying different safety measures. Safety measures must be proportionate to the risk. Complete ban of operations is unacceptable. There should be clear guidance on what constitutes a danger area and to ensure a harmonized application of the ash contamination levels. In addition, more EU leadership is required to deploy adequate radar / observation infrastructure in Iceland or over Europe to improve the VAAC model input and to have a better coordination of measurement tools.	
response	*Noted*	
	As a result of the A-NPA, the Agency is going to initiate a rulemaking task with the aim of producing guidance material based on version 7 of the IVATF AIR04 team document. As for the comment referring to the need of more EU leadership in order to improve volcanic observation infrastructure and the methods used for prediction of ash distribution, these were identified by the IVATF as critical issues at a global level after the meeting held in July in Montreal. In order to provide guidance for these issues, ICAO has set up a challenge team with representatives of several States, including European representatives.	

comment	62	comment by: *AEA*
	General AEA Comment (2) The draft ICAO document is confusing in some aspects. We agree with the principle that the operator has direct accountability for the safety of operations as defined in ICAO Annex 6 (see paragraph 2.2, page 18). However, this is contradicted by other statements throughout the document which gives the impression that Authorities need to give a formal approval before airlines are allowed to operate through areas with suspected volcanic ash contamination (for example para 3.1 responsibilities, page 21 goes beyond the concept of acceptance and looks more like a formal approval procedure) From the AEA point of view, operators should be responsible for assessing the risk and conducting safe flight as part of their Safety Management System The role of regulators is to approve and oversee the safety management system of the airline, but not to get involved in particular safety cases. There should therefore only be a requirement to make the procedure for Safety Risk Assessment (SRA) available to the National Aviation Authority (= acceptance) but no need for the NAA to formally approve the safety cases or methodology used for a specific safety case. It is therefore important that the draft ICAO document is rephrased to make these different responsibilities of airlines and NAAs crystal clear.	
response	*Noted*	
	The version 7 of the IVATF AIR04 guidance material presents the safety risk assessment as part of the operator's safety management system and explains	

	that the aviation authority should normally accept the safety risk assessment as an identifiable part of the operator's safety management system. However, the document also recognises that until the approach proposed in the guidance material is widely adopted, a State may seek from another State or from a foreign operator confirmation of the implementation of a safety risk assessment. Nevertheless, this comment would be considered during the rulemaking process that should be initiated as a result of this A-NPA.

comment	*63*	comment by: *AEA*
	General AEA Comment (3) An SRA should be valid globally and should only be made available to the NAA of the state of the operator. There should be no need for separate approvals/acceptance from foreign NAA in charge of the airspace.	
response	*Noted*	
	See reply to comment 62.	

comment	*78*	comment by: *ERA*
	European Regions Airline Association: The limited time available to respond to this A-NPA is of concern. EASA would be advised to take care when pre-empting ICAO's activities by preparing rules ahead of an ICAO decision. Especially as EASA's SIB 2010-17R4 is a good base for development as it recognised as being mature enough for use. EASA should consider a number of possible options, such as: • Develop an AMC for operators risk assessment • Amend via the fast track process, IR-ARO and or ATM to mandate ANSPs to provide data necessary for the risk assessment by operators. • Ensure NAAs allow risk assessment to be conducted and that acceptance in one state will be mutually recognised in others.	
response	*Noted*	
	One of the objectives of this A-NPA was to collect feedback from stakeholders on how they consider the Agency should proceed following the activities of the IVATF. Therefore, with this A-NPA the Agency is not pre-empting that rulemaking is necessary. SIB2010-17 will be updated to include version 7 of the IVATF AIR04 team guidance material. The last part of this comment would be considered during the rulemaking process that should be initiated as a result of this A-NPA.	

comment	79	comment by: *AIRBUS*
	Airbus has contributed to, and endorses, ICCAIA letter ref. ICCAIA/AC/052.	
response	*Noted*	

comment	80	comment by: *European Cockpit Association*
	ECA - through its international parent organisation, IFALPA - will provide detailed feedback on Draft 4 through ICAO's consultation channels. Only a few comments (those that are of particular importance in relation to the 4 questions raised in this NPA) are provided within the EASA Comments and Response Tool. ECA is concerned that the safety maturity of States (and their appropriate authorities) varies greatly and that therefore no uniform level of safety can be achieved by guidance material only. The validity of this argument is confirmed by the fact that the European Union considers it necessary to establish and maintain a "black list" of airlines that do not guarantee an adequate level of safety and are therefore banned from operating in EU airspace.	
response	*Noted*	
	This comment would be considered during the rulemaking process that should be initiated as a result of this A-NPA.	

comment	86	comment by: *The Norwegian Ministry of Transport and Communications*
	EASA - Advance notice of proposed amendment (A-NP A) No 2011-06 Reference is made to the Advanced Notice of Proposed Amendment (A-NPA) No 2011-06 dated 03 March 2011 concerning the consultation on the ICAO IV ATF paper on the management of flight operations with known or forecast volcanic cloud contamination. It is our firm view that there is a need for common European rules harmonising the management of flight operations related to volcanic contamination of the air space. At the same time we realise the necessity of flexibility for the airline operators within certain limits. Generally, and related to your questionnaire, the main issue to discuss should therefore be where to draw the line between obligatory regulation and, if at all, attached guidelines. We have the following comments to the different questions in your questionnaire: Øyvind Ek Deputy Director General *on behalf of* the Norwegian Ministry of Transport and Communications	
response	*Noted*	
	This comment would be considered during the rulemaking process that should be initiated as a result of this A-NPA.	

ADVANCE NOTICE OF PROPOSED AMENDMENT (A-NPA) No 2011-06 – General comments p. 1-2

comment	10	comment by: *AAPA*

The Association of Asia Pacific Airlines (AAPA) appreciates this opportunity to submit comments on the EASA Advance Notice of Proposed Amendment (A-NPA) 2011-06, concerning consultation on the ICAO IVATF paper about the management of flight operations with known or forecast volcanic cloud contamination.

The AAPA is the principal trade and service organisation for the leading scheduled international air carriers based in the Asia Pacific region1[1]. Carriers in the Asia Pacific today, already carry a quarter of global passenger traffic, and 40% of global freight traffic. AAPA members' traffic represents more than 17% of the global passenger traffic and more than 30% of the global freight traffic.

First, and foremost, AAPA would like to indicate its appreciation for the opportunity to comment on the A-NPA and we trust our comments will be given due consideration.

With 6 million passengers globally travelling safely on a daily basis it should not come as a surprise that the industry's number one priority of safety remains unchanged. Flying is undoubtedly the safest mode of travel. This is not by chance, but the result of the continuous efforts of a mature responsible aviation industry responding to lessons learnt from in-service difficulty reporting by operators or from the results of aircraft accident and incident investigations.

1[1] Royal Brunei Airlines, EVA Airways, China Airlines, Cathay Pacific Airways, Garuda Indonesia, Japan Airlines, Dragonair, Korean Air, Malaysia Airlines, All Nippon Airways, Asiana Airlines, Philippine Airlines, Singapore Airlines, Thai Airways International, Vietnam Airlines.

response *Noted*

comment	97	comment by: *Luftfartstilsynet, Norge (CAA Norway)*

Dear Sir/Madam,

With reference to the Advanced Notice of Proposed Amendment (A-NPA) No 2011-06 dated 03 March 2011, related to consultation on the ICAO IVATF paper about the management of flight operations with known or forecast volcanic cloud contamination.

We have all gained experience from two volcano eruption the last year as we just now are at the end phase of the eruption of the Icelandic volcano

	Grimsvotn. The need for common rules and a European harmonisation regarding management of flight operations related to volcanic cloud contamination has become tremendously visible to us all. The CAA Norway would like to thank the European Aviation Safety Agency for the quick response in the latest volcano eruption by issuing the SIB No: 2010-17R4 on the 24 of May 2011. Comments and reply to questions of the proposal in A-NPA from CAA Norway are the following: Yours sincerely Svein J. Pedersen Ira Smedby Head of ANS department Inspector Meteorology
response	*Noted*
	SIB2010-17 will be updated to include version 7 of the IVATF AIR04 team guidance material.

comment	*105*	comment by: *Federation of Norwegian Aviation Industry*
	ADVANCE NOTICE OF PROPOSED AMENDMENT (A-NPA) NO 2011-06 Dear Sir/Madam With reference to A-NPA No 2011-06 the Federation of Norwegian Aviation Industry (NHO Luftfart) would like to comment on the raised questions. Yours sincerely Federation of Norwegian Aviation industry Torbjørn Lothe Director General	
response	*Noted*	

comment	*109*	comment by: *FAA Aircraft Certification*
	FAA Comments to EASA A-NPA 2011-06 **'Consultation on the ICAO IVATF paper about the management of flight operations with known or forecast volcanic cloud contamination'** Prepared by: John Fisher, ANE-111, FAA May 18, 2011 EASA has posed the following questions in their A-NPA. FAA proposed comments to each question are included. After each EASA question, there is a series of options in italics that represent EASA's suggested response options. Following the EASA choices for response is an FAA response section for each question.	
response	*Noted*	

EXECUTIVE SUMMARY

comment	28	comment by: *IACA International Air Carrier Association*

1. IACA notes the gradual improvements made since the eruption of the *Eyjafjallajökull* in April 2010, including the extensive work done by airframe and engine manufactures providing written guidance to operators. Major concerns remained on how individual States will deal with the next volcanic eruption, especially the potential inconsistencies between States when establishing Danger Areas.

2. Here, IACA is pleased to notice the progress during the eruption of the *Grímsvötn* in May 2011. The vast majority of the (European) States accepted the Risk Assessment concept for operation into Areas of Medium Contamination, where volcanic ash may be encountered at forecast concentrations greater than 2 mg/m³, but less than 4 mg/m³. Still, in a few exceptions, a Restricted Area was declared through which flights were prohibited.

3. The same consensus did not exist for Areas of High Contamination where volcanic ash may be encountered at forecast concentrations equal to or greater than 4 m g/m³. It stems however positive that the number of States that maintained the Risk Assessment approach was slightly higher than those declaring Danger Areas and applying a zero flight rate.

4. This real test case once more demonstrates the need for a harmonised approach on risk assessment. **IACA welcomes this A-NPA 2011-06 to formalise (European) comments on the latest ICAO IVATF Guidance Material; ICAO is an opportunity for a globally harmonised approach, i.e. beyond the European borders.**

5. To assess the adequacy and feasibility of the ICAO guidance material, the International Air Carrier Association organised a survey on the implementation of the recommendations among its member airlines, with an impressive response rate of 66%. The results were encouraging: the guidance published by the aircraft and engine manufacturers was implemented: operators reviewed and updated their procedures; operators' policies included routeing, diversion, enhanced flight watch, extra fuel...; operators report in-flight volcanic ash and maintenance findings.

6. The guidance is useful and practical to achieve safe flight operations in airspace with know/forecast volcanic ash contamination or at aerodromes with runway volcanic ash contamination, without further investigation by National Aviation Authorities, being confident in the ability of operators to undertake such operations with minimal risk.

7. IACA much appreciated that during the eruption of the *Grímsvötn* flights entering such airspace could satisfy with a statement and were not challenged to show any Safety Risk Assessment. **Mutual confidence in - the safety management and risk assessment by the operator and the source data provided by States and their Air Navigation Service providers - is essential for safe flight operations with known or forecast volcanic cloud contamination.** IACA hereby welcomes any further improvements to the accuracy of source data, such as but not limited to ash concentration maps.

response	*Noted*

A-NPA No 2011-06 – A. EXPLANATORY NOTE – IV. Content of the A-NPA – Background p. 5

comment	*81*	comment by: *DGAC*

General Comments :

1. Approval by the operator's NAA of the Safety Risk Assessment implemented by operators wishing to conduct operations in areas of known or forecast volcanic contamination should not be required.

The document should reflect this but is currently unclear on this issue :
E.g. :
- Approval nor acceptance are mentioned in §**2.2 Managing the risk (page 18)**

- But **prior** acceptance is mentioned In §**3.1 Responsibilities c) and d) (page 21)**

"c) The operator should have its SRA accepted by its supervising NAA before initiating operations […]"

"d) An operator will need to have satisfied its NAA regarding the likely accuracy and quality of information sources…"

The SRA and elements on which the SRA is based should be acceptable ("acceptable" as per EU OPS 1.003), in which case no prior validation is needed from the NAA.

In the future, when SMS are mandated :
- SRA should be part of the SMS,
- Acceptance of the SMS should mean acceptance of its sub parts, hence of the SRA

2. Validity of a SRA should be global : as long as it is considered acceptable to the operator's NAA, no obstacle should be raised to its operations.

3. DGAC recognises that the document improves the decision making process for continuation or discontinuation of operations in areas of known/forecast volcanic contamination.

At the same time harmonisation of provisions pertaining e.g. to ANSP is not achieved as stated in §**2.3 Coordinating the response to a volcanic event (page 19)** ("This present document, in addressing the role of the aircraft operator and of the operator's NAA, is complementary to the documents listed above [Doc 4444, ICAO Manual on Vocanic Ash…]. Relevant parts of these documents are under review by other subgroups of IVATF and amendment proposals are to be expected. In time, it is anticipated that ICAO will wish the guidance material to be consolidated.").

	This is why we urge to be cautious on rulemaking process initiation
response	*Noted*
	The version 7 of the IVATF AIR04 guidance material presents the safety risk assessment as part of the operator's safety management system and explains that the aviation authority should normally accept the safety risk assessment as an identifiable part of the operator's safety management system. However, the document also recognises that until the approach proposed in the guidance material is widely adopted, a State may seek from another State of from a foreign operator confirmation of the implementation of a safety risk assessment. Nevertheless, this comment would be considered during the rulemaking process that should be initiated as a result of this A-NPA.

A-NPA No 2011-06 – A. EXPLANATORY NOTE – IV. Content of the A-NPA – Objectives p. 5-6

comment	*11*	comment by: *AAPA*
	The AAPA welcomes the decision by EASA to seek consultation from aviation stakeholders on the future course of actions that should be implemented by EASA, in Europe, following the release of the final version of the IVAFT guidance material which is expected in July 2011. The potential hazard to aviation activities resulting from volcanic ash is not unique to Europe. Within Asia and North America there is wide experience of such airline operations and they have been and continue to be operated safely and efficiently. Understandably, AAPA welcomes and supports the work of the ICAO IVATF as it will assist in harmonising established best practice of the operator sourcing the best available information, developing the necessary risk assessment and taking the required decision for continued operations. Nevertheless, it is understood that following eruption of the Eyafjallajokull volcano in Iceland in April 2010 and the significant impact it had on Europe there is a need to re-evaluate requirements to respond to similar situations in the future and to minimise the social and economic impacts. AAPA submits that ICAO is the appropriate international organisation to take the leadership role in providing guidance to the aviation community on the management of flight operations within known and forecast volcanic cloud contamination. Following the Eyafjallajokull volcano event ICAO has responded accordingly with the establishment of the IVATF and has developed draft guidance material that is linked to an SMS safety risk assessment. AAPA believes this is certainly a step in the right direction for a more pragmatic and coherent approach instead of blanket closures of national airspace without any specific technical assessment of the actual situation concerning the spread of volcanic ash. We encourage greater use of shared data, and collaborative decision making, involving all interested stakeholders, as they are keys to proper risk assessment.	

response	*Noted*
	This comment would be considered during the rulemaking process that should be initiated as a result of this A-NPA.

A-NPA No 2011-06 – A. EXPLANATORY NOTE – IV. Content of the A-NPA – The need for a rulemaking initiative p. 6

comment	*1*	comment by: *Chief Operational Support NUAC*
	My comment is on the behalf of the Operational Support NUAC Copenhagen, and is covering our view on the subject with a Danish focus. We are not the regulator and not the service provider, we are delivering operational support to the Danish service provider and are commenting as such. We believe the correct approach would be a) since it makes the most sense to ensure a world wide approach. However we believe the matter should be treated with high importance and it is absolutely necessary to ensure progress in the ICAO work.	
response	*Noted*	

comment	*2*	comment by: *Heinz Frühwirth - IFALPA*
	Question 1: Due to the yet undetermined outcome of the discussion of ICAO's IVATF in a great number of details that affect the outcome of the draft document provided by ICATF AIR team 04, **EASA should wait at least until after the second meeting of IVATF (11 - 15 July 2011) before committing to any action.**	
response	*Noted*	

comment	*3*	comment by: *REGIONAL (gilles VITROU)*
	Our answer to question 1) is b) "Initiate a rulemaking task to take into account the work of the ICAO IVATF AIR team 04 at European level." Risks of new eruptions are real ; the sooner an organization will be in place in europe, the better. This organiation will first be based upon work of the ICAO IVATF AIR team 04 paper and when SARPs or guidance material is issued, organization if needed will be amended.	
response	*Noted*	

comment	*6*	comment by: *BALPA*
	BALPA's answer to question 1 is a) Justification: It is highly desirable to work through ICAO in order to achieve global standardisation. The ICAO process should only be pre-empted in order to significantly enhance safety or to reduce disruption to flight operations. Rulemaking in advance of the ICAO process could lead to undesirable differences between EU rules and ICAO SARPs. It is assumed that in the event of a further VA event before ICAO SARPs are published the procedures adopted within Europe will be based on those established as a result of the Eyafjallajokull eruption. These procedures are sufficient to provide a safe operation. Although the procedures may be	

	disruptive it is unlikely that any procedures developed in advance of the outcome of the ICAO process will be signifcantly less disruptive. Disruption is best reduced by improved detection and prediction of VA.
response	*Noted*

comment	*7*	comment by: *Denim Air*

In answer to Question 1: c - other action. See position below.

General
During the disruption in 2010 the airspace restrictions put in place by the NAAs were not all developed according to the usual procedures. Political and media pressure appears to have played a role in some cases. This is something that EASA's proposed requirements will not be able to address. For example, the Dutch ATS provider claims not to have shut the airspace, but merely to have reduced the airspace capacity to zero, thereby grounding all flights including, explicitly mentioned, gliders.

An effort to develop and adopt detailed requirements does not seem warranted in the light of the above and the likelihood that similar restrictions will be applied on a state by state basis. Until a single European approach is taken to airspace management – from the ground up – the requirements proposed here are unlikely to be of much use.

Link with ICAO
Furthermore, EASA should take great care when pre-empting ICAO's activities by preparing rules ahead of ICAO. In the interim, EASA's SIB 2010-17R2 is a good basis for any regulatory material that has been developed and is considered mature enough for use.

Content of the A-NPA
There is no need to explain **how** to perform a risk assessment. The data in Appendix B (similar to Attachment 1 in ICAO document EUR/NAT VATF/1) is of use as one, but not the only, means of compliance. Equally, Appendix C is of use. These materials could be integrated into a new revision of SIB 2010-17.

Relationship with EASA OPS
If rulemaking is planned, the result of the approval should be regulated. An addition to SPA is the only way to ensure that other NAAs respect the approval to operate in low concentrations of ash – assuming that the airspace made available.

TC –holder data
Some of the data required for the mitigation risks do not exist. For example, not all turboprop powered commuter aeroplanes have an approved procedure for dealing with unreliable air data (a 'pitch & power' table). Where the TC-holder declines or is unable to produce such data the operator should be permitted to have its own research (e.g. data gathered in the simulator) easily approved.

response	*Noted*

comment	*12*	comment by: *AAPA*

We take note that EASA A-NPA endeavours to support the work of ICAO IVATF AIR 04 team. EASA is well aware that ICAO is in the final stage of finalising its guidance material which could potentially become an amendment to ICAO SARPS. AAPA therefore would urge EASA to delay the proposed rulemaking process until the work of the ICAO IVATF has been finalised thereby ensuring harmonisation and standardisation of processes and procedures and the avoidance of potential differences.

The introduction of additional rules in advance of ICAO's efforts either by EASA or any other national aviation authorities would only add extra burden to air operators and demote the global effort in harmonising international aviation policy.

Question 1:

The AAPA strongly suggests EASA to take no immediate action and wait until ICAO has finalised its efforts to develop either an amendment to ICAO SARPS or guidance material.

response *Noted*

comment *24* comment by: *UK CAA*

Question 1: Which action do you consider the Agency should take following the conclusion of the work of the ICAO IVATF AIR team 04?

Answer: b) Initiate a rulemaking task to take into account the work of the ICAO IVATF AIR team 04 at European level.

response *Noted*

comment *33* comment by: *IACA International Air Carrier Association*

IACA answer to Question 1:
b) EASA should initiate a rulemaking task to ensure the uniform and harmonised application of the ICAO guidance at European level. This rulemaking tasks (OPS.089) shall be conducted with industry experts (Group).

response *Noted*

comment *37* comment by: *MOT Austria*

PLease find below the answers from Austria to the Questions listed in the NPA:

Question 1: Which action do you consider the Agency should take following the conclusion of the work of the ICAO IVATF AIR team 04?
b) Initiate a rulemaking task to take into account the work of the ICAO IVATF AIR team 04 at European level.

Question 2: How should Attachment 1 to the ICAO IVATF AIR team 04 Working Paper be implemented in the European regulatory framework?
c) The content of the ICAO IVATF AIR team 04 paper should be included partly

	in an Opinion and partly in a Decision. (Opinion: Definitions, responsibilities of NAAs and operators, safety risk assessment; Decision: guidlines of procedures and processes (AMC/GM) **Question 3: What priority should be given to the proposed rulemaking task?** *a) High priority; the task should start immediately after the conclusion of the work of the ICAO IVATF AIR team 04.*
response	*Noted*

comment	*41*	comment by: *SFB*
	Reply to the questions raised (Page 6 and Page 7) Question 1: Which action do you consider the Agency should take following the conclusion of the work of the ICAO VATF AIR team 04? SFB reply: Answer b). EASA should initiate a rulemaking task to ensure there is uniform application of the ICAO guidance through Europe. This rulemaking task should be conducted in full cooperation with industry experts. Question 2: How should the attachment 1 to the ICAO IVATF AIR team 04 working paper be implemented in the European regulatory framework? SFB reply: Answer a) The content of the ICAO IVATF AIR team 04 paper should be included in a Decision and implemented as guidance material to the requirements for operators and National Aviation Authorities Question 3) What priority should be given to the proposed rulemaking task SFB reply: Answer a) High priority. This is essential since another fragmented reaction during a volcanic eruption should be avoided taking into account the huge economic impact on the airline industry not justified on safety grounds. Question 4) Which action do you consider the Agency should take following the conclusion of the work of the ICAO IVATF AIR team 04? SFB reply: More work is required at European level to ensure a consistent and harmonized interpretation of the guidance material. In particular a new SIB will be needed at short notice to push for harmonization of ash contamination levels and danger areas in line with ICAO guidance. In addition, more work is required at EU level to ensure a better coordination of measurement tools and to improve information management related to volcanic ash but this should not delay the implementation of the SRA approach.	
response	*Noted*	

comment	42	comment by: *European Cockpit Association*
	Question 1: which action do you consider the Agency should take following the conclusion of the work of the ICAO IVATF AIR team 04? a) No immediate action is required. Wait until ICAO develops an amendment to Standards and Recommended Practices (SARPs) or guidance material. ECA considers that the work of ICAO's International Volcanic Ash Task Force (IVATF) is not concluded with the development of Draft 4 of above mentioned document. The paper has only the status of a discussion paper for the upcoming IVATF/2 meeting (11-15 July), where it will most likely be further amended. IVATF still has to find consensus on a number of issues that affect the concept of safety risk assessments (SRA) for the management of flight operations. Furthermore the basis for the SRAs (information on the type, content and extent of volcanic contamination) is still under development within IVATF. Given the extensive discussion on a number of issues still going on within the scientific community, there is no reasonable assurance yet about the maturity of the material produced by AIR team 04. **Comments**: Although harmonisation of the process and methods for SRAs through a European rulemaking activity is inevitable to achieve a uniform and adequate level of safety in the European market, it is preferable to work through ICAO in order to achieve global standardisation first. Rulemaking in advance of the outcome of the ICAO process can create a clash with eventual ICAO SARPs. Airplanes and pilots operate worldwide. Volcanoes exist on every continent. Therefore, one set of procedures and rules has to be created within the framework of ICAO in order to achieve one level of safety, worldwide.	
response	*Noted*	

comment	47	comment by: *CAA CZ*
	Question 1: Initiate a rulemaking task to take into account the work of the ICAO IVATF AIR team 04 at European level.	
response	*Noted*	

comment	50	comment by: *DTA*
	Question 1: Option b) Question 2: Option a)	
response	*Noted*	

comment	53	comment by: *CAA-NL*

	Answer to question 1: Alternative b. However this action is already initiated by the issue of the SIB during the volcanic eruption of the Grimvotn. Consistency of rules to be checked, specifically on the responsibility and activities of the operator/pilot and the ATSP/controller
response	*Noted*

comment	*65*	comment by: *AEA*
	Reply to the questions raised (Page 6 and Page 7) Question 1: Which action do you consider the Agency should take following the conclusion of the work of the ICAO VATF AIR team 04? AEA reply: Answer b). EASA should initiate a rulemaking task to ensure there is uniform application of the ICAO guidance through Europe. This rulemaking task should be conducted in full cooperation with industry experts.	
response	*Noted*	

comment	*82*	comment by: *DGAC*
	Answer to Question 1 : b) Nevertheless, the rulemaking task to take into account the work of the ICAO IVATF AIR team 04 should only be initiated when the ICAO guidance is mature enough.	
response	*Noted*	

comment	*87*	comment by: *The Norwegian Ministry of Transport and Communications*
	Ad Question 1: Which action do you consider the Agency should take following the conclusion of the work of the ICAO IVATF AIR team 04? In our view reply (b) should be the correct answer. We consider that the Agency should initiate a rulemaking task taking into account the work of the ICAO IVATF AIR 04. Such rulemaking process is the only way to achieve the necessary harmonization and common approach at a European level.	
response	*Noted*	

comment	*93*	comment by: *Snecma*
	Attachment #4	
	Please see attached file for comments	
response	*Noted*	

comment	98	comment by: *Luftfartstilsynet, Norge (CAA Norway)*
	Question 1: **Which action do you consider the Agency should take following the conclusion of the work of the ICAO IVATF AIR team 04?** **b)** We consider that the Agency initiate a rulemaking task to take into account the work of the ICAO IVATF AIR 04. A rulemaking process would be the accurate way to achieve a harmonization and a common approach at European level.	
response	*Noted*	

comment	101	comment by: *Ryanair*
	Question 1: Which action do you consider the Agency should take following the conclusion of the work of the ICAO IVATF AIR team 04? Initiate a rulemaking task to take into account the work of the ICAO IVATF AIR team 04 at European level.	
response	*Noted*	

comment	106	comment by: *Federation of Norwegian Aviation Industry*
	Question 1: NHO Luftfart supports action point b). In our view a harmonized European regulatory framework in this area is of utmost importance for a functional and level playing field for European aviation.	
response	*Noted*	

comment	110	comment by: *FAA Aircraft Certification*
	Question 1: Which action do you consider the Agency should take following the conclusion of the work of the ICAO IVATF AIR team 04? *No immediate action is required. Wait until ICAO develops an amendment to Standards and Recommended Practices (SARPs) or guidance material.* *Initiate a rulemaking task to take into account the work of the ICAO IVATF AIR team 04 at European level.* *Other action. (Please go to question 4)* FAA Response to Question 1: The FAA agrees with the first optional response suggested by EASA above. We recommend that EASA take no action on this draft AIR04 document until ICAO has fully developed this document as well as other related standards and recommended practices (SARPs) that represent fully agreed guidance on operations near volcanoes. Currently the ICAO Volcanic Ash Task Force has not completed their work and many issues have not been resolved by this international community.	
response	*Noted*	

A-NPA No 2011-06 – A. EXPLANATORY NOTE – IV. Content of the A-NPA – The deliverable expected p. 6-7

comment	*4*	comment by: *REGIONAL (gilles VITROU)*
	Our answer to question 2 is c) "The content of the ICAO IVATF AIR team 04 paper should be included partly in an Opinion and partly in a Decision. " Organization (including SRA) airlines have to implement, should be guidance materials. General principles (defining that airlines are responsible to decide of their operations in vulcanic contaminated area subject to NAA accepting their SRA) should be opinion.	
response	*Noted*	

comment	*13*	comment by: *AAPA*
	Question 2: In the event the EASA rulemaking goes forward, the AAPA would strongly suggest EASA to consider including the content of the ICAO IVATF AIR team 04 paper, once finalised, should be included in a Decision and implemented as guidance material to the requirements for operators and National Aviation Authorities.	
response	*Noted*	

comment	*19*	comment by: *BALPA*
	Although BALPA's answer to Q1 is a) a rulemaking process will eventually be initiated in response to the ICAO process. An answer to Q2 is therefore appropriate. BALPA's answer to Q2 is c). Appendices B and C contain material that should form part of an opinion. Other parts of the A-NPA are guidance material.	
response	*Noted*	

comment	*25*	comment by: *UK CAA*
	Question 2: How should Attachment 1 to the ICAO IVATF AIR team 04 Working Paper be implemented in the European regulatory framework? Answer: a) The content of the ICAO IVATF AIR team 04 paper should be included in a Decision and implemented as guidance material to the requirements for operators and National Aviation Authorities.	
response	*Noted*	

comment	*34*	comment by: *IACA International Air Carrier Association*

	IACA answer to Question 2: c) The content of the ICAO IVATF AIR team 04 paper should be included in a **Decision** and implemented as guidance material to the requirements for operators and National Aviation Authorities. Additionally, an **Opinion** will be required to amend the applicable rules (e.g. ARO, ATM...) to ensure that States and Air Navigation Service Providers provide the source data required for the risk assessment as specified in the ICAO guidance (such as but not limited to ash concentration maps). Due to the urgency and considering the established procedures, a "fast-track" process could be applied for this Opinion.
response	*Noted*

comment	*43*	comment by: *European Cockpit Association*
	Question 2: How should Attachment 1 to the ICAO IVATF AIR team 04 Working Paper be implemented in the European regulatory framework? a) The Having answered a) to Q1, an answer is not required to Q2 but nevertheless ECA believes that the appropriate rulemaking tool depends on the outcome of IVATF/2. Comments: most of the material in the Annex of the A-NPA contains 'Recommendations', 'Guidelines' or 'Examples'. These together with the Definitions and Introduction sections are appropriate for guidance material. Appendix B 'Procedures to be considered by an Aircraft Operator when conducting a Safety Risk Assessment' and Appendix C 'Risks to be considered by an Aircraft Operator when conducting a Safety Risk Assessment' contain material that should form part of the requirements in any regulations	
response	*Noted*	

comment	*48*	comment by: *CAA CZ*
	Question 2: An Opinion should be issued proposing an amendment to include specific requirements in the implementing rules for operators and National Aviation Authorities in line with the content of the ICAO IVATF AIR team 04 papers. The specific requirements should be also included in the implementing rules for ATM and aerodromes.	
response	*Noted*	

comment	*55*	comment by: *CAA-NL*
	Answer to question 2: Alternative c. The introduction of the work of IVATF AIR team 04 has consequences for (1)the operator as the SMS should be amended as well as the operational procedures (2) Air Traffic Service provider, as the ATSP is no longer responsible to separate aircraft from volcanic ash, but remains responsible for separation between aircraft in contaminated area's and (3) the NAA, as certification and safety oversight needs to be aligned to the proposals	

	as described by the IVATF. Clear responsibilities and obligations should be in the rule/opinion, guidelines should be in the descision/AMC/GM. Depending on the way these issues are regulated at the time, amendments are needed.
response	*Noted*

comment	*66*	comment by: *AEA*
	Question 2: How should the attachment 1 to the ICAO IVATF AIR team 04 working paper be implemented in the European regulatory framework? AEA reply: Answer a) The content of the ICAO IVATF AIR team 04 paper should be included in a Decision and implemented as guidance material to the requirements for operators and National Aviation Authorities.	
response	*Noted*	

comment	*83*	comment by: *DGAC*
	Answer to question 2 : a) The content of the ICAO IVATF AIR team 04 paper should be included in a Decision and implemented as guidance material to the requirements for operators and National Aviation Authorities. Inclusion in an opinion may be envisaged at a later stage, when experience on operations in areas of known or forecast volcanic contamination is gained and work on other ICAO documents performed, at least nearly achieved (see general comment 3 associated to page 5)	
response	*Noted*	

comment	*88*	comment by: *The Norwegian Ministry of Transport and Communications*
	Ad question 2: How should attachment 1 to the ICAD IVATF AIR team 04 working paper be implemented in the European regulatory framework? With reference to what is mentioned in our second paragraph above, at least the following items in the ICAO IV ATF team 04 paper should be incorporated in a European mandatory regulation: 1. Definitions 2. Introduction 2.2 Managing the Risk 2.3 Coordinating the response to a volcanic event 3.1 Responsibility 3.2 Procedures 3.3 Information 4.0 National Aviation Authority (NAA) With some doubt we consider that the following items in the ICAO IVATF team 04 paper could be a part of the Guidance Material:	

Appendix A: Guidelines for completing a Safety Risk Assessment
Appendix B: Procedures to be considered by an Aircraft Operator
Appendix C: Risk to be considered by an Aircraft Operator
Appendix D: Example of Risk Register
Appendix E: Guidelines on volcanic activity information and operator response
Appendix F: Guidance for NAAs on evaluating an operator's capability to conduct flights safely in relation to volcanic ash.
Appendix G: Example of a safety and risk assessment matrix.

We have some further comments to the points 3.1, 3.2 and 4 above:

In line with the comments made by the Norwegian Civil Aviation Authority, we believe that there is a need to accentuate a clearer division of responsibilities between the aircraft operator and the NAA (refer the above points 3.1 and 4). Furthermore, Opinion item 4.0 NAA might be too limited concerning the responsibility of the NAAs. It may therefore be necessary to include some of the substance of Appendix F from the Guidance material into the regulation.

The ICAO Safety Management Manual (Doc 9859 Section 9, Issue2, 2009) should also be consulted to possibly add the needed substance.

Regarding Opinion item 3.2 Procedures, it should be clearly stated that the Operator's
procedures shall be accepted by its NAA. In the regulation, the terminology *should* used in the ICAO working paper principally should be replaced with *shall*.

response *Noted*

comment 91 comment by: *Heinz Frühwirth - IFALPA*

IFALPA believes that the appropriate rulemaking tool depends on the outcome of ICAO's International Volcanic Ash Task Force (UVATF) and the Agency should wait at least for the outcome of its second meeting (IVATF/2) in July 2011.

response *Noted*

comment 94 comment by: *Snecma*

See attached file for comments on page 6

response *Noted*

comment 99 comment by: *Luftfartstilsynet, Norge (CAA Norway)*

Question 2: **How should attachment 1 to the ICAO IVATF AIR team 04 working paper be implemented in the European regulatory framework?**

c) We consider that the content of the ICAO IVATF AIR team 04 paper should be included partly as regulation and partly as guidance material.

Henceforth the reference is made to the items in the ICAO IVATF team 04 paper which we consider should be made regulation**:**

2. Introduction/could be renamed Objective and scope
2.2 Managing the Risk
2.3 Coordinating the response to a volcanic event
3.1 Responsibility
3.2 Procedures
3.3 Information
4.0 National Aviation Authority(NAA)

Henceforth the reference is made to the items in the ICAO IVATF team 04 paper which we consider should be a part of **Guidance Material:**
Appendix A: Guidelines for completing a Safety Risk Assessment
Appendix B: Procedures to be considered by an Aircraft Operator
Appendix C: Risk to be considered by an Aircraft Operator
Appendix D: Example of Risk Register
Appendix E: Guidelines on volcanic activity information and operator response
Appendix F: Guidance for NAA`s on evaluating an operator`s capability to conduct flights safely in
relation to volcanic ash.
Appendix G: Example of a safety and risk assessment matrix
Appendix H: Terminology

The item 3.1 responsibility could be divided in two parts notice the responsibility to the NAA`s and the responsibility to the Aircraft Operator.
Our suggestion regarding Opinion item 4.0 NAA`s, is that this item might be too limited stating the responsibility of the NAA`s. From an NAA`s point of view it may be necessary to include some of the substance in Appendix F from Guidance material into the regulation. Furthermore the ICAO Safety Management Manual (Doc 9859 Section 9, Issue2, 2009) should also be consulted to possibly add the needed substance.
Our suggestion regarding Opinion item 3.2 Procedures, is that it should be clearly stated that the Operators procedures shall be accepted by its NAA's as with any other procedure. In some part of the document this can be misunderstood. In the parts of that are made regulation we consider that the terminology **should** used in the ICAO working paper principally should be replaced with the **shall**.

response *Noted*

comment *102* comment by: *Ryanair*

Question 2: How should Attachment 1 to the ICAO IVATF AIR team 04 Working Paper be implemented in the European regulatory framework?

An Opinion should be issued proposing an amendment to include specific requirements in the implementing rules for operators and National Aviation Authorities in line with the content of the ICAO IVATF AIR team 04 paper.

response *Noted*

comment *107* comment by: *Federation of Norwegian Aviation Industry*

	Question 2: NHO Luftfart considers that the content of the ICAO IV ATF AIR team 4 paper should partly be implemented as a regulation, and partly as guidance material. In general we consider that section 1- 4 in the paper should be made a regulation, while appendix A-H should be implemented as guidance material. Some items in section 1 - 4 may after due consideration among stakeholders be implemented as guidance materiel. Likewise some material from the appendix may strengthen the implementing rules, for example some parts of appendix F may clarify the responsibility of the NAA.
response	*Noted*

comment	*111*	comment by: *FAA Aircraft Certification*
	Question 2: How should Attachment 1 to the ICAO IVATF AIR team 04 Working Paper be implemented in the European regulatory framework? *The content of the ICAO IVATF AIR team 04 paper should be included in a Decision and implemented as guidance material to the requirements for operators and National Aviation Authorities.* *An Opinion should be issued proposing an amendment to include specific requirements in the implementing rules for operators and National Aviation Authorities in line with the content of the ICAO IVATF AIR team 04 paper.* *The content of the ICAO IVATF AIR team 04 paper should be included partly in an Opinion and partly in a Decision. (Please specify in your reply which sections should be part of an Opinion and which should be Guidance Material.)* FAA Response to Question 2: The FAA recommends that EASA take no action on this issue until ICAO has fully developed this document as well as other related SARPs.	
response	*Noted*	

A-NPA No 2011-06 – A. EXPLANATORY NOTE – IV. Content of the A-NPA – The priority – Question 3 p. 7

comment	*5*	comment by: *REGIONAL (gilles VITROU)*
	Our answer to the question 3) is a) "High priority; the task should start immediately after the conclusion of the work of the ICAO IVATF AIR team 04." Risks of new eruptions are real, the sooner an organization will be in place, the better.	
response	*Noted*	

comment	*8*	comment by: *Denim Air*
	There is a high priority to ensure that NAAs will allow such risk assessments to be conducted and that acceptance in one state will be mutually recognised in others.	

response	*Noted*

comment	*14*	comment by: *AAPA*
	Question 3: In the event the EASA rulemaking goes forward, in spite of the recent eruption of Grimsvötn volcano, AAPA believes this rulemaking should have Medium priority; the task should start in the next 2 years and that the task should not start until after the conclusion of the work of the ICAO IVATF AIR team 04.	
response	*Noted*	

comment	*20*	comment by: *BALPA*
	BALPA's answer to Q3 depends on the outcome of Q1. Rulemaking in advance of completion of the ICAO process should only be undertaken if significant improvements in safety and/or reduction in disruption can be quickly achieved. If this is the case then it should be commenced without delay. In this case BALPA's answer to Q3 is a) Otherwise the commencement of the task should await the outome of the ICAO process.	
response	*Noted*	

comment	*26*	comment by: *UK CAA*
	Question 3: What priority should be given to the proposed rulemaking task? Answer a) High priority; the task should start immediately after the conclusion of the work of the ICAO IVATF AIR team 04.	
response	*Noted*	

comment	*35*	comment by: *IACA International Air Carrier Association*
	IACA answer to Question 3: a) High priority; the task should start immediately after the conclusion of the work of the ICAO IVATF AIR team 04. The eruption of the *Grímsvötn* clearly demonstrated the urgency.	
response	*Noted*	

comment	*44*	comment by: *European Cockpit Association*
	Q ***Question 3: What priority should be given to the proposed rulemaking task?*** ***a)*** ECA believes that the Agency should prepare itself for the upcoming rulemaking activity by making principled decisions on the need for adequate procedures for safety management (with a particular focus on SRAs to achieve safe flight operations in the presence of volcanic	

	ash). The Agency should rely on the combined expertise of ICAO's IVATF for the detailed guidance and should assure speedy and complete implementation once it is finalised. It should be noted that this activity should be based on the outcome of the IVATF and not just on one drafting team of its airworthiness sub-group. *a*
response	*Noted*

comment	*49*	comment by: *CAA CZ*
	Question 3: High priority; the task should start immediately after the conclusion of the work of the ICAO IVATF AIR team 04.	
response	*Noted*	

comment	*54*	comment by: *DTA*
	Question 3: Option a)	
response	*Noted*	

comment	*56*	comment by: *CAA-NL*
	Answer to question 3: Alternative a. Given the fact that EASA already began the work and the activity of volcano' s has increased, harmonization of this issue at a European level is needed urgently. However, since IVATF is meeting in July to complete this work, the European proposals should be based on the final results.	
response	*Noted*	

comment	*67*	comment by: *AEA*
	Question 3) What priority should be given to the proposed rulemaking task? AEA reply: Answer a) High priority. This is essential since another fragmented reaction during a volcanic eruption should be avoided taking into account the huge economic impact on the airline industry not justified on safety grounds.	
response	*Noted*	

comment	*84*	comment by: *DGAC*
	Answer to question 3 : b) Medium priority; the task should start in the next 2 years.	
response	*Noted*	

comment	89	comment by: *The Norwegian Ministry of Transport and Communications*
	Ad Question 3: What priority should be given to the proposed rulemaking task? Reply (a) is in our opinion the appropriate answer. It is our view that this rulemaking task is a matter of highest priority and should start immediately after the conclusion of the work of the ICAO IV ATF AIR team 04. In light of our experiences fyom the recent Eyafjallajokull and Grimsvotn volcano eruptions, we would urge the Agency to endeavour a speedy rulemaking process. In our view this could also support the achievement of a common European approach and set the terms for the management of future volcanic ash eruptions in Europe.	
response	*Noted*	

comment	90	comment by: *Heinz Frühwirth - IFALPA*
	The Agency should prepare itself for the upcoming rulemaking activity by making principled decisions on the need for adequate procedures for safety management (with a particular focus on SRAs to achieve safe flight operations in the presence of volcanic ash). The Agency should rely on the combined expertise of ICAO's IVATF for the detailed guidance and should assure speedy and complete implementation once it is finalised.	
response	*Noted*	

comment	95	comment by: *Snecma*
	See attached file for comments on page 6	
response	*Noted*	

comment	100	comment by: *Luftfartstilsynet, Norge (CAA Norway)*
	Question 3: **What priority should be given to the proposed rulemaking task?** **a) Based on our very resent experience w**e consider this to be a matter of high priority, the task should start immediately after the conclusion of the work of the ICAO IVATF AIR team 04. CAA-Norway also recommend the development of regulations and guidance material for General Aviation flight operations with known or forecast volcanic cloud contamination coincident with those for operators. We are aware that the Agency is bound to follow a structured rulemaking process. If the conclusion of the consultation of the ICAO IVATF paper result in the establishment of a rulemaking group, Norway would be pleased to offer an expert for the rulemaking group. Pursuant to the two latest volcanic crises Norway expect a speeded rulemaking process. This will sustain the achievement of a common European approach, it	

	will also set the terms for the management of future volcanic ash eruptions. How to manage flight operations with known or forecast volcanic cloud contamination will due to this become more and more a part of Aircraft Operators and NAA`s management of the day to day operations.
response	*Noted*

comment	*103*	comment by: *Ryanair*
	Question 3: What priority should be given to the proposed rulemaking task? High priority; the task should start immediately after the conclusion of the work of the ICAO IVATF AIR team 04.	
response	*Noted*	

comment	*108*	comment by: *Federation of Norwegian Aviation Industry*
	Question 3: NHO Luftfart considers that the rulemaking tasks are given a high priority. During the last 14 months European aviation has experienced two major volcanic crises, and the probability for future volcanic ash eruptions is high. The experiences in dealing with ash crisis underline the need for a harmonized European approach, and we are now on overtime. It is time for action.	
response	*Noted*	

comment	*112*	comment by: *FAA Aircraft Certification*
	Question 3: What priority should be given to the proposed rulemaking task? *High priority; the task should start immediately after the conclusion of the work of the ICAO IVATF AIR team 04.* *Medium priority; the task should start in the next 2 years.* *Low priority; the commencement of the task could be delayed more than 2 years.* FAA Response to Question 3: The FAA agrees with the third optional response suggested by EASA above. We recommend that EASA take no action on this draft AIR04 document until ICAO has fully developed this document as well as other related SARPs. That will likely take about two years to complete agreement on this international issue.	
response	*Noted*	

comment	9	comment by: *Denim Air*
	See remarks made as answer to Question 1 above.	
response	*Noted*	

comment	15	comment by: *AAPA*
	Question 4: AAPA would urge EASA to delay any rulemaking until the ICAO IVATF has completed its work and once finalised adopt the recommendations provided in either amended ICAO SARPS or guidance material thereby ensuring effective harmonisation of requirements.	
response	*Noted*	

comment	36	comment by: *IACA International Air Carrier Association*
	IACA answer to Question 4: On short notice, a new SIB to ensure a uniform and harmonised application of ash contamination levels and Danger Areas in accordance with ICAO guidance. IACA would like to stress the importance of a uniform standard for ash concentration.	
response	*Noted*	

comment	45	comment by: *European Cockpit Association*
	Question 4: Which action do you consider the Agency should take following the conclusion of the work of the ICAO IVATF AIR team 04? It is important to recognise that a team of the AIRworthiness Subgroup of IVATF is only a group of experts that is tasked to make a proposal, but that not even IVATF has the mandate to develop ICAO Standards and Recommended Practices (SARPs). IVATF/2 will have to identify areas, where SARPs are needed (or need to be amended), so that the appropriate ICAO groups can develop them. The Agency should therefore wait for mature proposals (SARPs, PANS, Guidance Material) emanating from the ICAO process. Other comments: The appendices in the Annex to the A-NPA are not exhaustive. Additional items will be required, for example in Appendix B 'Maintenance Procedures' it should be emphasised that procedures will be needed to detect contamination in parts of an engine that are not easily inspectable, such as the turbine blade cooling passages. There is a particular concern with the contamination of turbine blade cooling passages by VA. The report at http://www.alpa.org/portals/alpa/volcanicash/03_NASADC8AshDamage.pdf describes such an ash encounter and the resulting investigation and contains	

	the assertion that “some of the turbine blades had been operating partially uncooled and may have had a remaining lifetime of as little as 100 hr”. It will be important that procedures are developed to detect this type of contamination and ensure that appropriate rectification action is taken. Turbine blades commonly run at a temperature above the melting temperature of VA. Any intrusion into these passages by VA will tend to obstruct them. This will cause the blades to run at a somewhat higher temperature particularly when maximum thrust is demanded. In conditions where a particular thrust level is demanded as in normal cruise the increased blade temperature may be unnoticeable. Engine monitoring systems may not detect the problem. A small increase in the operating temperature of turbine blades can drastically shorten their life as described in the report above and it is likely that any consequential failure will occur when high thrust is demanded for example during a take-off. Such contamination may be caused by the smallest VA particles that remain at altitude when larger particles have settled out so that the predicted density of VA is apparently in a safe range. Further research will be needed to ensure that this risk is safely managed.
response	*Noted*

comment	*57*	comment by: *CAA-NL*
	Answer to question 4: Next to the work of team 04, the IVATF has an agenda that includes a number of other activities to update the whole world wide system to assure safe flight during volcanic eruptions. Some of these activities will be finalized this summer, other activities need more time and research to achieve the requested outcome. As EASA is responsible for rulemaking in respect of aviation safety in total, the outcome of IVATF should be considered for introduction into Europe and the activities that need further work should be supported. Specifically susceptibility of aircraft and aircraft engines for volcanic ash is only partly known and to facilitate safe continuation of air transport under conditions of severe eruptions improvement of knowledge is needed.	
response	*Noted*	

comment	*68*	comment by: *AEA*
	Question 4) Which action do you consider the Agency should take following the conclusion of the work of the ICAO IVATF AIR team 04? AEA reply: More work is required at European level to ensure a consistent and harmonized interpretation of the guidance material. In particular a new SIB will be needed at short notice to push for harmonization of ash contamination levels and danger areas in line with ICAO guidance. In addition, more work is required at EU level to ensure a better coordination of measurement tools and to improve information management related to volcanic ash but this should not delay the implementation of the SRA approach	
response	*Noted*	

comment	85	comment by: *DGAC*
	Independently from possible future rulemaking process, priority should be given to issuance of a Safety Information Bulletin in order to harmonize interpretation of the guidance material.	
response	*Noted*	

comment	92	comment by: *Heinz Frühwirth - IFALPA*
	It is important to recognise that a team of the AIRworthiness Subgroup of IVATF is only a group of experts that is tasked to make a proposal, but that not even IVATF has the mandate to develop ICAO Standards and Recommended Practices (SARPs). IVATF/2 will have to identify areas, where SARPs are needed (or need to be amended), so that the appropriate ICAO groups can develop them. The Agency should therefore wait for mature proposals (SARPs, PANS, Guidance Material) emanating from the ICAO process.	
response	*Noted*	

comment	96	comment by: *Snecma*
	See attached file for comments on page 6	
response	*Noted*	

comment	113	comment by: *FAA Aircraft Certification*
	Question 4: Which action do you consider the Agency should take following the conclusion of the work of the ICAO IVATF AIR team 04? *Please explain your recommendation including the priority and timeframe.* FAA Response to Question 4: The FAA suggests that EASA should implement all finalized and agreed published ICAO guidance and policy contained within ICAO SARPs, the ICAO volcanic ash handbook, and the ICAO volcanic ash manual. Currently the ICAO Volcanic Ash Task Force has not completed their work on developing this guidance and many issues have not been resolved by this international community.	
response	*Noted*	

A-NPA No 2011-06 – V. Annex – 1. IAVTF/2 – WP/ p. 8-9

comment	51	comment by: *CAA-NL*
	In the summary the word process is being used both for the activity of the	

	operator and the State. To improve readability of the summary the activity of the State could be worded as procedure.
response	*Noted*
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.

A-NPA No 2011-06 – V. Annex – 1. IAVTF/2 – WP/ – 2. Discussion/Recommendations/Findings p. 10-12

comment	*16*	comment by: *AAPA*
	The AAPA welcomes the approach taken by the ICAO IVATF AIR 04 team in developing a guidance material that is linked to an SMS safety risk assessment. We feel making use of an already established system is a more proactive pragmatic approach rather than a reactive approach of introducing a new set of processes and procedures each time a new hazard emerges. It is well understood that the air operator is responsible for the safety of its operations. Consequently AAPA believes all stakeholders have a significant role to play when responding to any volcano crisis. In particular the State of the operator must be ready and willing to work with its air operators and provide support to determine the best course of action that is mutually acceptable.	
response	*Noted*	
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.	

comment	*52*	comment by: *CAA-NL*
	In 2.1 a number of important recommentations are given. However a recommendation towards the ATM subgroup may be added. This recommendation would be about the responsibility of the air traffic control, where the responsibility of avoidance of volcanic ash is directed to the operator. De guidance for air traffic control should be amended to reflect this change in responsibilities. The last sentence of 2.2 to be reflected as a new alinea in the text since it covers a new subject.	
response	*Noted*	
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.	

comment	*59*	comment by: *DTA*
	2.1.3 It is agreed that “quality information, correctly applied, is an essential foundation of a safe and effective operation”. It is also agreed that “operators	

	be encouraged to make use of all available information sources (e.g. forecasts or actual measurements) in assessing the hazard presented by volcanic contamination". It is further seen, however, that there seems to be a need for an official recognition/approval and/or setting standards of/for these information and their sources in order to eliminate doubts and ensure the use of "quality information". Who can supply information and what are the quality requirements for this information?
response	*Noted*
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.

comment	*60*	comment by: *DTA*
	2.2.1 It is agreed that "it is necessary and desirable that an appropriate value be agreed". In addition we find it desirable to agree/set standards for uncertainties/accuracies of these values.	
response	*Noted*	
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.	

comment	*104*	comment by: *Ryanair*
	ADD new section 2.1.7. 2.1.7. EASA shall maintain a centralised SRA VA register of EU Airlines with a SRA accepted by their NAA, which shall be accessible to ATS and stakeholders. TCO Airlines shall be included on the SRA VA register having complied with the relevant section TCO, Acceptance of TCO SRA VA. (SRA VA = Safety Risk Assessment Volcanic Ash)	
response	*Noted*	
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.	

A-NPA No 2011-06 – V. Annex – 2. IAVTF/2 – WP/ ATTACHMENT 1 p. 14-17

comment	*27*	comment by: *UK CAA*
	Attachment #5	
	We have noted some editorial corrections as contained in the attached word document.	
response	*Noted*	
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.	

A-NPA No 2011-06 – V. Annex – 2. IAVTF/2 – WP/ ATTACHMENT 1 – 2. INTRODUCTION p. 17-20

comment	17	comment by: *AAPA*
	The AAPA welcomes the suggestion made in draft version 4.0 for individual States to determine the allowance of flight operations in areas known or forecast to be affected by volcanic cloud based on its air operators' safety risk assessments. In our opinion, this is certainly a step in the right direction for a more pragmatic and coherent approach instead of blanket closures of national airspace without any technical assessment of the actual situation and not considering the social and economic impacts. However we believe it should not be mandated for any State whose airspace is known or forecast to be affected by volcanic cloud to seek foreign assistance for positive confirmation of the satisfactory completion of a safety risk assessment. Involvement from foreign States should be avoided unless requested and ICAO should be the point of reference for such confirmation. AAPA fully supports the ICAO IVATF proposals that the operator manage the safety of flight in situations where volcanic ash is a hazard in accordance with ICAO's Safety Management Systems approach; to this end, an identifiable Safety Risk Assessment for this hazard would exist within the operator's SMS. This would be in line with ICAO Annex 6.	
response	*Noted*	
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.	

A-NPA No 2011-06 – V. Annex – 2. IAVTF/2 – WP/ ATTACHMENT 1 – 3. RECOMMENDATIONS FOR THE AIRCRAFT OPERATOR p. 21-23

comment	64	comment by: *DTA*
	3.1.d) The operator is not prevented from operating through, or over, areas affected by a VAA, VAG or SIGMET provided it has demonstrated in its SRA the capability to do so safely. It must be noted, however, that it is the position of DTA that "High Contamination Areas" are to be considered as No Fly Zones.	
response	*Noted*	
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.	

comment	69	comment by: *AEA*
	3. Recommendations to the Aircraft Operator	

	3.1 Responsibilities b) In order to decide whether or not to operate into, or avoid, airspace or aerodromes which may be contaminated by volcanic ash or volcanic clouds, the operator should have in place either a standalone SRA or identifiable SRA within its SMS AEA comment The associated procedures used should be available as well. We suggest to add 'and the associated procedures used' to paragraph 3.1 b) c) The operator should have its SRA accepted by its supervising NAA before initiating operations into or avoiding airspace or aerodromes, which may be contaminated by volcanic clouds or ash. AEA comment: This text is confusing and gives the impression that the Authority need to give a formal approval before allowing operations. This contradicts with the core principle that the operator is responsible for safety of its operations. We therefore suggest amending this paragraph to read as 'The operator should make available its SRA to the supervising Authority…' d) An operator will need to have satisfied its NAA regarding the likely accuracy and quality of information sources it uses in its SRA and its own competence and capability to interpret such data correctly in order to reliable and correctly resolve any conflicts among data sources that may arise. AEA comment: This text is confusing and again gives the impression that the Authority needs to give a formal approval. There should be no requirement for the Authority to approve the list of information sources that are used since this contradicts with the core principle that the airline is responsible for safety of operations. We therefore suggest that in-stead the list of information sources should be listed in the SRA but there is no need for NAA approval/acceptance.
response	*Noted*
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.

comment	*70*	comment by: *AEA*
	Para 3.1 f) The operator SRA should take into account data published by relevant TCHs regarding susceptibility to volcanic cloud related airworthiness effects of the aircraft they operate, the nature of these effects and the related pre-flight, in-flight and post-flight precautions to be observed by the operator. NOTE: if no suitable information is available from the TCHs, then it is expected that the operator will constrain the risk assessment accordingly, it should then be assumed that the aircraft or engine has minimal tolerance to volcanic cloud exposure.	

	AEA Comment The NOTE should be deleted. If no info is available from TCHs, than the airline will deal with this issue through its SMS/SRA based on expert judgement but there is no justification to automatically constrain operations. Paragraph 3.2 Procedures AEA comment: Differences in ATC procedures and phraseology/definitions need to be avoided. ICAO definitions should be used and where needed be improved. Para 3.2 b) These procedures should ensure that, at all times, flight operations remain within accepted safety boundaries… AEA Comment: The aim is to avoid accidents/major incidents and therefore a risk assessment methodology is applied. Therefore this paragraph should be amended to read as 'These procedures should ensure that, at all times, flight operations remain within the boundaries of the Safety Risk Assessment'.
response	*Noted*
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.

A-NPA No 2011-06 – V. Annex – 2. IAVTF/2 – WP/ ATTACHMENT 1 – 4. RECOMMENDATIONS FOR THE NATIONAL AVIATION AUTHORITY p. 23

comment	*71*	comment by: *AEA*
	4. Recommendations for the National Aviation Authority The NAA overseeing an operator that intends to undertake operations into, or avoid, areas of known or forecast volcanic contamination should establish a methodology for evaluating the SRA of such an operator and, if satisfied, accept the SRA. AEA Comment: Refer to earlier comments. This text is confusing and gives the impression that the Authority need to give a formal approval before allowing operations. This contradicts with the core principle that the operator is responsible for safety of its operations.	
response	*Noted*	
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.	

A-NPA No 2011-06 – V. Annex – 2. IAVTF/2 – WP/ ATTACHMENT 1 – APPENDIX A – GUIDELINES FOR COMPLETING A SAFETY RISK ASSESSMENT – A2 The Process Steps p. 24-26

comment	58	comment by: CAA-NL
	We suggest to include here some more information on the different type of information an operator can expect around the world such as the EUR/NAT levels now described in the definitions of Appendix H on page 58 of 61 and those of other areas around the world. This to make the operator aware that his procedures and process has to deal with different kind of information.	
response	*Noted*	
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.	

A-NPA No 2011-06 – V. Annex – 2. IAVTF/2 – WP/ ATTACHMENT 1 – APPENDIX A – GUIDELINES FOR COMPLETING A SAFETY RISK ASSESSMENT – A3 Records p. 26-28

comment	72	comment by: AEA
	Appendix A Guidelines for completing a safety risk assessment A3 Records The result of the safety risk assessment should be documented and submitted to the operator's NAA. Mitigating actions should be completed and verified and supported by evidence prior to start of operations. Any assumption should be clearly stated, and the safety risk assessment reviewed at regular intervals and as necessary, to ensure that the assumptions and decisions remain valid. AEA Comment: The intent of this paragraph is unclear and redundant with other paragraphs. There should be no need for NAA approval of the SRA (the operator should only make available its SRA). Any SRA will have a feedback loop with lesson learned but this is not something which needs NAA approval.	
response	*Noted*	
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.	

A-NPA No 2011-06 – V. Annex – 2. IAVTF/2 – WP/ ATTACHMENT 1 – APPENDIX B – PROCEDURES TO BE CONSIDERED BY AN AIRCRAFT OPERATOR WHEN CONDUCTING A SAFETY RISK ASSESSMENT – Preparation p. 29

comment	73	comment by: AEA
	Appendix B (Procedures to be considered by an aircraft operator when conducting a safety risk assessment) Type Certificate Holder. The operator will need to obtain advice from TCHs of	

	the aircraft it operates concerning operations in potentially contaminated airspace… AEA Comment: Information published by TCHs (where available) will be taken into account into the SRA but there is no need to obtain formal advice, in particular since some TCHs might not publish any information. In such case the airline will deal with it through expert judgement within its SRA/SMS. This paragraph should therefore be amended to read 'The operator will need to take into account information (where available) from TCHs…
response	*Noted*
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.

comment	*74*	comment by: *AEA*
	Operator Personnel or their service providers. - Flight planners, operations staff and dispatchers are equipped to evaluate correctly the risk of flight into volcanic ash-contaminated airspace, or aerodromes, and can plan accordingly. AEA comment: This paragraph is very much tailored to the US system where there is shared responsibility between dispatchers and flight crew. In Europe, the flight crew is responsible for safety of the flight. This paragraph should therefore be amended to read as 'Personnel responsible for flight planning are equipped to plan for flights into volcanic and contaminated airspace or aerodromes' Operator Personnel or their service providers - Flight crew can detect volcanic ash and execute the associated escape manoeuvres AEA Comment: This paragraph might lead to misunderstanding and should therefore be amended to read 'flight crew need to be aware of the possible signs related to volcanic ash encounters and the associated procedures'	
response	*Noted*	
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.	

A-NPA No 2011-06 – V. Annex – 2. IAVTF/2 – WP/ ATTACHMENT 1 – APPENDIX B – PROCEDURES TO BE CONSIDERED BY AN AIRCRAFT OPERATOR WHEN CONDUCTING A SAFETY RISK ASSESSMENT – Flight Crew Procedures p. 31

comment	*75*	comment by: *AEA*
	Flight Crew Procedures	

	Standard Operating Procedures / the operator should ensure that crews review normal and abnormal operating procedures… NOTE: In promulgating changes to SOPs, it is anticipated that the normal practice of the operator will be to not only ensure appropriate briefing of these changes but also to ensure that any necessary training is completed AEA Comment: This paragraph might lead to misunderstanding and is redundant We therefore suggest to delete the NOTE and to amend the paragraph to read as 'The operator should ensure the crews are familiar with normal and abnormal operator procedures… AML The operator should ensure that crews: - make an AML entry for each operation to or from an aerodrome which may be contaminated - make an AML entry related to any actual or suspected volcanic ash encounter - confirm, prior to flight, completion of maintenance actions related to an AML entry for volcanic ash encounter or the previous flight AEA Comment: There should be only a requirement for an AML entry in case of actual or suspected volcanic ash encounter but not for all situations where the aerodrome might be contaminated (in particular in respect to forecast low density ash contamination). The first sentence (make a AML entry for each operation to or from an aerodrome which may be contaminated) should therefore be deleted since it is redundant with the second sentence.
response	*Noted*
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.

A-NPA No 2011-06 – V. Annex – 2. IAVTF/2 – WP/ ATTACHMENT 1 – APPENDIX E – GUIDELINES ON VOLCANIC ACTIVITY INFORMATION AND OPERATOR RESPONSE p. 37-39

comment	*18*	comment by: *AAPA*
	In order for the proposed guidelines both for air operators and national aviation authorities to work effectively, we believe there is a need to include provisions of relevant training for the operational staff involved in order for them to carry out their duties effectively.	
response	*Noted*	
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.	

comment	*76*	comment by: *AEA*

	Appendix E / Guidelines on Volcanic Activity Information and Operator Response E2 Pre-Eruption a) The operator should have in place a robust mechanism for ensuring that it is constantly vigilant for any alerts of pre-eruption volcanic activity relevant to its operations. AEA Comment: This requirement is too wide if it relates to non-aeronautical information sources. We therefore suggest amending it to read 'any aeronautical information alerts.'
response	*Noted*
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.

comment	*77*	comment by: *AEA*
	Page 38 E4 Ongoing eruption e) The operator should be aware that, depending on the State concerned: i) affected areas or danger areas may be established that differentiate between various levels of volcanic ash contamination such as the low, medium or high contamination currently being used in Europe AEA Comment: See general AEA comment. There should be uniform application of the danger areas and ash contamination levels throughout Europe in line with global standards. This requires more solid EASA guidance.	
response	*Noted*	
	This comment was forwarded to the AIR04 team for their consideration during the review of version 4 of the guidance material.	

Appendix A to CRD 2011-06 -

Flight Operations in Volcanic Ash

Risk *Management of flight operations with known or forecast volcanic ash contamination*

Preface

The ICAO International Volcanic Ash Task Force Airworthiness Sub-Group AIR04 task team has developed this proposal to States for a globally applicable process to facilitate the management of flight operations into, or avoiding, areas of known or forecast volcanic cloud through the provision of appropriate information to assist in minimising safety risk in such operations.

The approach is based on a safety management system including a risk assessment process for use by an operator wishing to conduct such an operation and a methodology for use by that operator's State in evaluating the robustness of the process and the competence of the operator in using the process.

TABLE OF CONTENTS

1. DEFINITIONS

The terminology and acronyms used in this document are set out in Appendix H.

2. INTRODUCTION

There are areas of volcanic activity worldwide that are hazardous to aviation. Volcanic clouds can also be transported long distances into non-volcanic areas. Notwithstanding national regulations, this document sets out guidelines which States may cause aircraft operators and Civil Aviation Authorities to adopt in order to minimize the safety risk of flight operations in areas known or forecast to be affected by volcanic cloud.

2.1 The hazard

Volcanic ash[1] may cause:

- the malfunction, or failure, of one or more engines leading not only to reduction, or complete loss, of thrust but also to failures of electrical, pneumatic and hydraulic systems. Volcanic ash contains particles whose melting point is below engine burner temperature; these then fuse in the turbine section reducing the throat area and efficiency leading to engine surge and possibly flame-out;
- blockage of pitot and static sensors resulting in unreliable airspeed indications and erroneous warnings;
- windscreens to be rendered partially or completely opaque;
- smoke, dust and/or toxic chemical contamination of cabin air requiring crew use of oxygen masks, thus impacting communications;
- erosion of external aircraft components;
- reduced electronic cooling efficiency and, as ash readily absorbs water, potential short circuits leading to a wide range of aircraft system failures and anomalous behaviour;
- the aeroplane ventilation and pressurization systems to become heavily contaminated. In particular, cleaning or replacement may be required in response to air cycle machine contamination and abrasion to rotating components, ozone converter contamination and air filter congestion.

1 Although the specific material being warned for is the ash contained in the volcanic cloud, it is understood that other elements of the cloud may also be undesirable to operate through and cause additional hazards

- aircraft to be manoeuvred for volcanic cloud avoidance in a manner that conflicts with other aircraft;
- deposits of volcanic ash on a runway degrading braking performance, especially if ash is wet; in extreme cases, this can lead to runway closure.

This list is not intended to be exhaustive.

2.2 Managing the risk

Contracting States are required by Annexes 1, 6 (Parts I or III), 11 or 14 to implement a State Safety Programme and establish an acceptable level of safety. By the same token, Operators are . required to implement a Safety Management System.

It is proposed that the approach set out in this document be applied also by States to those engaged in international general aviation as governed by Annex 6, Part II. The definition of an (aircraft) operator, set out in Appendix H, reflects this.

The principle of the operator having direct accountability for the safety of its operations is clearly defined in ICAO Annex 6. That Annex specifies an SMS as a key part of an operator's approach to exercising this accountability. ICAO Doc 9859 (Safety Management Manual) provides general guidance on the establishment of an SMS and on the conduct of safety risk assessments.

One of many issues requiring such an SMS approach relates to operations into or avoiding airspace with known or forecast volcanic cloud contamination or at aerodromes contaminated by volcanic ash. The operator is accountable for assessing the risk of such operations and for determining and implementing appropriate mitigation measures. This document describes an approach to formulate and evaluate the safety risk assessment, within an SMS, that is central to this decision-making process.

Regulatory authorities of the State of the Operator or State of Registry, as appropriate, have an obligation to ensure that the operators they supervise are competent and capable of conducting a robust safety risk assessment and that the assessment process itself is robust. This document sets out a process that Civil Aviation Authorities (CAAs) may use in evaluating an operator's safety risk assessment.

It is further expected that the CAA will maintain adequate ongoing surveillance of the operator so that it can identify those operators who fail to maintain adequate competence, capability and robust procedures to continue to operate safely into or avoiding volcanic cloud contamination; in such cases, it is expected that the

CAA could take such action as may be necessary to control the risk associated with the operator's lack of competence, capability or necessary procedures.

The safety control measures set out in this document are intended to be sufficiently robust that they facilitate acceptance by a State whose airspace is known or forecast to be affected by volcanic clouds without further investigation, confident in the ability of operators from other States to undertake operations safely in their airspace.

It is recognized that a State may wish to seek from the State of the Operator of a foreign operator, positive confirmation of the satisfactory consideration of a safety risk assessment.

2.3 Coordinating the response to a volcanic event

There are many other contributors to the overall volcanic risk mitigation system such as, Air Navigation Service Providers including Aeronautical Information Services and Air Traffic Flow Management Units, Meteorological Service providers including Meteorological Watch Offices, Volcanic Ash Advisory Centres and Volcano Observatories and aircraft and engine TCHs, STC holders and PMA holders. Their cooperation in supplying States, operators and CAAs with the information necessary to support the pre-flight process and the in-flight and post-flight decision making process is essential to continuing safe operations.

Information on the procedures of these contributors in respect of operations with known and forecast volcanic ash cloud contaminated areas is available in other ICAO documents such as:

- ICAO Meteorological Services for International Air Navigation (Annex 3),
- ICAO Procedures for Air Navigation Services (PANS) – Air Traffic Management (ICAO Doc 4444),
- ICAO Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds (ICAO Doc 9691),
- ICAO International Airways Volcano Watch (IAVW) Handbook (ICAO Doc 9766), and
- Regional contingency plans such as the EUR/NAT Contingency Plan (EUR Doc 019).

This present document, in providing advice to States on addressing the role of the aircraft operator and of the operator's CAA, is complementary to the documents listed above.

To ensure good coordination between all concerned, it is recommended that States encourage operators and their CAAs to participate in such annual volcanic risk exercises as are organized by ICAO (VOLCEX). In the EUR and NAT

region, for example, information on these exercises is available on the ICAO Paris website http://www.paris.icao.int/.

3. THE AIRCRAFT OPERATOR

ICAO's generic safety risk assessment process is described in ICAO Doc 98592. Alternative approaches, aligned with an organization's approved SMS, would be equally appropriate. The material in this document is designed to provide States with information to support operators in developing the safety risk assessment, within their SMS, covering the volcanic cloud hazard.

3.1 Responsibilities

a) The operator is responsible for the safety of its operations.

b) In order to decide whether or not to operate into, or avoid, airspace or aerodromes with known or forecast volcanic cloud contamination, the operator should have in place an identifiable safety risk assessment within its SMS.

> **NOTE:** Guidance on the production of a safety risk assessment is provided in Appendices A (guidelines on conducting a safety risk assessment), B (procedures to be included in a safety risk assessment) and C (risks to be considered). Each operator should develop its own list of procedures and hazards since these have to be relevant to the specific equipment, experience and knowledge of the operator, and to the routes to be flown.

c) The operator should have this safety risk assessment as part of the SMS before initiating operations into or avoiding airspace or aerodromes, which may be contaminated by volcanic clouds or ash. During its normal oversight of its operators, a CAA should normally accept3 this safety risk assessment as an identifiable part of the operator's SMS.

> **NOTE:** Subject to the provisions set out below regarding the updating of safety risk assessments, it is intended that the operator should present the CAA with a safety risk assessment covering its

2 ICAO *Safety Management Manual* (Section 9, Issue 2, 2009).

3 "Accept" has here the meaning "not objected to by the CAA as suitable for the purpose intended" as opposed to "approved" which, had it been used, would mean "documented by the CAA as suitable for the purpose intended". The former has been adopted to remain consistent with the key principle of prime responsibility for safe operations resting with the operator. This distinction is not novel as evidenced by European Commission Regulation (EC) 859/2008 (EU OPS) OPS1.003.

overall operations in which volcanic clouds are a hazard rather than a safety risk assessment for each flight.

d) An operator will need to have satisfied its CAA regarding the likely accuracy and quality of the information sources it uses in its SMS and its own competence and capability to interpret such data correctly in order to reliably and correctly resolve any conflicts among data sources that may arise.

> **NOTE**: The operator is not prevented from operating through, under or over, airspace affected by a VAA, VAG or SIGMET provided it has demonstrated in its SMS the capability to do so safely.

e) The operator should revise its safety risk assessment when changes that are material to the integrity of the safety risk assessment occur; it will need to inform its CAA of such updates in a timely manner.

f) The operator's safety risk assessment should take into account data published by the relevant TCHs regarding the susceptibility to volcanic cloud-related airworthiness effects of the aircraft they operate, the nature of these effects and the related pre-flight, in-flight and post-flight precautions to be observed by the operator.

> **NOTE:** If no suitable information is available from the TCHs, then it is expected that the operator will constrain its risk assessment accordingly; it should then normally be assumed that the aircraft or engine has minimal tolerance to volcanic cloud exposure.

g) The operator should ensure that those of its personnel needing to be familiar with the details of the safety risk assessments receive all relevant information (both pre-flight and in-flight) in order to be in a position to apply appropriate mitigation measures as specified by the safety risk assessments, especially when the situation deviates from any scenario contemplated in the safety risk assessments.

h) 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, an ASR and AML entry for;

i. any incidents related to volcanic clouds; and

ii. anytime that volcanic ash is not encountered in an area(s) where it was forecasted to be.

3.2 Procedures

a) The operator should have documented procedures for the management of operations into and around airspace, or at aerodromes, which may be contaminated by volcanic ash.

NOTE: Procedures should include crew action in the event that they encounter a volcanic cloud (the related material is being developed by the IVATF AIR 05 team).

NOTE: Procedures should include collaboration with ATM and aerodrome operators.

b) These procedures should ensure that, at all times, flight operations remain within the accepted safety boundaries, as established through the SMS, despite any variations in information sources, equipment, operational experience or procedures. Procedures should include those for flight crew, flight planners, dispatchers, operations, engineering and maintenance personnel such that they are equipped to evaluate correctly the risk of flight into airspace contaminated by volcanic clouds and to plan accordingly.

c) Maintenance and engineering personnel should be provided with procedures allowing them to correctly assess the need for, and execute, relevant maintenance or other engineering interventions.

d) The operator will need to retain sufficient qualified and competent staff to generate well supported operational risk management decisions, and ensure that its staff is appropriately trained and current.

NOTE: It is not intended that the operator be precluded from securing necessary resources from other competent parties.

e) The operator should encourage its flight operations staff to take up opportunities to be involved in volcanic ash exercises conducted in their area of operations.

3.3 Information

Before and during eruptions, information valuable to the operator is generated by various volcanological agencies worldwide. 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. Further material is provided in Appendix E.

4. THE TYPE CERTIFICATE HOLDER

In fulfilling its primary responsibility for the safety of operations, the operator is dependent on the Type Certificate Holders of the equipment it operates for some information necessary to inform its safety risk assessment when volcanic clouds are a hazard.

States are, therefore, advised to request TCHs to establish, update and make available to operators a range of information important to the operator's safety risk assessment when volcanic clouds are a hazard.

NOTE: An indication of the range of information that an operator might require is provided in Section 3 and in Appendix B.

5. THE CIVIL AVIATION AUTHORITY

ICAO's safety risk assessment process is described in the ICAO *Safety Management Manual (SMM)* (Doc 9859, Section 9, Issue 2, 2009). Alternative approaches, aligned with an organisation's approved SMS, would be equally appropriate.

The operator-orientated responsibilities of the CAA of the State of Operator/Registry, and of States with known or forecast volcanic contamination, are indicated in Section 2.2 above.

The State is advised that the CAA exercising oversight of an operator that intends to undertake operations into, or avoid, areas of known or forecast volcanic contamination should establish a methodology for evaluating the SMS including a safety risk assessment on volcanic ash of such an operator and, if satisfied, accept the SMS. The guidance set out in Appendix F indicates a process that the CAA can use to achieve this outcome.

APPENDIX A

GUIDELINES FOR COMPLETING A SAFETY RISK ASSESSMENT

A1 Introduction

ICAO's safety risk assessment process is described in the ICAO *Safety Management Manual* (Doc 9859 Section 9, Issue 2, 2009). Alternative approaches, aligned with an organisation's approved SMS, would be equally appropriate.

Implementation of an SMS, in accordance with State Regulation, is a key capability for an operator. The operator should develop any safety risk assessment in accordance with its authorised SMS risk management processes. Where the SMS regulatory framework has yet to be promulgated by a State, then it should be possible for the State to accept a safety risk assessment provided the operator has implemented an SMS that, as a minimum:

a) identifies safety hazards;

b) ensures the implementation of remedial action necessary to maintain agreed safety performance;

c) provides for continuous monitoring and regular assessment of the safety performance; and

d) aims at a continuous improvement of the overall performance of the safety management system.

Risk is an assessment of the probability and severity of adverse consequences resulting from a hazard. To help an operator to decide on the probability of a hazard causing harm, and to assist with possible mitigation of any perceived safety risk, all pertinent information available should be taken into account and relevant stakeholders consulted.

The safety risk from each hazard should be assessed using a suitable safety risk assessment worksheet. The safety risk should be derived by considering the severity of the safety risk outcome arising from the hazard, together with the probability of that outcome.

The severity of any adverse consequences resulting from a particular hazard should be assessed using a suitable severity scale.

A2 The Process Steps

When made specific to the issue of intended flight into, or avoiding, known or forecast volcanic ash cloud contaminated airspace or aerodromes, then the process involves:

- Identifying the hazard (i.e. arising from the generic hazard of airspace or aerodromes with known or forecast contamination by volcanic ash

clouds with characteristics harmful to the airworthiness and operation of the aircraft);

- Considering the seriousness of the hazard occurring (i.e. the actual level of damage expected to be inflicted on the particular aircraft from exposure to that volcanic ash cloud);
- Evaluating the probability of encountering volcanic ash clouds with characteristics harmful to the safe operation of the aircraft;
- Determining whether the consequent risk is acceptable and within the organisation's risk performance criteria;
- Taking action to reduce the safety risk to a level that is acceptable to the operator's Accountable Executive or equivalent.

A2.1 Hazard Identification

The generic hazard, in the context of this document, is airspace or aerodromes with known or forecast contamination by a volcanic ash cloud with characteristics harmful to the airworthiness and operation of the aircraft.

Within this generic hazard is the specific hazard of an operator not having secured the information necessary to properly characterise that hazard and develop a robust assessment of the risk and likely success of any chosen mitigating actions. To assist operators in relation to this specific hazard, guidance on the list of procedures to be considered is given in Appendix B.

A list of suggested hazards and their associated risks is provided in Appendix C.

Neither of these lists is exhaustive; the operator should develop its own taking into account its specific equipment, experience, knowledge and type of operation.

A2.2 Risk Severity

For each hazard, the potential adverse consequences or outcome should be assessed. Again, the results of this phase of the assessment should be recorded in a safety risk assessment worksheet, such as that reproduced at Appendix D.

A2.3 Risk Probability

For each hazard, the probability of adverse consequences should be assessed, either qualitatively or quantitatively, using a suitably calibrated probability scale. When assessing probability, the following factors should be taken into account:

- Any uncertainties in available information;
- The duration of exposure to the hazard and associated severity;
- Any historic incident or safety event data relating to the hazard. This can be derived using data from TCHs, regulators, other operators, Air Navigation Service Providers, internal reports etc;
- The expert judgement of relevant stakeholders notably from TCHs.
- Operational environment in which flight operations are performed.

The results of this phase of the assessment should be recorded in a safety risk assessment worksheet, an example of which is at Appendix D.

A2.4 Risk Tolerability

At this stage of the process, the safety risks should be classified acceptable or unacceptable.

It is recognised that the assessment of tolerability will be subjective based on qualitative data and expert judgement until specific quantitative data is available in respect of a range of parameters such as uncertainty in volcanic cloud forecast accuracy, the likely range of engine tolerability to ingestion of ash and other volcanic cloud elements with time and engine condition etc.

Appropriate mitigations for each unacceptable risk identified should then be considered, recorded on a safety risk assessment worksheet and implemented in order to reduce the risks to a level acceptable to the operator's Accountable Executive or equivalent.

Not all risks can be suitably mitigated; in such cases, the operation should not proceed.

A2.5 Mitigating Actions

Mitigating actions by themselves can introduce new risks. An effective SMS will incorporate procedures for continuous monitoring of hazards and risk, with qualified personnel establishing the mitigating actions or halting affected operations.

Given the potential introduction of new risks, or a change of circumstances on which the original assessment was predicated changing, it is critical that an operator ensures that the safety risk assessment is repeated as necessary following any mitigation process and at regular intervals as part of its SMS activities.

A3 Records

The results of the safety risk assessment should be documented and submitted to the operator's CAA. Mitigating actions should be completed and verified and supported by evidence prior to the start of operations.

Any assumptions should be clearly stated, and the safety risk assessment reviewed at regular intervals and as necessary, to ensure that the assumptions and decisions remain valid.

NOTE: **Any safety performance monitoring requirements should also be identified and undertaken through the organisation's safety risk management system.**

APPENDIX B

PROCEDURES TO BE CONSIDERED BY AN AIRCRAFT OPERATOR WHEN CONDUCTING A SAFETY RISK ASSESSMENT

Considerations	Actions
Preparation	
Type Certificate Holder	The operator will need to obtain advice from the TCHs of the aircraft and engines it operates concerning operations in potentially contaminated airspace and/or to/from aerodromes contaminated by volcanic ash cloud. This advice should set out: – the features of the aircraft or engine that are susceptible to airworthiness effects related to volcanic ash clouds; – the nature and severity of these effects; – the effect of volcanic ash clouds on operations to/from contaminated aerodromes; – 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/Despatch Deviation or equivalents required to support the operator (cf "Operator Procedures" later in this Appendix); – the recommended continuing airworthiness inspections associated with operations in volcanic cloud contaminated airspace and to/from volcanic ash contaminated aerodromes; this may take the form of Instructions for Continuing Airworthiness or other advice.
Operator Personnel or their Service Providers	The operator should publish procedures for flight planning, operations, engineering and maintenance ensuring that: – personnel responsible for flight planning are equipped to evaluate correctly the risk of flight into volcanic ash cloud-contaminated airspace, or aerodromes, and can plan accordingly; – flight planning and operational procedures enable crews to avoid areas and aerodromes with unacceptable volcanic ash contamination levels; – flight crew are aware of the possible signs of entry into a volcanic cloud and execute the associated procedures; – engineering and maintenance personnel are able to assess the need for, and to execute, any necessary maintenance or other required interventions.

Considerations	Actions
Operator procedures	
Provision of Enhanced Flight Watch	The operator will need to: – closely and continuously monitor VAA, VAR/AIREP, SIGMET, NOTAM and ASHTAM information, and information from its crews, concerning the volcanic ash cloud hazard; – ensure that its Operations Unit, or equivalent, and its crews, have access to plots of the affected area from SIGMETs and NOTAMs; – ensure that the latest information is communicated to its crews and planners in a timely fashion.
Flight Planning	The operator will need to plan flights to remain clear of areas with a volcanic ash cloud contamination level beyond that for which it has developed a safety risk assessment accepted by its CAA. The operator's process should be sufficiently flexible to allow re-planning at short notice should conditions change.
Departure, Destination and Alternates	For the airspace to be traversed, or the aerodromes in use, the operator should determine, and take account of: – the degree of known or forecast contamination; – any additional aircraft performance requirements; – required maintenance considerations; – fuel requirements for re-routeing and extended holding.
Routeing Policy	The operator should determine, and take account of,: – the shortest period in and over the contaminated area; – the hazards associated with flying over the contaminated area; – drift down and emergency descent considerations.
Diversion Policy	The operator should determine, and take account of: – maximum allowed distance from a suitable alternate; – availability of alternates outside contaminated area; – diversion policy after an volcanic ash encounter.
Minimum Equipment List / Dispatch Deviation Guide	The operator should consider additional restrictions for dispatching aircraft with unserviceabilities which might affect: – air conditioning packs; – engine bleeds; – pressurisation system; – electrical power distribution system; – air data computers; – standby instruments; – navigation systems; – de-icing systems; – engine driven generators; – Auxiliary Power Unit (APU); – Airborne Collision Avoidance System (ACAS); – Terrain Awareness Warning System (TAWS); – Autoland systems;

	– provision of crew oxygen; and – supplemental oxygen for passengers. (This list is not exhaustive)

Considerations	**Actions**
Flight Crew Procedures	
Standard Operating Procedures	The operator should ensure that crews are familiar with normal and abnormal operating procedures and particularly any changes regarding: – pre-flight planning; – in-flight monitoring of volcanic cloud affected areas and avoidance procedures; – diversion policy; – communications with ATC; – in-flight monitoring of engine and systems potentially affected by volcanic ash cloud contamination; – recognition and detection of volcanic ash clouds: – in-flight indications of a volcanic cloud encounter; – procedures to be followed if a volcanic cloud is encountered; – unreliable or erroneous airspeed; – non-normal procedures for engines and systems potentially affected by volcanic ash cloud contamination; – engine-out and engine relight; – escape routes; and – operations to/from aerodromes contaminated with volcanic ash. (This list is not exhaustive)
AML	The operator should ensure that crews: – make an AML entry related to any actual or suspected volcanic ash encounter whether in-flight or at an aerodrome; – confirm, prior to flight, completion of maintenance actions related to an AML entry for a volcanic ash cloud encounter on a previous flight.
Incident Reporting	The operator should specify crew requirements for: – reporting an airborne volcanic cloud encounter (VAR); – post-flight volcanic cloud reporting (VAR); – filing a mandatory occurrence report as required by the State.

Considerations	Actions
Maintenance Procedures	
Maintenance Procedures	An operator operating in, or near, areas of volcanic ash cloud contamination should: – enhance vigilance during inspections and regular maintenance and make appropriate adjustments to maintenance practices; – have produced a continuing airworthiness procedure to follow when a volcanic ash cloud encounter has been reported or suspected; – ensure that a thorough investigation is carried out of any signs of unusual or accelerated abrasions or corrosion or of volcanic ash accumulation; – co-operate in reporting to TCHs and the relevant authorities their observations and experiences from operations in areas of volcanic ash cloud contamination; – comply with any additional maintenance recommended by the TCH.

NOTE: The above list is not exhaustive; the operator will need to develop its own list taking into account its specific equipment, experience, knowledge and type of operation.

Appendix C: Hazards & Risks to be considered by Aircraft Operators

(when conducting a Safety Risk Assessment for volcanic ash operations)

1) Process/ Activity	2) Hazards	3) Existing Defences	4) Additional Defences (from this SRM exercise)	5) Unsafe Event [UE] (and intermediate consequences)		6) Existing Recovery Measures (from UE)	7) Additional Recovery Measures (from this SRM exercise)	8) Ultimate (Worst) Consequence/ Risk
				UE	Intermediate Consequences			
Flight Planning	Hazard #1- Regulatory or operator requirements concerning volcanic regions operations **not correctly incorporated** into the flight planning process	See Note	See Note	Inadvertent volcanic ash encounter (with intermediate consequences as indicated on the right)	a) P/S probes blockage	See Note	See Note	Loss of equipment dependent on the P/S signals
					b) Severe Window abrasion	See Note	See Note	Loss of vision through cockpit windshields
					c) Turbine and compressor damage (all engines)	See Note	See Note	Loss of thrust on all engines/ Aircraft Crash
					d) etc	See Note	See Note	
	Hazard #2- Information on volcanic ash concentration **not properly communicated** to crews at pre-flight briefing	See Note	See Note			See Note	See Note	
	Hazard #3 etc	See Note	See Note			See Note	See Note	

Volcanic ash communication with flight crew	Hazard #1- Communication not transmitted to in-flight crew as required			Inadvertent volcanic ash encounter (with safety implications)				Loss of thrust on all engines/ Aircraft Crash
	Hazard #2 – Communication not received by in-flight crew			Inadvertent volcanic ash encounter (with safety implications)				Loss of thrust on all engines/ Aircraft Crash
	Hazard #3, etc							
ETC								

Notes: Columns 3, 4, 6 & 7 to be addressed by Operator's SRM process on volcanic region operations.

APPENDIX D

EXAMPLE SAFETY RISK ASSESSMENT WORKSHEET

				Outcome (Pre-Mitigation)				Outcome (Post-Mitigation)				
No	Hazard Description	Hazard Consequence Description	Existing Controls	Severity	Probability	Risk Tolerability	Further Actions to Reduce Risk	Severity	Probability	Risk Tolerability	Risk Owners	Monitoring and Review Actions
1	Flying into area of volcanic ash cloud	Loss of thrust – all engines	Avoidance, existing crew procedures	High	Remote	Un-acceptable	Monitoring of NOTAMs, Flight planning to avoid flying into Danger Area, QRH drills for volcanic ash procedures, Notice to crew on in-flight volcanic ash encounters	High	Extremely Remote	Review	Flight Operations	Ensure latest information available to crew. Monitoring of pilot reports and review of revised flight planning and operating procedures
2	Flying into area of volcanic ash cloud	Damage to windscreen obscuring vision	Avoidance, existing crew procedures	Medium	Remote	Un-acceptable	Monitoring of NOTAMs, Flight planning to avoid flying danger Area, QRH drill for volcanic ash procedures, Notice to crew on in-flight volcanic ash encounters	Medium	Extremely Remote	Acceptable	Flight Operations	Ensure latest information available to crew. Monitoring of pilot reports and review of revised flight planning and operating procedures
3	Flying into or close to area of volcanic ash cloud	Undetected engine and airframe damage leading to system or component failure	Pre-flight checks and walk-around checks, Scheduled maintenance	Medium	Possible	Un-acceptable	Enhanced reporting and flight tracking for flights into or close to Danger Area. Additional inspections of ash cloud contamination iaw TCH Instructions	Medium	Extremely Remote	Acceptable	Operations, Engineering	Monitoring of enhanced reporting system and engineering inspections
4	…	…	…	…	…	…	…	…	…	…	…	…
5	…	…	…	…	…	…	…	…	…	…	…	…

APPENDIX E

GUIDELINES ON VOLCANIC ACTIVITY INFORMATION AND OPERATOR RESPONSE

E.1 Overview

The material set out in this Appendix is intended to inform the operator about the range of volcanic activity information that may be available during an eruptive cycle and to indicate the operator's potential response. It is noted that eruptions rarely follow a deterministic pattern of behaviour.

E.2 Pre-Eruption

a) The operator should have in place a robust mechanism for ensuring that it is constantly vigilant for any alerts of pre-eruption volcanic activity relevant to its operations. The staff involved need to understand the threat to safe operations that such alerts represent; some operators include this expertise within their "Operations Unit".

b) An operator whose routes traverse large, active volcanic areas for which immediate IAVW alerts may not be available, should define its strategy for capturing information about increased volcanic activity before pre-eruption alerts are generated.[4] Such an operator should also ensure that its crews are aware that they may be the first to observe an eruption and so need to be vigilant and ready to ensure that this information is made available for wider dissemination as quickly as possible.

E.3 Start of an Eruption

a) Given the likely uncertainty regarding the status of the eruption during the early stages of an event and regarding the associated volcanic cloud, the operator's procedures should include a requirement for crews to initiate or accept re-routes to avoid the affected airspace.

b) The operator should ensure that flights are planned to remain clear of the affected area and that consideration is given to available alternate aerodromes and fuel requirements.

c) It is expected that following initial actions will be taken:

- Determine if any aircraft in flight could be affected, alert the crew and provide advice re-routing as required;

4 For example, an operator may combine elevated activity information with information concerning the profile and history of the volcano to determine an operating policy, which could include re-routing or restrictions at night. This would be useful when dealing with the 60% of volcanoes which are unmonitored.

- Alert management;
- Brief flight crew and revise flight and fuel planning in accordance with the safety risk assessment;
- Alert flight crew and operations staff to the need for increased monitoring of AIREP/VARs, SIGMETs and NOTAMs;
- Initiate the gathering of all data relevant to determining the risk;

  NOTE: If the appropriate ATFM Unit organises regular data sharing teleconferences, the operator should make arrangements to participate

- Apply mitigations identified in the safety risk assessment process.

E.4 Ongoing Eruption

a) As the eruptive event develops, the operator can expect the responsible VAAC to provide VAA/VAGs defining, as accurately as possible, the vertical and horizontal extent of areas and layers of volcanic clouds. As a minimum, the operator should monitor, and take account of, this VAAC information as well as of relevant SIGMETs and NOTAMs.

b) Other sources of information are likely to be available such as VAR/AIREPs, satellite imagery and a range of other information from State and commercial organisations[5]. The operator should plan its operations in accordance with its safety risk assessment taking into account also those of these additional sources of information that it considers accurate and relevant.

c) The operator will have to resolve, reliably and correctly, any differences or conflicts among the information sources, notably between published information and observations (pilot reports, airborne measurements, etc.); the operator should, as soon as possible, report such discrepancies to the appropriate authorities.

d) Given the dynamic nature of the volcanic hazards, the operator should ensure that the situation is monitored closely and operations adjusted to suit.

e) The operator should be aware that, depending on the State concerned:

   i. Affected Areas or Danger Areas may be established that differentiate between various levels of volcanic ash contamination such as the Low,

5 In the US, operators holding Enhanced Weather Information System (EWINS) approval are authorized to produce flight movement forecasts, adverse weather phenomena forecasts and other meteorological advisories, including those related to ash contamination, based on meteorological observations provided by the State.

Medium and High contamination thresholds currently being used in Europe;

ii. Affected Areas or Danger Areas may be established covering airspace containing volcanic ash regardless of the contamination level. If no graduation of the volcanic ash contamination is given, operators should treat the whole area as if it contains High volcanic ash contamination, unless the operator's safety risk assessment allows it to do otherwise safely.

f) The operator should require reports from its crews operating in or close to areas affected, concerning any encounters with volcanic emissions, and ATC requirements. These reports should be passed immediately to the responsible authorities.

g) For the purpose of flight planning, the operator should treat the horizontal and vertical limits of the Danger Area to be over-flown as they would mountainous terrain, modified in accordance with their safety risk assessment. The operator will need to take account of the risk of cabin depressurisation or engine failure resulting in the inability to maintain level flight above a volcanic cloud, especially when conducting EDTO operations. Additional MEL restrictions should be considered in consultation with the TCHs.

h) When the airspace is no longer contaminated by volcanic ash clouds, a NOTAMC cancelling the active NOTAM is likely to be promulgated. A new NOTAM/ASHTAM would then be promulgated to update the situation.

APPENDIX F

GUIDELINES FOR CAAs ON EVALUATING AN OPERATOR'S CAPABILITY TO CONDUCT FLIGHTS SAFELY IN RELATION TO VOLCANIC CLOUD

F.1 Procedures

a) The aim of these guidelines is to assist the CAA of the State of Registry/Operator in its oversight of an operator intending to undertake operations into, or avoid, areas with known or forecast volcanic cloud contamination where the CAA requires the use of SMS.

b) Prior to the planned operation, the CAA will need to be satisfied that the operator has completed a safety risk assessment relevant to its type of operation and acceptable to the CAA.

> **NOTE:** The significance of the CAA accepting, rather than approving, a safety risk assessment is that the operator clearly retains responsibility for managing the risks and mitigating measures.

c) The objective of the SMS is to provide a formal, robust and transparent method by which the operator can demonstrate to the CAA that it has the capability and competence to achieve a safe outcome from flight operations into, or avoiding, areas with known or forecast volcanic cloud contamination.

d) The CAA's acceptance of the safety risk assessment should be dependent on a satisfactory confirmation by the operator of its competence and capability to:

- understand the hazards associated with volcanic ash clouds and the effect on the equipment being operated;
- be clear on where these hazards may exceed acceptable safety risk limits;

> **NOTE**: It is assumed that acceptable safety risk limits are exceeded when there is no longer a high level of confidence that the aircraft can continue to its intended destination or a planned alternate.

- identify and implement mitigations including suspension of operations where mitigation cannot reduce the risk to within safety risk limits;

> **NOTE:** This assessment is generally recorded in a formal safety risk assessment worksheet (example at Appendix D).

- develop, and execute effectively, robust procedures for planning and operating flights through, or avoiding, potentially contaminated airspace safely;
- choose correctly information sources to use, to interpret the information correctly and to resolve correctly any conflicts among such sources;
- take account of detailed information from its TCHs concerning volcanic ash-related airworthiness aspects of the aircraft it operates, and the related pre-flight, in-flight and post-flight precautions to be observed;
- assess the competence and currency of its staff in relation to the duties necessary to operate safely in, or avoid, areas of known or forecast volcanic ash cloud contamination and implement any necessary training;
- retain sufficient numbers of qualified and competent staff for such duties

> **NOTE:** It is not intended that the operator be precluded from securing necessary resources from other competent parties.

e) The CAA should consider:

- those of the operator's recorded mitigations of most significance to a safe outcome are in place;
- those of the operational procedures specified by the operator with the most significance to safety appear to be robust;
- that the staff on which the operator depends in respect of those duties necessary to operate safely in, or avoid, areas of known or forecast volcanic ash cloud contamination are trained and assessed as competent in the relevant procedures.

f) Analysis of the operator's SMS allows the CAA to review its Hazard Analysis competency and Safety Culture in a coherent way, and provides the CAA with a degree of confidence. An example of one approach to a Safety and Risk Assessment Matrix is given at Appendix G to guide CAAs through the process of evaluating operator safety risk assessments. It is acknowledged that each CAA may modify this document to fit their SMS approach. It is acknowledged that the nature of this assessment is such that it does not lend itself to a substantive quantitative approach though such an approach would be welcome in due course.

g) As part of its regular oversight of the operator, the CAA should remain satisfied as to the continuing validity of a safety risk assessment accepted for operations into or avoiding volcanic cloud contamination;

> **NOTE:** Should an operator fail to maintain an acceptable safety risk assessment, and associated resources, knowledge and procedures, the CAA should prohibit operations into or avoiding volcanic cloud contamination.

F.2 Capabilities

a) The CAA will need to have a thorough understanding of SMS principles and methodology.

b) The CAA will need to have the means to impose such restrictions on its operators as are necessary to minimise the volcanic ash cloud safety risk.

c) The CAA should ensure those of its staff involved in evaluating operator's SMS are appropriately trained and current and strongly encourage them to take up any opportunity to be involved in such VOLCEX exercises as are conducted in their area of operations.

d) Where a CAA considers that it lacks the capability to assess an operator's SMS and the related safety risk assessment on volcanic ash, it should enlist the assistance of a CAA with this capability.

APPENDIX G

EXAMPLE OF A SAFETY AND RISK ASSESSMENT MATRIX

THE OPERATION

Operator	
AOC No	
Aircraft Type(s)	
Engines	
Number of aircraft	
Zones of Operation	

AUTHORISATION

Any "NO" rating should cause the CAA to with-hold and withdraw acceptance of the safety risk assessment

Has the operator satisfactorily demonstrated:	Adequate understanding of the nature and location of the hazards?	YES/NO
	Clarity as to its safety risk limits?	YES/NO
	Robust documented procedures to ensure that the operation stays within limits?	YES/NO

	Adequate competence and capability to reliably execute its documented procedures on an on-going basis?	YES/NO
Has this demonstration been documented by the operator?		YES/NO
Authorisation	**Has the safety risk assessment been accepted thus signifying that the CAA is satisfied that the operator can operate, in accordance with its procedures, into areas of known or forecast contamination by volcanic material?**	YES/NO

EVALUATION

Any "unacceptable" elements in should result in operational restrictions up to and including prohibition or suspension of operations.
Any "acceptable" elements could indicate an increased probability of failing to sustain acceptable standards and should result in the CAA enhancing its operator surveillance accordingly.

	Evaluated As			
Factor	**Unacceptable**	**Acceptable**	**Best Practice**	**Notes**

Safety Policy6	No policy in place, or poorly developed/ inappropriate	An appropriate safety policy is in place	Management commitment to the safety policy is evident in all that the operator does	
	No evidence of commitment to/ action in line with the policy	The policy is linked to other company practices/activities	Safety is integral to business improvement in all relevant aspects of the operator's activity	
	Policy has not been approved at senior management level nor communicated effectively to staff	Policy has been approved and promulgated by senior management and is understood by all staff	Evidence that the policy has been approved and promulgated by senior management, is understood by all staff and staff understand and act on the policy in day to day business	
Understanding Risks	Operating procedures and practices do not reflect adequately the risks and hazards from this kind of activity	Operating procedures and practices reflect adequately the known risks/hazards of this type of activity	Evidence that the procedures and practices reflect well the known risks/hazards of this type of activity and the operator is proactive in receiving and sharing information regarding relevant risks/hazards with aviation community	

6 The Safety Policy is one component of the operator's SMS and the subject of a mandatory ICAO Annex 6 requirement. Without an acceptable or best practice safety policy, it would be expected that the AOC of the operator would be suspended.

	No particular effort made to identify or assess hazards/risks specific to this particular operation	An adequate Hazard identification and prioritisation carried out for this specific operation	Clear evidence of a regular review and update of hazard/risk assessment in light of own and others' experience	
	No documented picture of risks/ hazards faced ("Safety Risk Profile")	Documented Safety Risk Profile is in place	Staff understand the Safety Risk Profile and demonstrate commitment to their part in risk control	
	Own experience not factored into any documented picture of risks/ hazards the operator faces	Own incident and occurrence experience is factored into picture of risks/hazards faced	Leaders in understanding of relevant risks, based on own knowledge and evidence from elsewhere	

APPENDIX H

TERMINOLOGY

H.1 Acronyms

AIREP	Special Air Report - a message from an in-flight aircraft to a ground station describing significant in-flight conditions
AML	Aircraft Maintenance Log or equivalent, e.g. Aircraft Technical Log
ASHTAM	A special series NOTAM notifying a change in activity of a volcano, a volcanic eruption and/or volcanic ash cloud that is of significance to aircraft operations
ASR	Air Safety Report - used by an operator to document its safety incidents
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
CAA	Civil Aviation Authority
CDM	Collaborative Decision Making
EDTO	Extended Diversion Time Operations
ETOPS	Extended Range Twin-engined Operations
FIR	Flight Information Region
IAVW	International Airways Volcano Watch - international arrangements for monitoring and providing warnings to aircraft of volcanic ash cloud in the atmosphere
IVATF	ICAO Volcanic Ash Task Force
LIDAR	Light Detection and Ranging: an optical remote sensing technology counting among its capabilities that of detecting and measuring volcanic ash particle size and density
MEL	Minimum Equipment List
MET	Meteorological Service
MWO	Meteorological Watch Office
NOTAM	Notice to Airmen - Notices concerning the establishment, condition or change to any facility, service or procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations
PMA	Parts Manufacturer Approval
SIGMET	Significant Meteorological Information message - information concerning en-route weather phenomena which may affect the safety of aircraft operations
SMM	Safety Management Manual ICAO Doc 9859
SMS	Safety Management System
STC	Supplemental Type Certificate

TCH	Type Certificate Holder
VAA	Volcanic Ash Advisory message
VAAC	Volcanic Ash Advisory Centre
VAG	Volcanic Ash Advisory message in graphical form
VAR	Volcanic Activity Report from aircraft (the real-time part of the VAR is issued in the same manner as an AIREP Special)
VO	Volcano Observatory
VOLCEX	Regular ICAO volcanic ash exercises to validate and improve regional volcanic ash contingency plans and procedures.

H.2 Definitions

Accountable Executive: **The individual within a CAA-approved organisation who is accountable to that CAA for ensuring that the safety standards required by regulation, and any additional standards specified by the organisation, are met on an ongoing basis by the organisation.**

Affected Area: **A volume of airspace, an aerodrome or another area on the ground, identified by VAA/VAG and/or SIGMET as being affected by known or forecast volcanic cloud contamination.**

***(Aircraft) Operator*:** In the context of this document, references to the (aircraft) operator refer to those operators subject to ICAO Annex 6 Parts I, II and III being operators of aeroplanes or helicopters authorised to conduct International commercial air transport operations or involved in international general aviation.

Danger Area: **In the context of volcanic cloud contamination, a volume of airspace identified by NOTAM as being affected by levels of known or forecast volcanic cloud contamination which States judge merit publication to operators.**

Service Provider: **In the context of this document, includes approved training organizations, aircraft operators and approved maintenance organizations, organizations responsible for type design and/or manufacture of aircraft, air traffic service providers, aerodromes, MWOs and VAACs.**

State of the Operator: **The State in which the operator's principal place of business is located or, if there is no such place of business, the operator's permanent residence.**

State of Registry: **The State on whose register the aircraft is entered.**

Visible Ash: **[Needs formal definition from IVATF SCI Subgroup].**

Volcanic Cloud: **The sum of the material ejected from a volcano into the atmosphere and transported by winds aloft. It comprises volcanic ash, gases and chemicals[7] (refer section 2.1 of ICAO Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds - Doc 9691).**

Volcanic Ash: **is comprised of minerals unique to the volcanic eruption. Minerals common to most volcanic ash are silica together with smaller amounts of the oxides of aluminium, iron, calcium and sodium. The glassy silicate material is very hard and extremely abrasive. Its melting point is below jet engine burner temperature which introduces additional hazards. (refer section 2.1 of ICAO Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds - Doc 9691).**

Volcanic Ash Contamination Level: An ash concentration level used to delineate airspace in which ash density is considered to have significance in safety terms.

— — — — — — — —

7 Although the specific material being warned for used to be the ash contained in the volcanic cloud, it is understood that other elements of the cloud may also be undesirable to operate through

Appendix B - Attachments

AIC B 29_10.pdf
Attachment #1 to comment #22

11.05.26 EASA A-NPA 2011-06 Vol Ash ICCAIA Markups.pdf
Attachment #2 to comment #23

ICCAIA letter AC 052 Resp to EASA ANPA2011-06 (2).pdf
Attachment #3 to comment #23

Snecma comments to EASA A-NPA N 2011-06 (2731-RC).pdf
Attachment #4 to comment #93

CommentsExternal2.pdf
Attachment #5 to comment #27