Comment-Response Document 2017-03

Appendix 2
to Opinion No 02/2019

RELATED NPA: 2017-03 — RMT.0271 (MDM.073(a)) & RMT.0272 (MDM.073(b)) — 21.2.2019

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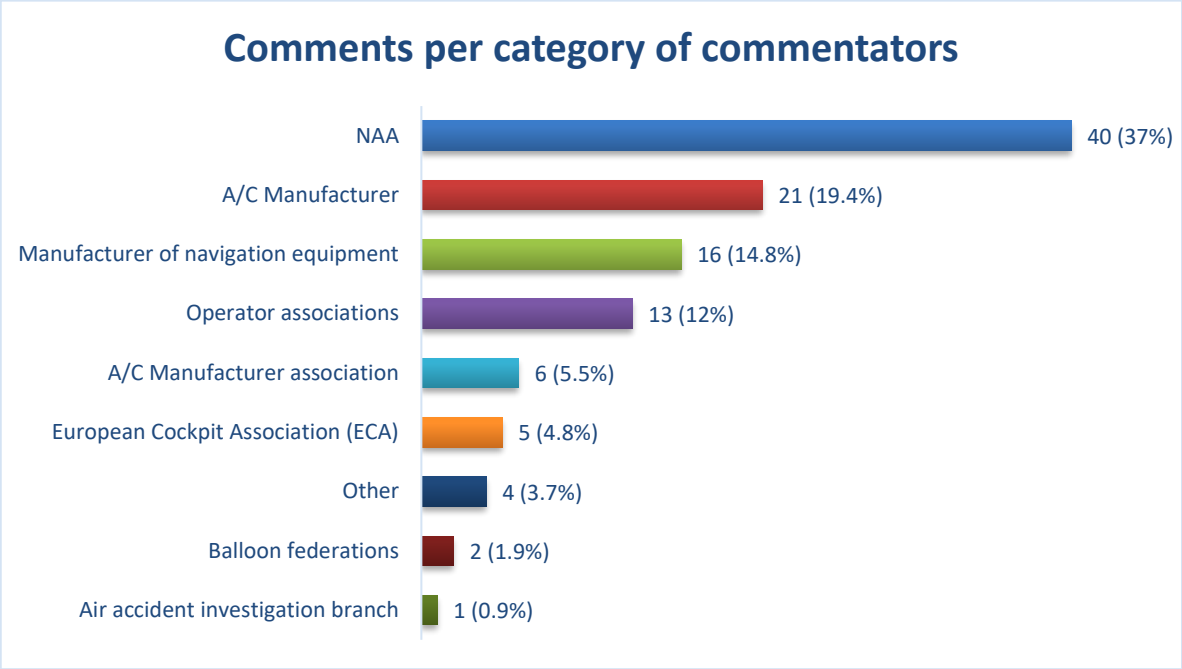
1. Summary of the outcome of the consultation

108 comments were received on NPA 2017-03 from 20 commentators from the following categories of stakeholders:



The comments focused mainly around the following topics:

Comments on removing the commercial specialised operations (SPO) from the regulatory proposal

The comments of one NAA argued that the impact assessment published in NPA 2017-03 did not provide sufficient justification to propose any requirements for in-flight recording for light aircraft involved in commercial SPO activities. Several counter-arguments were brought into discussion, among which the unjustified costs in the case of specialised operations with a low level of risk, such as aerial photography, or the fact that the new requirements would be too burdensome for light aeroplane manufacturers from third countries.

The review group discussed this issue at length. The work on the NPA considered from the very beginning commercial operations in comparison with non-commercial operations, in order to establish the area of application of the new rules. Since the aim was to cover commercial operations, it was decided to retain commercial SPO in the scope, as this is the only other-than-CAT type of commercial operations. The impact assessment published in the NPA showed that extending the requirement to commercial SPO 'captures three times more historical accidents with aeroplanes (22 instead of 7) and three times more accidents with helicopters (14 instead of 5)' (see Section 4.5.1 of NPA 2017-03).

Furthermore, ICAO recommends that light turbine-engine aeroplanes used for operations other than CAT should carry a flight recorder capable of recording flight parameters (see Annex 6 Part II). Moreover, three of the safety recommendations presented in Appendix C of the Explanatory Note of NPA 2017-03 are related to in-flight recording equipment for light aircraft engaged in SPO activities.

Since the new rules will apply only to newly manufactured aircraft (applicable 3 years after the date of publication of the new regulation), and by similarity with other forward-fitted equipment, the scale effect is expected to lower the purchasing price and the certification cost, no cost will be generated by aircraft downtime, and the number of hours needed to install the equipment will be reduced.

In conclusion, given the expected impacts on safety and economics, it was decided to maintain the initial proposal – to keep SPO in the new requirements. For more details, please see the response to comment #33 in this document.

Comments proposing to include audio recording as mandatory recording

Another significant topic addressed by several comments — mainly the comment #103 by AAIB-UK — was that audio recording, although required by ICAO Annex 6, was not considered for inclusion in the new rules, despite the benefits it would bring to the understanding of the causes of an accident or a serious incident.

EASA reviewed the safety statistics of HEMS flights in EASA Member States, having in mind the issue raised by the review group that accidents occurring in HEMS operations have a higher numbers of fatalities and that audio recording might improve understanding of the causes of such accidents and further help preventing accidents in HEMS operations. The purpose of the new statistics developed was to identify any possible correlation or trend supporting the safety benefit brought by the carriage of a CVR on board helicopters involved in HEMS operations. In particular, the safety figures involving helicopters with a MCTOM of over 3 175 kg (required to carry a CVR) were compared with the safety figures of helicopters with a MCTOM of 3 175 kg or less (not required to carry a CVR and most often not carrying any kind of flight recorder).

However, the available figures indicated stable safety trends since 2005 and did not contain any positive evidence of safety benefit brought by the carriage of a CVR.

Since audio recordings and image recordings have an intrinsic privacy content (with information that is private and unrelated to the accident), their use is more restricted than it is for the flight data recording. This in turn restricts the possible use by the operator.

Finally, while there probably is some safety benefit to recording cockpit audio on board light helicopters, a requirement does not seem justified at this stage. Therefore, instead of a requirement new GMs to CAT.IDE.A.191, CAT.IDE.H.191, SPO.IDE.A.146 and SPO.IDE.H.146 have been introduced to recommend the cockpit audio recording.

Comments on protection of privacy when images are recorded

A concern raised by a pilot association and an association of commercial operators was the protection of privacy if image recording is permitted in the flight crew compartment. To address these comments, the new subpoints in paragraph (f) in CAT.GEN.MPA.195 and respectively SPO.GEN.145 and the associated AMC (and GM) enhance the requirements to protect the privacy of the crew members. Moreover, CAT.IDE.A/H.191 and SPO.IDE.A/H.146 include a new requirement that the flight recorders in the range of aircraft covered by these rules are provided with a function enabling the commander to modify the image or audio recordings in the cockpit beyond normal possibilities of copying or replaying the image or audio recordings.

Comments on the function of a flight recorder, which may inadvertently erase image or audio recordings

Several comments raised the issue of the 'erasure function' as was published in NPA 2017-03, in CAT.IDE.A.191, CAT.IDE.H.191 SPO.IDE.A.146 and SPO.IDE.H.146 and the inadvertent erasure of an image or audio recording of the flight crew compartment. In order to address this concern, the text of the OPS rules has been amended to state 'a function to modify the [audio or image] recording' to protect the privacy of the flight crew. An additional GM has been created to each of those implementing rules, which explains that the purpose of this function is to make impossible the retrieval of image or audio recordings by using normal replay or copying techniques.

Comments on the recording duration of the flight recorder

Several comments questioned the need for a recording duration capability of 10 hours (proposed in new CAT.IDE.A.191, CAT.IDE.H.191, SPO.IDE.A.146 and SPO.IDE.H.146). The comments stated that the entire flight duration of most light aircraft used in general aviation rarely exceeds a few hours. The review group also discussed technical aspects such as storage space needed for 10-hour recording, which might be too burdensome in the case where images are recorded. When examining aeroplane and helicopter models within the scope of the new requirements, it was found that the majority of models have a flight endurance of less than 5 hours, and even those models with an endurance exceeding 5 hours seldom perform commercial flights with such a long duration. It was then concluded that 5 hours recording duration is sufficient.

Comments on the need to define a lightweight flight recorder

A few comments requested that the new rules include a definition of a lightweight flight recorder. In order to clarify what should be understood by a lightweight flight recorder, the proposed GM16 Annex I published in NPA 2017-03 was amended to include more explanations for a clear distinction between the crash-protected flight recorders and the lightweight flight recorders.

Comments on recording the main rotor speed for helicopter operations in CAT operations and SPO

Two comments from a NAA requested EASA to add the recording of the main rotor speed as one of the mandatory parameters for helicopters. The main rotor speed is essential in understanding the flight path of a helicopter and initial airworthiness requirements require that the revolutions per minute (rpm) of the main rotor are displayed by an instrument.Therefore it was decided to add the recording of this parameter in the list of AMC1 CAT.IDE.H.191 and respectively AMC1 SPO.IDE.H.146 in point (c), when flight parameters are captured by means of image recording. It was, however, not included in point (b), when the flight parameters are recorded by means of flight data, because any recording solution that requires interfacing with the aircraft systems may increase the complexity of the installation and the associated certification cost.

Comments on seven days of operation vs 150 flight hours between operational checks of the flight recorder

Several comments challenged the change proposed to the inspections and checks of recordings in AMC1 CAT.GEN.MPA.195 and respectively AMC1 SPO.GEN.145(b), whereby the operator should perform an operational check of the flight recorder at intervals not exceeding seven calendar days of operation whenever the aural or visual means for preflight check of the flight recorders are not available/installed.

When the preflight check was first transposed from ICAO Annex 6 into the Air OPS rules, the measure contained in the AMC was developed as a mitigation to ensure the serviceability of recorders on some older models of aircraft for which the means to perform a preflight check were not available.

The NPA proposed to replace the seven-days-of-operation interval with '150 flight hours' because 'days of operation' are not commonly used by operators. 150 flight hours correspond to more than 7 days of operation, assuming that the aircraft is operated 21 hours per day

However, this change triggered more discussions in the review group, because the issue can be viewed from two perspectives – of the flight operations and of maintenance. From the point of view of maintenance, specifying an interval in flight hours is more appropriate, whereas when the task can be performed by the flight crew, it is easier to measure the time in days of operation.

In order to offer sufficient flexibility, it was agreed to create a compromise solution and amend the text of AMC1 CAT.GEN.MPA.195(b) to include both intervals, and leave the operator to decide which one is more suitable to its operation.

Comments on balloons

Two comments (from a balloon association and a balloon manufacturer) addressed the issue of balloons as presented in NPA 2017-03. The comments heavily opposed any regulatory action on balloon operators, although the NPA does not contain any such proposal. The proposal in NPA 2017-03 related to operations with balloons was to encourage voluntary installation of means to record data and images on board balloons via safety promotion activities.

EASA decided to request an assessment of Option B.1 of the NPA from the Balloon Collaborative Analysis Group (BCAG). The BCAG is one of the collaborative analysis groups (CAGs) supporting EASA Safety Risk Management Process. The task of each CAG is to evaluate and, if possible, augment new accident and incident information within their domain, identify candidate safety issues, assess them and propose actions to mitigate the risks. The BCAG is composed of experts from the industry, balloon associations and national aviation authorities.

The written assessment made by the BCAG concluded the following:

'(…) the Balloon Collaboration Analysis Group (BCAG) considers this to be a very low priority issue and recommends to delete the paragraph on promoting data recording for all categories of balloons from the proposed recommended text of the NPA.'

Given this conclusion and the fact that other safety issues with a higher priority have been identified for balloons, EASA decided to not invest efforts in encouraging the voluntary installation of means to record data and images on board balloons.

For a more detailed answer, please see comment #3.

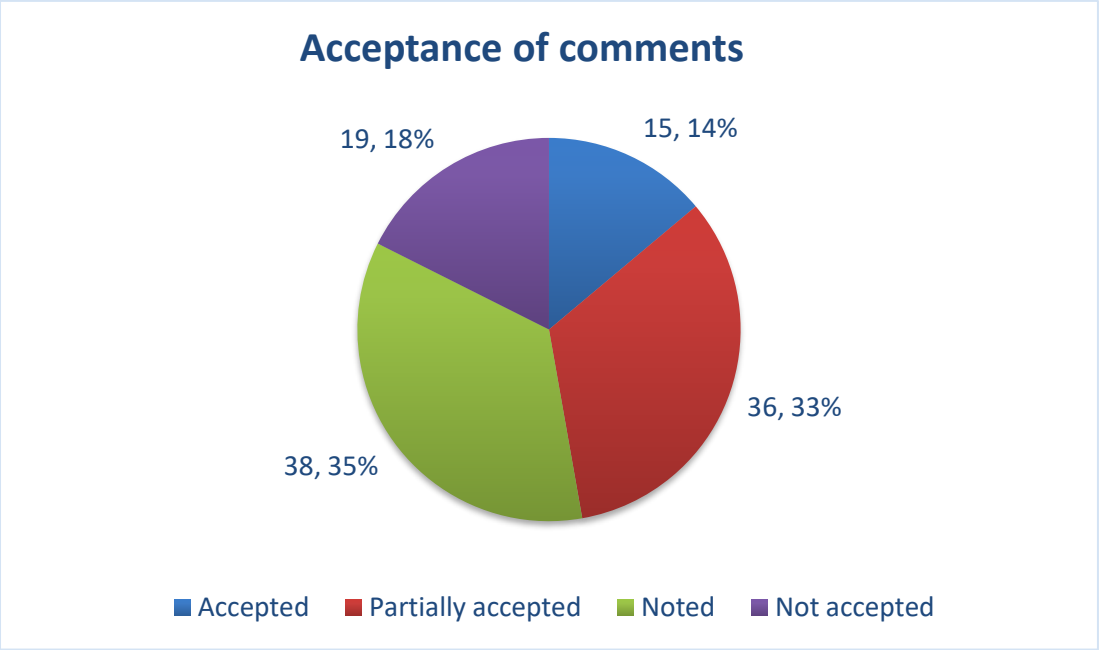
Statistics on the comments received

40 percent of the comments were submitted by the national aviation authorities.

The other approx. 40 percent of the comments were submitted by manufacturers of aircraft or of navigation equipment or aircraft manufacturer associations.

20 comments were received from air operators, operator associations and pilot associations, of which one operator association comes from the general aviation sector.

Of the 108 comments received, 15 were accepted, 36 were partially accepted, 38 were noted and 19 were not accepted. The acceptance of comments in percentage is shown below:



2. Individual comments and responses

In responding to comments, a standard terminology has been applied to attest EASA's position. This terminology is as follows:

(a) **Accepted** — EASA agrees with the comment and any proposed amendment is wholly transferred to the revised text.

(b) **Partially accepted** — EASA either agrees partially with the comment, or agrees with it but the proposed amendment is only partially transferred to the revised text.

(c) **Noted** — EASA acknowledges the comment but no change to the existing text is considered necessary.

(d) **Not accepted** — The comment or proposed amendment is not shared by EASA.

(General Comments)	-

comment *3* comment by: *European Ballooning Federation*

The comments made are the result of internal consultation of the EBF (European Ballooning Federation) members.

General:
We are disappointed to read that we have not been consulted on the subject under discussion regarding the chapters about balloons. We could have provided you with the consensus view of all our members and given your proposals more balloon expert content.
We are always prepared to provide a balanced view on any topic involving balloons and balloon safety. We represent the commercial balloonists and operators as well as the hobby and competition pilots.

On topic:
We have read the proposals to "promote" the presence of cameras and trajectory parameter recorder. Reading from the RIA the people who have discussed this in the RMT 271 and 272 were not quite sure how to attack the problem for balloons. It is clear that only a few balloons (in only a few countries) operate under CAT. Other commercial operations are under a declaration or unregulated. There are initiatives such as RMT 674 that is addressing these topics. We expect Commercial Passenger Ballooning to be introduced including the associated rules and regulations.
Let us start with the problem for which an on board camera and trajectory recorders are the solution.
It was stated in the NPA under 2.1 that CAT balloons are more vulnerable to or involved in incidents and accidents than non-CAT balloons. This must be a misunderstanding for not many (if any) countries have balloons under CAT. How these statistics came to life is unclear and we have serious question marks as to their correctness and interpretation for all European countries.
For training purposes a set of Go-Pros is used by some FI's in one or two countries on an individual FI's initiative. They record the basket during the flight including one additional Go Pros recording the flight direction. These Go-Pros are linked to GPS systems. They can simultaneously be viewed after the flight on one single screen. What we cannot see on the

recordings is the most relevant "other" data such as changes in the wind, weather, visibly, cloud base, state of mind of the pilot and FI. The experience with those recordings is that they are a rather technical way of instructing a new pilot. The experience is that recording the basket is not conclusive because they do not record anything else than the basket. On the recording you can see what the pilot actually did but not why he felt action should be taken and it does not say anything about the timing of the actions in relation to the surroundings. We feel that these recordings are of limited value even for training purposes.
Most of the pilots today use GPS trackers and or IPad with appropriate software for navigation and data storage without using a camera. Most of the data is stored on the IPad or GPS. The advantage is that it is much less privacy sensitive than recording the passengers and the pilot (who is in the same area as the passengers). The position of the pilot is quite different from other aircraft namely physically near or in-between the passengers.
The equipment used is not fixed to the basket and not installed permanently. Therefore the cost are quite acceptable. After an incident this equipment can be used for an investigation.
What fear that these recordings could be used for monitoring commercial pilots working for a balloon operators in the sense that their interactions with the passengers and entertainment value is monitored by an in-basket recorder. In order to prevent his it will involve formal rules and regulations for the access, use and storage of these recordings.
One other issue is the privacy of the passengers. Ballooning has a substantial entertainment component which can involve people and situations that are very privacy sensitive. Some passengers do not want to be recorded during their leisure trip with business associates or the like.
We feel that the recording involves a considerable list of other issues besides the recording itself.

Structural changes to the airframe:
The operator will have to make changes to the structure of the burner frame. This is costly and may involve certification issues. This may be a costly exercise. Looking at the countries (UAE) in which the recording is compulsory we can see that changes to the burner frame have to be made in order to get a clear picture of the entire balloon basket including the workspace of the pilot. This is an issue for all sizes and shapes of balloons.

Storage access and administration:
The second issue is the storage and access to the recordings. Most operators are small (part time) pilot/operators. They have very limited resources. All recordings need to be administered and stored and kept for a certain period of time. They may need to be stored in a "safe" environment. This may also need additional investments. The matter of access and usage of the data is an issue that would need further detailed rules and regulations.

The investment:
The operator will have to purchase a recording device with the possibility to record other data than the visual. The trajectory data derive from a GPS logger for speed, course and altitude. This needs to be synchronised with the recording of the basket pictures. This involves additional investments as well.

Legal framework:
As you will appreciate, if EASA makes a “recommendation” to use additional equipment during a flight it is often seen as an obligation to install and use this equipment. The operator will not want to explain why he/she did not install this equipment to the NAA or the insurance company whilst EASA recommends such instalment. Recommendation in practise almost means an obligation to install.

Conclusion:
Considering:

- That under the current national rules and regulations there are only a few countries that operate balloons under CAT. In most countries CAT is not applicable to balloons. In the new proposed rules this will remain so.
- the very limited additional safety achieved by introducing camera and trajectory recordings and
- the limited effectiveness of recordings for accident investigation and
- the substantial investment in changes to the equipment such as the burner frame and
- the safe keeping and use of data and
- the privacy sensitive nature of recording passengers and
- the legal issues as described
- the absence of the possibility to permanently install equipment in or on a balloon airframe and all equipment therefore must be portable.

We would recommend to delete the paragraph on promoting data recording for all categories of balloons from the proposed recommended text of the NPA.

The comments made by the undersigned on behalf of EBF (European Ballooning Federation).

European Ballooning Federation
Karel Abbenes
kaa@ballooning-federation.eu

response

Partially accepted.

Given the concerns expressed by EBF in this comment, it was decided to request an assessment of Option B.1 of the NPA from the Balloon Collaborative Analysis Group (BCAG). The BCAG is one of the collaborative analysis groups (CAGs) supporting EASA Safety Risk Management Process. There are Collaborative Analysis Groups for most aviation domains. The task of each CAG is to evaluate and, if possible, augment new accident and incident information within their domain, identify candidate safety issues, assess them and propose actions to mitigate the risks. The BCAG is composed of experts from the industry, balloon associations and national aviation authorities.

The written assessment made by the BCAG concluded the following:

'the Balloon Collaboration Analysis Group (BCAG) considers this to be a very low priority issue and recommends to delete the paragraph on promoting data recording for all categories of balloons from the proposed recommended text of the NPA.'

Given this conclusion and the fact that other safety issues with a higher priority have been identified for balloons (refer to EASA Annual Safety Review 2017), EASA will not invest efforts in implementing Option B.1, unless new data or a need expressed by the stakeholders require revisiting this assessment.

However, the following is brought to the attention of the commenter:

1. Option B.1 of the NPA means promoting the benefits of recording trajectory parameters as well as images of the basket interior. Safety promotion is a different activity, developed outside the rulemaking framework, and safety promotion

material is not considered as binding recommendations. As explained on EASA Safety promotion webpage: 'Safety Promotion is a set of means, processes and procedures that are used to develop, sustain and improve aviation safety through awareness raising and changing behaviours.' Examples of safety promotion material can also be consulted on this webpage. Each organisation or individual can decide whether to make use of the safety promotion material or not. In addition, an EU Member State may not introduce requirements 'on top of the EU rules' in the areas covered by Regulation (EC) 216/2008, except by invoking an exemption (Art 14 by Regulation (EC) 216/2008). However, even in this case, exemptions are reserved for addressing regulatory gaps or if practical implementation of an EU rule is impossible or very difficult. For these reasons, we disagree with the statement that safety promotion 'almost means an obligation'.

2. It is not stated in the NPA that 'CAT-balloons are more vulnerable to or involved in incidents and accidents than non-CAT balloons', but that CAT statistics indicate a significantly higher rate of accidents with balloons compared to aeroplanes and helicopters (see section 2.1 of the NPA). EASA Annual Safety Review 2017 indicates that the rate of fatal accidents with aeroplane airline operations (for EASA Member States operators) is less than $2x10^{-7}$ per flight. EASA Opinion 01/2016 (Revision of the European operational rules for balloons) indicates in Appendix 2, Table A2.2 that in 2015, 5 fatal occurrences affected commercial air transport operations with balloons. In 2015, 94 093 CAT flights with balloons were performed. Hence the rate of fatal accidents of balloons operated under CAT in EASA MS was 5/94 053=5. 10^{-5} per flight.

3. The relevance of recorded data for the safety investigation should not be underestimated or minimised. While flight recorders on board large aeroplanes and helicopters do not record every action of the flight crew or the cabin crew, they have proven to be essential investigation tools. In the absence of flight recorders, data recorded by other aircraft systems or coincidental recordings made by passengers or witnesses were often instrumental to identify the probable causes of an accident. In addition, recorded data is usually not analysed in isolation but combined with other sources of information (witness statement, wreckage examination, weather data, etc.). Hence statements such as 'recording the basket is not conclusive' are questionable, and we don't concur with EBF general statement about 'the limited effectiveness of recordings for accident investigation'.

4. Section 4.1.4 of the NPA explains why 'relying on GPS trackers and/or IPad' is not considered an appropriate alternative: 'One should also not rely on coincidental recordings from portable electronic devices (portable GNSS receiver, action camera, smartphone) to replace dedicated in-flight recording, because the data formats used by these devices are proprietary and data is encrypted; this makes retrieval of any useful data very challenging when the device is damaged (often the case after an accident). Also retrieving data from these devices on a day-to-day basis for operational purposes is difficult for technical and privacy reasons. The manufacturers of these electronic devices usually provide little assistance to the investigation authorities.'

5. Regarding the risk of misuse of image recordings, it should be noted that personal data protection is now covered by Regulation (EU) 2016/679[1] (General Data

[1] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC

Protection Regulation). The legal framework provided by this regulation is sufficient to protect the privacy of a balloon pilot and of balloon passengers.

6. The technical difficulties in installing and managing the storage of the equipment are acknowledged, but since Option B.1 of NPA 2017-03 is about voluntary installation, it is assumed that a balloon operator would make its own impact assessment and that it would eventually decide against installation if the cost and the administrative burden exceed the expected benefit. For this reason, the economic impact of Option B.1 is considered neutral (refer to section 4.5.4.1 of the NPA).

comment

8 comment by: *René Meier, Europe Air Sports*

Europe Air Sports, on behalf of all members thanks the Agency's Rulemaking Group for the careful preparation of this Notice of Proposed Amendment.

We particularly welcome the proposal for voluntary installations of recorders on light aircraft and light helicopters not engaged in commercial air transport or in commercial operations.

Being familiar with the topic as directly concerned stakeholders we put a special accent on the conclusions drawn by the authors.

Our communities operating aircraft at the lower end of the weight classes welcome the outcome of work done, we only have a handful of remarks or questions which we integrate in this CRT.

response

Noted.

Thank you.

comment

18 comment by: *Luftfahrt-Bundesamt*

LBA comment:

In our opinion the implementation of the ideas of the NPA 2017-03 will be only a positive impact for investigation authorities. The industry, owner and pilots of aircraft and balloons will have to bear an additional burden to modify their light aircraft and balloons. We assume that the relation between accidents and incidents and the prosed in-flight recording will not be effective. The efforts and costs for change all light aircraft will not avoid additional incidents, but only make the investigation easier.
Investigations of accidents with aircraft below 2 t and gliders have shown that these accidents were related to inadequate flight preparation, fuel mismanagement, excessive risk taking etc. This circumstance is well known among aviation experts.
Flight records most often would not improve investigations as the knowledge about these accidents caused by inexperienced or risk taking pilots already exist.
Finally, the financial capacity of non-commercial operators and private owners are limited. Those owners have to bear the arising costs. The result might be a decrease of flight hours conducted by private pilots. That lack of practice may amplify the possibility of an accident.
Regarding Option A.3 (SPO, CAT) the impact is acceptable as these aircraft operating commercially.

response | Noted.

The concerns expressed in this comment were taken into account in the analysis of the issue. The comment is consistent with the conclusion taken in the NPA. The option A.3 was indeed retained as the preferred option.

NPA 2017-03 does not propose any requirement for sailplanes, balloons, aeroplanes with a MCTOM of less than 2250 kg and helicopters with a MCTOM of less than 2250 kg. NPA 2017-03 does not propose any requirement for aircraft used for non-commercial operations.

comment | *22* comment by: *General Aviation Manufacturers Association*

ASTM approved F3228-17 Standard Specification for Flight Data and Voice Recording in Small Aircraft. GAMA recommends this specification be considered for an equivalent ED-155/112 standard for the "lightweight" FDRs discussed in the NPA.

response | Not accepted.

ASTM F3228-17 contains a section "cockpit voice recorders" and a section "flight data recorders". The content of the section "flight data recorders" is almost the same as FAR Part 25, 25.1459 flight data recorders.

ASTM F3228-17 is covering installation aspects, not equipment performance aspects, so it is not equivalent to ED-155 or ED-112.

In addition, ASTM F3228-17 contains additional specifications which are not justified for a lightweight recorder installed on a light aircraft, such as:

- *'receive its electrical power from the bus that provides the maximum reliability for operation of the flight data recorder without jeopardizing service to essential or emergency loads',*
- *'There must be an aural or visual means for preflight checking of the recorder for proper recording of data in the storage medium'*
- *'there must be an automatic means to simultaneously stop a recorder that has a data erasure feature and prevent each erasure feature from functioning, within 10 min after crash impact'*
- *'each nonejectable record container must be located and mounted so as to minimize the probability of container rupture resulting from crash impact and subsequent damage to the record from fire.'*

Finally, ASTM F3228-17 contains no specification regarding image recorders, while this is an option proposed by NPA 2017-03.

Therefore, reference to ASTM F3228-17 is not considered appropriate.

comment | *23* comment by: *Federal Office of Civil Aviation (FOCA), Switzerland*

The Federal Office of Civil Aviation (FOCA) appreciates the opportunity to comment on this NPA and would like to thank the Agency.

	FOCA believes that it is of utmost importance that the new regulation regarding In-flight recording for light A/C is proportionate and reasonable in order to minimize the burden for the General Aviation community, which have limited human and financial resources. In our opinion, the installation of in-flight recording into light A/C is debatable because with the new concept lightweight flight recorders are required to meet less demanding crash-protection requirements, hence the data might not be available or is lost in case of a serious incident or accident. With this in mind, a cost-benefit-analysis might not support the purposes of the NPA regarding the tremendous high installation costs for purchasing the lightweight recorder unit, installation design and test certification (STC) and equipment installation. The involved costs seem to be a significant burden for the GA community. Furthermore, we would like to add that the provided data quality and availability is also questionable, as the data is not picked-up from a standardized data bus such as ARINC 429 (MCDU, datalink) or ARINC 717 (FDR, QAR, WQAR).
response	Noted. This comment probably refers to the text of draft AMC1 CAT.IDE.A.191: '(f) The operational performance requirements for the flight recorder should be those laid down in: (1) EUROCAE Document ED-155 or any later equivalent standard accepted by EASA for lightweight flight recorders; or (2) EUROCAE Document 112 or any later equivalent standard accepted by EASA for crash-protected flight recorders.' First, NPA 2017-03 proposes requirement only for CAT and commercial SPO operations, not for general aviation operations. In addition, the crashworthiness specifications of lightweight recorders (ED-155) are less stringent than those of crash-protected recorders (ED-112), because lightweight recorders are meant to be installed on aircraft that are lighter and slower than aircraft on which crash-protected recorders are installed (reduced kinetic energy in case of impact and reduced risk that the recorder is crushed by the airframe). Such light aircraft also carry limited quantities of fuel (reduced probability that the recorder is exposed to a high-temperature fire or a long lasting fire). With regard to data bus standards: the proposed requirements do not require the use of any data bus, because they were designed so that picking flight parameters from the aircraft systems is not necessary. For example, they could be met with just images from the main instrument panel (using a camera) or using dedicated sensors (such as GNSS receiver and inertial sensors). Refer to AMC1 CAT.IDE.A.191.
comment	*27* comment by: *Austro Control* Dear all, Austria offers the following general comments to this NPA: The intent of this NPA is not fully comprehensible and raises some questions, which should generally be discussed. Please find below our questions and recommendations:

	1) 1. Due to the fact that the requirements for ADS-B is already defined, it would make more sense that ADS-B records its data as substitute for an FDR. In addition to that ACG is of the opinion that there is a need for active safety promotion, which would lead at least to the same result. 2) 2. We are missing a comprehensive impact assessment where all areas had been considered. (keeping current regulations - MCTOM of more than 5 700 for aeroplanes and MCTOM of more than 3 175 kg for helicopters, impact on the general aviation community and operation of such aircraft including cost and benefit analysis, etc.) 3) 3. CAT.IDE.A/H.191 point b) requires aircraft speed to be recorded. That is very difficult, as from technical side you have to ensure that e.g. no interference arises etc. We recommend to require that the ground speed is being recorded? 4) 4. Where do the 150 hours in AMC1 CAT.GEN.MPA.195(b) come from? This value is not a common interval and should be type related (refer e.g. functioning and described in Part-M). 5) 5. What are the structural/design limits for a "light FDR"? ETSO? ASTM?
response	**Comment No 1: Partially accepted** Promoting the voluntary installation of in-flight recording equipment is part of the options discussed in NPA 2017-03: refer to chapter 4, section 4.3.2, Option A.1. The safety impact of this option is considered just slightly positive, for reasons which are explained in chapter 4, section 4.5.1, Option A.1. By comparison, the safety impact of requiring in-flight recording equipment for commercially operated light aeroplanes and light helicopters is considered medium positive: see chapter 4, section 4.5.1, Option A.3. Hence the retained Option A.4 is a combination of requirements (for commercially operated aeroplanes and helicopters only) and promotion. Relying on a SSR transponder to record the position of the aircraft on the ground is discussed in NPA 2017-03, Appendix F: see 7.6.1, 7.6.2.1 and table F.1. However, this alternative solution has several drawbacks compared to carrying a lightweight flight recorder, in particular: - Data is not necessarily stored for a long time (only 3 days for some ANSPs) and the ICAO Standards in ICAO Annex 11 section 6.4.1 prescribing that this data is automatically recorded and preserved for at least 30 days have not yet been transposed into EU rules (at this date, they are part of the proposals in EASA Opinion 03/2018). - Data may be missing if the aircraft is not in the range of an SSR or an ADS-B station. It should be noted that the coverage of commercial ADS-B receivers networks such as flightradar24 at low altitude (where most light aeroplanes and helicopters operate) is not known and not guaranteed. - Data is not recorded in a unique place, but may be scattered over several ANSPs, which usually means time-consuming reconstruction work for investigation authorities. **Comment No 2: Not accepted.**

Chapter 4 of NPA 2017-03 contains a detailed RIA which includes assessments of the likely evolution of the issue if nothing is done (refer to section 4.1.4), of the options' impacts on the general aviation community (refer to section 4.5.5) and of the economic impact (refer to section 4.5.4). The methodology used for comparing options is the multi-criteria analysis, which applies cost-benefit thinking to cases where there is a mixture of qualitative, quantitative, and monetary data and varying degrees of certainty (refer to section 4.4.1).

Comment No 3: Noted.

Draft AMC1 CAT.IDE.A.191 (refer to section 3.2.1) lists the flight parameters to be recorded. 'Aircraft speed' may be the ground speed when flight data are recorded because the most convenient data source is typically a GNSS receiver (refer to point (b)(10) of draft AMC1 CAT.IDE.A.191) and it may be the indicated airspeed when images are recorded because according to CAT.IDE.A.125 and CAT.IDE.A.130, measuring and displaying the indicated airspeed is mandatory on-board all aeroplanes (refer to point (c)(4) of draft AMC1 CAT.IDE.A.191). The same reasoning was applied to helicopters and to Part-SPO. See also subsection 3.2.2.3.1.

Comment No 4: Noted.

An operational check of the flight recorders is recommended by point (c) of AMC1 CAT.GEN.MPA.195(b) to be performed every day by the flight crew using pre-flight check means. However, when this is not made possible by the recorder installation, then a looser time interval is permitted by point (c) of AMC1 CAT.GEN.MPA.195(b), and it is currently 7 days of operation.

The justification for changing the time interval from 7 days to 150 flight hours is provided in subsection 3.2.2.3.2 of the NPA:

'If, however, no means for preflight checking of the flight recorder is available, an operational check should be performed at time intervals not exceeding 150 flight hours, instead of previously '7 calendar days of operation'. Indeed 'days of operation' is not commonly used metrics. 150 flight hours correspond to more than 7 days of operation, assuming that the aircraft is operated 21 hours per day (case of large aeroplanes which are flying most of the time). For a light aircraft which is usually less used, the operational check can be performed at longer time intervals. '

However, after reviewing this comment and comment No 97, it was decided to change the current wording of point (c) of AMC1 CAT.GEN.MPA.195(b) so that operators are given the possibility to choose between 7 days and 150 flight hours at their convenience.

Comment No 5: Noted.

The operational performance of the flight recorder, including design specifications, are provided in point (f) of draft AMC1 CAT.IDE.A.191, point (f) of draft AMC1 CAT.IDE.H.191, point (f) of draft AMC1 SPO.IDE.A.146 and point (f) of draft AMC1 SPO.IDE.H.146. All these points contain the following text:

'(f) The operational performance requirements for the flight recorder should be those laid down in:

(1) EUROCAE Document ED-155 or any later equivalent standard accepted by EASA for lightweight flight recorders; or

(2) EUROCAE Document 112 or any later equivalent standard accepted by EASA for crash-protected flight recorders.'

Section 2 of EUROCAE Document 155 contains common design specifications for a lightweight flight recorder, including crash survival and the associated test procedures. Section 2 of EUROCAE Document 112 contains common design specifications for a crash-protected flight recorder, including crash survival and the associated test procedures.

comment *28* comment by: *UK CAA*

Page No: General

Paragraph No: N/A

Comment: The UK CAA welcomes and supports the principals behind this comprehensive NPA to introduce flight recording facilities to aircraft that are not yet required to carry such equipment. Analysis by the European Helicopter Safety Team (EHEST) and others has demonstrated the need to improve the recording of information to help accident investigation but the same data can also be used for safety promotion, training and management of aircraft.

Alignment with ICAO Annex 6 is also supported for CAT aeroplanes and helicopters but the Impact Assessment as presented raises some concerns, particularly with regard to the inclusion of commercial SPO and we have made comment and alternative options to address this.

The promotion of voluntary recording of data for other aircraft not covered by the proposed regulation changes should be actively encouraged throughout Europe.

response Noted.

Thank you.

comment *60* comment by: *Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)*

The Swedish Transport Agency supports the proposal. We only have some comments of editorial nature. At page 30 in AMC1 CAT.IDE.H.191 (c) and at page 36 in AMC1 SPO.IDE.H.146 (c) the word "aeroplane" is used when it should be "helicopter".

response Accepted.

Thank you.

comment *102* comment by: *DGAC France*

DGAC France fully supports the content of this NPA and thanks the Agency.

response | Noted.

Thank you.

comment | *114* comment by: *Danish Aviation Association*

We support the specific objectives of this rulemaking and the CRD/NPA proposal to carry lightweight flight recorders, as set out in the NPA.
However, it is important to emphasize that this rulemaking must be carried out with respect to proportionality and based on risk assessment, and the installation of a light device can be made without too much expenses. The owner of such an aircraft / helicopter is typical a small or medium size enterprise.

response | Noted.

Proportionality was carefully considered during the development of this NPA. We thank you for this comment.

comment | *115* comment by: *Textron Aviation*

Comment:

We see no discussion of harmonization activities with the US or other authorities. This is disappointing given the work and cooperation of the authorities for recent rule making activity aimed at simplifying and improving light aircraft design rules.

Suggested Change:

Please address harmonization efforts with the US or other authorities, if any.

response | Noted.

According to the Basic Regulation, Article 17(2)(e), the Agency shall 'in its fields of competence, carry out, on behalf of Member States, functions and tasks ascribed to them by applicable international conventions, in particular the Chicago Convention.' The proposed requirements are better aligning the EU rules for air operation with Standards in ICAO Annex 6 Part I and III (refer to NPA 2017-03, Appendix A). Harmonisation between EU air operation rules and the air operation rules of non-EU States is achieved through the worldwide alignment with ICAO standards.

U.S. regulations were indeed checked and there is, in FAR Part 135 Subpart L paragraph 135.607 (Helicopter Air Ambulance Equipment, Operations, and Training Requirements), a requirement on helicopters operated after 23 April 2018 to be 'equipped with an approved flight data monitoring system capable of recording flight performance data'. The text of draft CAT.IDE.H.191 does not contain any inconsistency with FAR 135.607, however it should be noted that:

- The equivalent of FAR 135.607 requirement regarding power source reliability can be found in the CS-27, 27.1459 point (a)(3) (draft CAT.IDE.H.191 does not contain any requirement regarding power source reliability);

- FAR 135.607 prescribes that the flight data monitoring system shall be operated 'from the application of electrical power before take-off' (while draft CAT.IDE.H.191 only requires that the flight recorder starts recording 'prior to the helicopter being capable of moving under its own power');
- Draft CAT.IDE.H.191 contains a requirement regarding the recording duration and a requirement to provide an erasure function, which are not addressed in FAR 135.607.

Apart from FAR 135.607, U.S regulations do not contain any requirement to carry a flight recorder on board a light aeroplane or a light helicopter. To this date, the Agency is not aware of any FAA announcement to adopt such requirements.

It should also be noted that FAA and EASA design rules applicable to light aeroplanes and light rotorcraft only specify how to install a flight recorder when this equipment is required by the operating rules. Refer to FAR Part 23, 23.1457 point (a) and 23.1459 point (a), to FAR Part 27, 27.1457 point (a) and 27.1459 point (a), and to CS-23, 23.2555. However, certification specifications are out of the scope of RMT.0271.

comment

116 comment by: *Textron Aviation*

Comment:

Semi Positive comment. It appears that it limits the application to CAT which would exempt most of GA. I think that the industry would be better served by requiring ADS-B out and then recording it than adding a recording system to get almost the same data.

Suggested Change:

Offer recording ADS-B out on the ground as a compromise.

response

Not accepted.

See reply to comment 27.

EXECUTIVE SUMMARY p. 1

comment

11 comment by: *René Meier, Europe Air Sports*

Executive summary
page 1/178
General comment
Please integrate in the best possible way new powerplant and propulsion systems technologies, .i.e. electric power, when it comes to preparing adequate provisions. We think it is the moment to start doing so e.g. by replacing "turbine engined" or "turbine engines" with "powerplants and/or propulsion systems other than piston engines" throughout the entire set of provisions. The sentence now is a bit longer, but it leaves room for new technologies.

response

Noted.

	While the Agency agrees with this comment, it is considered more appropriate to update OPS rules altogether for enabling the use of new technologies. Rulemaking task RMT.0392, Regular update of OPS rules, is expected to address such comment.
comment	*29* comment by: *UK CAA* **Page No:** 1 **Paragraph No:** Executive Summary **Comment:** The title of this NPA refers to "light aircraft" which is understood but which is a term that is not formally defined. Indeed the only explanation of the terminology appears in Section 4 Impact Assessment at page 43. If it is intended to use these descriptions in the regulations then it would be appropriate for the definitions to appear in 'Annex I Definitions'. Only the similar term European Light Aircraft (ELA 1 or 2) is currently defined but these are not the target aircraft for this NPA. It is suggested that either the accepted term 'other than complex motor-powered aircraft' be used or the explanations of 'Light aeroplane' and Light helicopter' be added to Annex I. **Justification:** Clarification of terminology to ensure the regulations are pertinent.
response	Partially accepted. The term 'light aeroplanes' and 'light helicopters' have been explained as early as possible in the Explanatory Note of the Opinion. However, adding corresponding definitions in Annex I 'Definitions' could create a conflict with the definitions used for the certification specifications (CS-23, CS-27). Instead it would be easier to modify the titles of CAT.IDE.A.191, CAT.IDE.H.191, etc. With regards to the proposed rules, AMC & GM: the terms 'light aeroplane' and 'light helicopter' have been removed from the titles of CAT.IDE.A.191, CAT.IDE.H.191, SPO.IDE.A.146, SPO.IDE.H.146 and associated AMC and GM. The new titles of the paragraphs CAT.IDE.A.191, CAT.IDE.H.191, SPO.IDE.A.146, SPO.IDE.H.146 are 'Lightweight flight recorder'. The new titles are consistent with similar provisions in Subparts CAT.IDE and SPO.IDE.
comment	*103* comment by: *Air Accidents Investigation Branch* Please find below the general AAIB comments on NPA 2017-03 **Introduction** EASA issued NPA 2017-03 regarding flight recorder requirements for smaller aircraft; the outcome of which will affect the future ability of investigators to determine causal and contributory factors. In addition, EASA's response to AAIB Safety Recommendation 2015-035 (for EASA to mandate recorders for HEMS operations) stated that this would be considered in the RMTs that

generated the NPA. A focus of the comments in this document relate to the need for audio recorders to be fitted to EC135-sized helicopters which are in the 2,250 kg to 3,175 kg weight category and used for HEMS operations.

The G-SPAO report identifies that limited trajectory information was available from radar but no audio or image recordings were available to support the investigation. The outcome of the investigation was unsatisfactory as there was no evidence to support the understanding of decisions made and so the opportunity to identifying safety issues was significantly restricted.

G-SPAO was engaged on a police operation and hence is State regulated. However, the risks are not dissimilar to those for helicopters operated for HEMS and which are regulated by EASA.

This document provides comments on the rationale used by EASA in NPA 2017-03 with regard to the proposal not to include a requirement for audio and image recording for helicopters engaged on such operations.

Comments

The NPA includes proposed amendments to CAT.IDE.H (page 13) and SPO.IDE.H (page 16) requiring helicopters greater than 2,250kg (forward fit only) to record only trajectory information; no audio, no image and no retrofit.

The NPA provides no comparison of the risks associated with commercial A to B flight against those of the specialist nature of HEMS operation, and hence provides no evidence or justification as to why these two types of operation, and a proposed recorder fit, should be comparable.

Although it is 'industry standard practice' to base equipage levels partly on the weight category of aircraft, the type of operation and associated risks should also be taken into account and included in the relevant cost benefit analysis. The NPA provides no evidence that this has been done and does not address the specialist nature of HEMS operations.

One fundamental failing of the NPA is that it does not propose to mandate audio recording for certain categories of helicopter, especially those engaged in HEMS operations. The results of Study 3 on page 58 of the NPA clearly state that;

'*For all investigation reports analysed, the CVR was instrumental in determining some significant events or significant contributory factors, in particular:*

- *information on chronology and timeline;*
- *information on communication and CRM;*
- *information on the application of procedures and checklists; and*
- *information on alarms and technical failures*.'

The AAIB has also noted, through a number of helicopter investigations, the benefit of audio recordings which, following a catastrophic event, have greatly assisted the investigation such that preventative Safety Recommendations could be made.

	The EASA assessment of the results of Study 3 appear to rely heavily on the fact that the value of this essential information is greatly reduced as there is no clear link to Safety Recommendations. The AAIB considers that it is inappropriate to include the list of all contributing information sources within a Safety Recommendation in order to justify it being made. In fact, the NPA makes that very point in the summaries of all the other Studies. Study 1 states '*since the primary purpose of an accident report is not to express investigation needs, no factual conclusion as regards the need for in-flight recording for the investigation can be drawn from this figure alone*.' Study 2 (page 141) and Study 4 (page 146) contain similar sentiments. Study 3, addressing the benefit of CVRs on helicopters, does not mention this fact and thus the conclusions drawn appear to be somewhat unbalanced. The AAIB respectfully request that the conclusions of Study 3 are reviewed to ensure that the criteria being used to assess the results are consistent across all four Studies. The NPA categorises 'catastrophic' as an accident involving more than two fatalities. On page 58 of the NPA, HEMS operations appear to be included in the 'light aviation' category with an associated maximum severity of 'hazardous'. However, HEMS operations, by their nature, are likely to have more than two persons on-board (including paramedic/flight crew/casualty) and so, an accident to such an operation would, by EASA's definition be 'catastrophic'. Additionally, the NPA has classified HEMS accidents, amongst light aviation accidents, as 'remote' (page 59 refers). According to the general principles of the safety risk assessment contained in Appendix H, Table H.3, such a combination of 'catastrophic' and 'remote' indicates that the current status is unacceptable and rulemaking action is required. In light of this, and the other comments made above, the AAIB respectfully requests that EASA consider the specialist nature of HEMS operations as being inappropriate to include in 'light aviation' and so review the current lack of proposal in the NPA to mandate CVRs for such operations. **Summary** The AAIB welcomes the move by EASA to extend the range of aircraft required to be fitted with some form of recording. However, the AAIB considers that, when the above comments are taken into consideration, it would be appropriate for EASA to include mandatory audio recording, in particular for HEMS operations. However, the AAIB was disappointed that the NPA did not take the opportunity to also address the benefits that image recording could bring at relatively little cost.
response	Partially accepted. It is decided to recommend in GM to CAT.IDE.A.191, CAT.IDE.H.191, SPO.IDE.A.146 and SPO.IDE.H.146 the fitment of the flight recorder with a cockpit audio recording capability for the following reasons: - such capability adds limited purchase cost (it has been already implemented on several lightweight flight recorders models in the market); - it does not require connection to the audio system of the aircraft (if it relies on a dedicated microphone); and - it can bring valuable information for the analysis of significant events.

Moreover, the privacy aspects have been covered by CAT.GEN.MPA.195(f) by extending the audio recording protection to all systems installed in the cockpit. In addition, the recording of audio is proposed to be promoted by NPA 2017-03 (see section 4.3 and Option A.1).

However, the conclusions of the impact assessment (chapter 4 of NPA 2017-03) are still considered valid, and in particular Option A.3 has a better rating than Option A.2.

Further to that, a review of safety statistics for HEMS was performed in order to address this comment and to check whether there is a difference in the level of safety of HEMS operations between helicopters with a MCTOM of over 3 175 kg (required to carry a FDR and a CVR when the helicopter was first issued with an individual CofA on or after 1 January 1987, according to Part-CAT, CAT.IDE.H.185/CAT.IDE.H.190 and to JAR-OPS 3) and helicopters with a MCTOM between 2250 kg and 3 175 kg (not required to carry a FDR or a CVR, and most often not carrying any kind of flight recorder). With the available data (accidents and serious incidents in EU Member States since 1 January 2005 and HEMS EU-registered fleet data since 2015), no relevant trend or correlation could be found. Broad safety studies pertaining to helicopters, such as EHEST Analysis of 2000-2005 European helicopter accidents, unfortunately don't specify the type of information to be recorded.

In conclusion, while introducing a requirement to record cockpit audio on board light helicopters does not seem justified at this stage, the following text has been introduced in GM to CAT.IDE.A.191, CAT.IDE.H.191, SPO.IDE.A.146 and SPO.IDE.H.146 (example for Part-CAT helicopters):

'**GM1 CAT.IDE.H.191 Recording of flight parameters on other than complex helicopters**

ADDITIONAL USEFUL INFORMATION

(a) Experience has shown the usefulness, for analysing incidents and for training purposes, of recording cockpit audio, additional instrument indications (such as position of flight controls, position of engine controls, fuel and oil indications, aircraft configuration selection), and an external view. To capture such information, simple equipment such as an integrated microphone and integrated camera may be sufficient.

(b) If the flight recorder includes optional capabilities such as described in (a), their recording duration is recommended to be at least 2 hours for maximum usefulness.

(c) if the flight recorder is capable of acquiring data from some aircraft system, it is advised to record in priority the flight parameters listed in Annex II-B of ED-155 or the flight parameters listed in Annex II-A of ED-112. Indeed, these flight parameters were selected based on their relevance in many safety investigations.'

In addition, because it is advised to record cockpit audio in guidance material, the wording of point (e) of CAT.IDE.A.191 has been changed as follows:

'(e) If the flight recorder referred to in (a) records images or audio of the flight crew compartment, then a ~~erasure~~ function shall be provided which can be operated by the commander and which modifies image recordings and audio recordings ~~of these images~~ made before the operation of this function, so that ~~they~~ these recordings cannot be retrieved using normal replay or copying techniques.'

Regarding the arguments detailed in this AAIB UK comment, the following should be considered:

- Safety Recommendation UNKG-2015-035 was taken into consideration: see section 4.1.1.2 and Appendix C of the NPA. However, the rulemaking group decided to not base the safety risk assessment only on safety recommendations for reasons explained in section 4.1.2.4 of the NPA.
- Police flights are not in the scope of the NPA, because such flights are excluded by Article 1 point 2 of Regulation (EC) 216/2008, and subsequently EASA is not competent for regulating police flights. Such flights remain an exclusive competence of the Member States.
- The level of risk associated to a particular type of operations (such as HEMS) is not a main driver for justifying carriage of a flight recorder. Indeed flight recorders are not meant to directly reduce operational risks, but to facilitate the reconstruction of a sequence of events leading to an accident and the identification of causal factors. There are other aircraft systems which have a direct and demonstrated positive impact on some categories of risk (e.g. TAWS reduces the risk of CFIT, ACAS reduces the risk of mid-air collision) and identification of particular risk would justify mandating the installation of such systems rather than flight recorders.
- The sentence quoted related to the results of Study 3 (see NPA 2017-03, subsection 4.1.2.4, page 58) needs to be read in a wider context. It is also stated that: 'a link to corrective actions (safety recommendations or other) was not clearly demonstrated.' And the conclusion regarding Study 3 is:
    - 'while recordings indisputably provide useful data for reconstructing trajectories and flight instrument indications, as well as determining some significant events or significant contributory factors,, their potential benefits for accident prevention seems moderate because they do not significantly influence the number of corrective actions.'
- According to AMC 25.1309, 'hazardous' means '*Serious or fatal injury to a relatively small number of the occupants other than the flight crew*'. When considering a helicopter of less than 3 175 kg used for HEMS operation, there are usually 3 or less occupants other than the flight crew (1 patient and max 2 medical staff members). Hence, the 'hazardous' severity category is considered more relevant than 'catastrophic' when considering an accident with such an aircraft. Table H.2 presented in Appendix H of NPA 2017-03 is not fully accurate and it would need to be corrected accordingly. (Note: no severity classification is specified in CS-23 or CS-27, hence the reference to AMC25.1309).

comment	*7* comment by: *io.n.ut.cmn@gmail.com* this is a test
response	Noted.

comment	*1* comment by: *Balóny Kubíček* Petr Kubicek Kubicek Balloons Czech Balloon Federation We were hoping that one of the current EASA goals is to develop "simple and proportional rules for balloons". This is really against this goal and we are very very strong against to any kind of in-flight recording ideas. We see no practical reasons or any the safety benefit. If we want to destroy our sport we can continue in the proposed direction. No we will not support this even on promotional/voluntary level. Please stop this activity and save EASA manpower to fields where it is needed. PS I can speak only about balloons but feel the same for any kind of small aviation
response	Noted. See reply to comment No 3.

comment	*9* comment by: *René Meier, Europe Air Sports* 2.1. Why we need to change... page 5/178 Remark CAT, commercial air transport, commercial operations are used in this set of provisions, this makes it difficult to understand the exact field of applicability. We think clarification is needed throughout the NPA.
response	Noted. In the NPA, the following definitions are used. • *Commercial Air Transport:* an aircraft operation to transport passengers, cargo or mail for remuneration or other valuable consideration. (Commission Regulation (EU) No 965/2012, Article 2) • *Commercial Operation:* any operation of an aircraft, in return for remuneration or other valuable consideration, which is available to the public or, when not made available to the public, which is performed under a contract between an operator and a customer, where the latter has no control over the operator. (Regulation (EC) No 216/2008, Article 3).

comment	*30* comment by: *UK CAA* **Page No:** 5 **Paragraph No:** 2.1

Comment: With regards to balloons, the statement "*Finally, CAT statistics indicate a significantly higher rate of accidents with balloons compared to aeroplanes and helicopters, which raises the question of the need for in-flight recording on-board balloons with a large passenger capacity*" needs to be considered in the right context.

There are two significant issues here, which are repeated through this NPA. Firstly, statistical comparison between different types of aircraft, specifically with reference to CAT is not comparing similar types of operations or hazards and risks. Passenger hot-air balloons do not undertake CAT in the true sense of the phrase. The purpose of a hot-air balloon flight is not to travel from "A" to "B" but rather the flight itself. Many of the rule requirements attached to CAT are not appropriate for ballooning. Therefore, the RMT.0674 expert group developed a new category specifically for passenger ballooning called "Commercial Passenger Ballooning" [CPB], which is fully detailed in EASA Opinion 01/2016.

Secondly, the risk exposure to passengers in a larger balloon is not necessarily greater than in a smaller balloon. In fact, the opposite applies and stronger baskets with specific passenger compartments and, perhaps, rearwards facing "seats", offer much greater passenger safety in larger balloon baskets.

The proposal to not specifically address any mandatory requirement to equip balloons with flight recorders as in the preferred Option B.1 is fully supported. Similarly to the other alleviated sectors, the benefits should be promoted leading to voluntary fitment of some form of device solely at the discretion of the operator.

Justification: Proportionality and work already undertaken by the RMT.0674 expert group in so far as CPB 'v' CAT.

response Noted.

Thank you.

For clarification purposes, proportionality has been carefully considered in the NPA 2017-03, which is reflected by preferring option B.1 for balloons. In particular, it is not stated in the NPA that CAT balloons are more vulnerable than non-CAT balloons, but that 'CAT statistics indicate a significantly higher rate of accidents with balloons compared to aeroplanes and helicopters'. See also section 4.1.1.2.3 of the NPA.

2.3. How we want to achieve it — overview of the proposals p. 6-7

comment *12* comment by: *René Meier, Europe Air Sports*

2.3.1.2. New recording requirements...
page 6/178
Question
Why did the Rulemaking Group choose the 2250 kg MTOM preferring this to the 2000 kg of the ELA2 or the 2730 kg MTOM of Part-M/Part-ML?

response Noted.

	2 250 kg is the mass threshold chosen in Standards related to lightweight flight recorders in ICAO Annex 6 Part I and Part III. Therefore this value was also retained for regulatory harmonisation with ICAO.
comment	*31* comment by: *UK CAA* **Page No:** 6 **Paragraph No:** 2.3.1.1 **Comment:** The explanation of why there needs to be new definitions to describe flight recorders in Annex I is appreciated but it might be more appropriate to use the proposed GM at 'GM16 Annex I Definitions' to provide a more comprehensive description of the range of equipment, including FDR and CVR, that encompasses recorders meeting the international standards under ED112A and ED155 for example. The new definition of "Flight Recorder" is sufficient supported by the GM which is how it is accomplished in ICAO Annex 6 for instance. **Justification:** Clarity and simplicity with easier means of amendment in the future as equipment changes. **Proposed Text:** Add to new GM16 Annex I Definitions *"Crash protected flight recorders comprise one or more of the following systems: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) or a data link recorder (DLR).* *Lightweight flight recorders comprise one or more of the following systems: an aircraft data recording system (ADRS), a cockpit audio recording system (CARS), an airborne image recording system (AIRS) or a data link recording system (DLRS)."*
response	Partially accepted. The first proposed sentence is added in the text of the GM 16 Annex I Definitions, because there already exist requirements related to crash-protected flight recorders (FDR, CVR and DLR) in Part-CAT, Part-NCC and Part-SPO: **GM16 Annex I Definitions** FLIGHT RECORDER 'A flight recorder may be crash-protected or lightweight. Crash-protected flight recorders are capable of withstanding very severe crash conditions such as those encountered during some accidents of large aeroplanes and large helicopters. Crash protected flight recorders comprise one or more of the following systems: a flight data recorder (FDR), a cockpit voice recorder (CVR), an airborne image recorder (AIR) or a data link recorder (DLR). Lightweight flight recorders are usually designed to meet less demanding crash-protection requirements, which allows them to be lighter.' However, the second proposed sentence would introduce more terms, which are not intended to be used in Part-CAT or Part-SPO at this time (ADRS, CARS, etc.). Therefore, it is not considered appropriate to introduce them for the time being.

comment	*32* comment by: *UK CAA* **Page No:** 6 **Paragraph No:** 2.3.1.2 **Comment:** In this section, the EUROCAE standard ED112 is introduced which also appears elsewhere. Whilst this is an accepted standard it has been superseded by ED112A and as the proposed regulations will affect new aircraft in the future it is recommended that this standard be applied throughout where otherwise ED112 is mentioned. **Justification:** Application of current standards to new aircraft **Proposed Text:** Replace ED112 with ED112A wherever mentioned.
response	Not accepted. With regard to the performance of the flight parameters, see 3.2.2.3.1: 'It should be noted that although ED-112 was superseded by ED-112A in 2013, compliance with ED-112 is still considered acceptable: this is because the flight parameters performance provided by ED-112 is considered sufficient for investigation purposes in the case of a light aircraft. ' With regard to the operational performance of the flight recorder, similarly the specifications in ED-112 are considered sufficient in the case of a light aircraft. In any case, the text of the draft AMC to CAT.IDE.A.191/CAT.IDE.H.191 specifies 'or any later equivalent standard accepted by EASA for crash-protected flight recorder', hence they implicitly include ED-112A.

2.4. What are the expected benefits and drawbacks of the proposals p. 8-9

comment	*33* comment by: *UK CAA* **Page No:** 8 **Paragraph No:** 2.4.1 **Comment:** The preferred option A.4 for aeroplanes and helicopters is <u>not</u> supported. Whilst the promotion of the use of flight recorders under Option A.1 is supported, the extension within Option A.3 to include commercial SPO aeroplanes and helicopters is not considered to have been adequately justified within the Impact Assessment and should not be adopted. Aligning the Ops Rules with ICAO Annex 6 for CAT aeroplanes and helicopters together with the proposed changes is acceptable. Therefore it is strongly recommended in light of this that revised options A.3A and A.4A as shown below are adopted. When experience and better justification can be realised together with more proportionate modification schemes under

	CS-STAN then perhaps the inclusion of commercial SPO aeroplanes and helicopters might be re-considered. The preferred option should now be Option A.4A. **Justification:** Capturing aircraft that may be used for commercial SPO and requiring them to meet the same requirements as for CAT has not been fully justified when considering the additional costs against the likely benefits. This additional need for FR equipment will have a significant financial impact on commercial SPO operators and they should remain covered by the benefits expected by Option A.1 alone at this stage. **Proposed Text:** Amend Options to include: ***"Option A.3A: Transpose ICAO Standards in Annex 6 with some differences:*** · ***include aeroplanes which have an MOPSC of more than 9; and*** · ***do not require the recording of audio.*** ***Option A.4A: Implement Options A.1 and A.3A together."***
response	Not accepted. The approach taken in NPA 2017-03 was to classify the cases between commercial operations and non-commercial operations (refer to subsection 4.1.2.3). Commercial operations are regulated only in Part-CAT and Part-SPO. The justification for the requirement has been reconsidered in the light of this comment. First, it should be noted that the carriage of a flight recorder capable of recording flight parameters is recommended by ICAO Annex 6 for light turbine-engine aeroplanes used for other operations than commercial air transport: refer to ICAO Annex 6 Part II, 2.4.16.1. Second, three of the safety recommendations presented in Appendix C of the Explanatory Note of NPA 2017-03 are related to in-flight recording equipment for light aircraft engaged in aerial work activities: • IRLD-2008-014: 'EASA should initiate a study of the necessity for aerial work aircraft in the General Aviation category to have installed a simple on-board device to record basic flight parameters. ' • BELG-2015-001: 'It is recommended that EASA mandates the installation of a lightweight recording system in aircraft used for parachuting activities ' • Spain recommendation to ICAO: 'It is recommended that the International Civil Aviation Organisation establish as an essential requirement for skydiving operations that the aircraft utilized for this activity have onboard a flight data recorder capable of logging at least the basic parameters of the operation.' In addition, the regulatory impact assessment in NPA 2017-03, chapter 4, 4.5.1 shows that extending the requirement to commercial SPO 'captures 3 times more historical accidents with aeroplanes (22 instead of 7) and 3 times more accidents with helicopters (14 instead of 5).' Regarding the economic impact, Option A.3 is only applicable to aeroplanes and helicopters manufactured three years after the publication of the rule, therefore it is assumed that the equipment will be installed by aircraft manufacturers during the production (as it is already

the case for some aircraft models: see Appendix G of NPA 2017-03). Similar to other forward-fitted equipment, the scale effect is expected to bring down the purchase price and the certification cost, no cost will be generated by aircraft downtime, and the number of hours needed to install the equipment will be reduced. Furthermore, it should be kept in mind that the requirements proposed under the new SPO.IDE.A.146 and SPO.IDE.H.146 are applicable to turbine-engine aeroplanes and helicopters with a MCTOM greater than or equal to 2 250 kg and to aeroplanes with an MOPSC of more than 9. The aircraft within the scope of new SPO.IDE.A.146 and SPO.IDE.H.146 have unit purchase prices ranging from 1 500 000 to 5 000 000 Euro, thus the relative cost impact of installing in-flight recording equipment may be considered low. More details are provided in NPA 2017-03, chapter 4, sections 4.5.4 and 4.5.5.

Moreover, it should be noted that Issue 2 of the certification specifications for standard changes and repairs (CS-STAN) includes in Subpart B (Standard Changes) a new paragraph CS-SC104a — Installation of lightweight in-flight recording systems. All non-complex aeroplanes and non-complex helicopters[2] are eligible to CS-SC104a. This means in practice that CS-SC104a can be used for most aeroplane and helicopter models in the scope of Option A.3, because these models are not considered complex. The list of flight parameters to be recorded according to SPO.IDE.A.146 and SPO.IDE.H.146 was defined in a way so that they could be obtained without having to connect the flight recorder to aircraft systems or instruments, which is one of the main technical limitations for using CS-SC104a.

Given the expected impacts on safety and economics, it is still considered appropriate to include commercial SPO in the proposed requirements. Therefore it has been decided to not modify Option A.3 and Option A.4.

3. Proposed amendments and rationale in detail — 3.1. Draft Regulation (Draft EASA opinion) — 3.1.1. Draft resulting text — 3.1.1.1. Annex I (Definitions) p. 10

comment *34* comment by: *UK CAA*

Page No: 10

Paragraph No: 3.1.1.1

Comment: As previously mentioned in the comment against 2.3.1.1, it is recommended that the new definitions for FDR and CVR be removed and placed in a modified "GM16 Annex 1 Definitions". This reflects the method of description in ICAO Annex 6 and seems more flexible and comprehensive.

[2] Note: according to Regulation (EC) 216/2008 (Basic Regulation),
(i) a complex aeroplane is an aeroplane:
— with a maximum certificated take-off mass exceeding 5 700 kg, or
— certificated for a maximum passenger seating configuration of more than nineteen, or
— certificated for operation with a minimum crew of at least two pilots, or
— equipped with (a) turbojet engine(s) or more than one turboprop engine, or
(ii) a complex helicopter is a helicopter certificated:
— for a maximum take-off mass exceeding 3 175 kg, or
— for a maximum passenger seating configuration of more than nine, or
— for operation with a minimum crew of at least two pilots

Justification: Better explanation of all the terms used within the context of Flight Recorders and alignment with ICAO.

Proposed Text: As shown in previous comment against 2.3.1.1.

response

Partially accepted.

The terms 'FDR' and 'CVR' are already used throughout the Annexes to Commission Regulation (EU) 965/2012. When a term is used in an implementing rule, the definition should be found in Annex I rather than in a GM to Annex I. However GM16 has been expanded to ensure that suitable explanations are provided. See also reply to comment No 31.

3.1.1.2. Annex IV (Part-CAT) — CAT.GEN.MPA.195 Handling of flight recorder recordings: preservation, production, protection and use p. 11-12

comment *82* comment by: *Airbus Helicopters*

There does not seem to be a rationale for numbering last sub-paragraph (f)(3a), instead of (f)(4).

response

Noted.

This is for organising the provisions in a more consistent manner, because (1) and (1a) are dedicated for the CVR, (2) for the FDR.

comment *104* comment by: *IATA*

IATA General Comment CAT.GEN.MPA.195

Introduction of the image provisions in CAT.GEN.MPA.195 which deals with flight recorders in general and is applicable to all commercial aircraft (higher than 5.7 tons MTOW) might lead to misinterpretation and confusion. It would be more appropriate to indicate that "images of the flight crew compartment recorded by a flight recorder in a light aircraft..." etc. Another solution would be to introduce a separate article specifically addressing "light aircraft".

response

Not accepted.

The requirements on the protection of image recordings are intended to be the same whatever the category of the aircraft. Indeed, the protection of such recordings is justified by the fact that they may contain elements of privacy. The sensitivity of these privacy elements does not depend on the aircraft in which they were recorded.

In addition, the proposed requirements give practical means to implement Regulation 2016/679 (on personal data protection) in this case.

comment *105* comment by: *IATA*

IATA Comments item (3)

EASA mentions the protection of images showing the body parts of the crew members only in respect to the processes to ensure serviceability of the flight recorder. The protection should however refer to all instances and usage of the images.
IATA would suggest the introduction of a separate point stating:

"There should be no video recording on the flight deck used to capture any part of a flight crew member's body while they are seated, in order to avoid personal identification."

response

Partially accepted.

The protection of flight crew privacy in other instances than serviceability is already addressed by point (f)(3) of CAT.GEN.MPA.195 (refer to section 3.1.1.2 of the NPA) and draft AMC1 CAT.GEN.MPA.195(f)(3) (refer to section 3.2.1.3 of the NPA), which are similar to already published point (f)(1) of CAT.GEN.MPA.195 and AMC1 CAT.GEN.MPA.195(f)(1) for the protection of CVR recordings. Points (f)(3) and (f)(3a) of CAT.GEN.MPA.195 and the proposed AMC are considered a sufficient framework for the protection of recorded images.

However, the following recommendation has been added into GM paragraphs (example for CAT.IDE.A.191):

GM2 CAT.IDE.A.191

INSTALLATION OF CAMERAS

'It is advised, when practicable, to install any camera so that it does not capture images of head and shoulders of the flight crew members whilst seated in their normal operating position, in order to avoid identification of persons.'

comment

106 comment by: *IATA*

IATA comments item (3)(i)

Although image recording might bring useful information for accident investigations, the usage of image recordings for other purposes should be carefully considered by EASA. In commercial operations where Flight Data Monitoring programs are implemented for decades there is enough experience and practice to properly protect the information and the individuals, and the use of the most appropriate data sources for safety analysis and investigation. The facility of video usage might lead to misuse, over-usage, etc by organizations not having the proper experience. This ease of access to video recordings might lead to negative effects in the implementation of Safety Management Systems.

response

Noted.

The proposed additions in points (f)(3) and (f)(3a) of CAT.GEN.MPA.195 are precisely meant to set up a framework for the protection of image recordings. In addition the proposed AMC1 CAT.GEN.MPA.195(f)(3) and AMC1 CAT.GEN.MPA.195(f)(3a) provide comprehensive means to comply with the protection requirement.

Furthermore, CAT.IDE.A.191 and CAT.IDE.H.191 include a requirement to offer an erase function when images of the flight crew compartment are recorded.

comment	*107* comment by: *IATA* IATA comments item (3a)(iii) IATA proposed text: "There should be no video recording on the flight deck used to capture any part of a flight crew member's body while they are seated, in order to avoid personal identification."
response	Partially accepted. See reply to comment No 105.

comment	*109* comment by: *European Cockpit Association* **CAT.GEN.MPA.195 (f) (3)** *(3) Images of the flight crew compartment recorded by a flight recorder shall not be disclosed or used except for ensuring the flight recorder serviceability, or if:* *(i) a procedure related to the handling of images is in place;* *(ii) all crew members and maintenance personnel concerned have given their prior consent; and* *(iii) these images are used only for maintaining or improving safety.* ECA's comment Flight recorder shall record print screen of EFIS displays. In aircraft not equipped with EFIS instruments, it is acceptable means of compliance to record images of information presented on analogue instruments. The recording of such images shall not capture the head and shoulders of the flight crew members whilst seated in their normal operating position. This MPA 195 is a general rule and must make distinction between light CAT.IDE.191 and CAT.IDE.190 aircraft and Helicopters. Proposed ECA's amendments Article 3 and 3a are applicable only for CAT.IDE.A.191 and CAT.IDE.H.191. "(3a) (ii) The recording of such images shall not capture the head and shoulders of the flight crew members whilst seated in their normal operating position." New article (4) "For CAT.IDE.A.190 and CAT.IDE.H.190 flight recorders shall be able to record printscreen of EFIS instrument panels. These flight recorder records shall not be disclosed or used for ensuring flight recorder serviceability unless: (i) a procedure related to the handling of recordings is in place and (ii) this procedure is agreed upon by flight crew members or their representative organisations, or all crewmember and maintenance personnel have given their prior consent and (iii) these recordings are used for only for improving safety. Reasoning

	ECA and IFALPA oppose the use of image recordings and support the use of technical alternatives like recording of print screens and switch settings by flight recorders.
response	Partially accepted. The requirements on the protection of image recordings are intended to be the same whatever the category of the aircraft: indeed, the protection of such recordings is justified by the fact that they may contain elements of privacy. The sensitivity of these privacy elements does not depend on the aircraft in which they were recorded. Therefore, points (f)(3) and (f)(3a) of CAT.GEN.MPA.195 should not be restricted to some categories of aeroplanes or helicopters. The text proposed by ECA for point (3a)(ii) of CAT.GEN.MPA.195 is not appropriate because it contains a requirement on the installation of the recorder image sensors, which is out of the scope of CAT.GEN.MPA.195 (the scope of CAT.GEN.MPA.195 is only the handling of flight recorder recordings). However, adding such text in CAT.IDE.A.191 and CAT.IDE.H.191 is not appropriate either because when considering the cockpit of a light aircraft, it is not technically possible to capture views of the main instrument displays at the pilot station(s) without capturing parts of the pilot's body. The point (f)(4) proposed by ECA for CAT.GEN.MPA.195 is not relevant, because it is an equipment-related requirement which is out of the scope of CAT.GEN.MPA.195. In addition CAT.IDE.A.190 and CAT.IDE.H.190 are out of the scope of this RMT. However a recommendation has been added into GM paragraphs to CAT.IDE.A.191 and CAT.IDE.H.191 (and corresponding paragraphs in Part-SPO): see reply to comment No 105.

SUBPART D — SECTION 1 — CAT.IDE.A.191 Recording of flight parameters on light aeroplanes p. 12-13

comment	*25* comment by: *General Aviation Manufacturers Association* GAMA questions the recording duration suggested, as most light-aircraft / general aviation flight don't exceed a few hours. Therefore, can the Agency please clarify the use of the collected data - a new FOQA program, accident investigation etc.
response	Accepted. 10 hours minimum recording duration was proposed in order to ensure that the flight recorder is capable of recording a complete flight. Indeed, as indicated in section 4.1.1.1 of NPA 2017-03, 'Since 2010, almost all accidents and serious incidents that occur over the territory of an EASA MS must be subject to safety investigation'. Experience with the FDR and the CVR required on-board large aeroplanes has shown that in order to record all serious incidents, the recording duration should exceed the maximum duration of a flight. However, after re-assessment, it was decided to reduce the required minimum recording duration of the flight recorder to 5 hours in CAT.IDE.A.191 and SPO.IDE.A.146. Please see also reply to comment No 67.

comment	*35* comment by: *UK CAA* **Page No:** 12 **Paragraph No:** CAT.IDE.A.191 **Comment:** The use of the term 'light aeroplane' needs to be defined, as previously mentioned in comment against page 1 'Executive Summary', or replaced with the accepted and defined term of 'other than complex motor-powered aeroplane'. This comment is equally applicable to the proposed CAT.IDE.H.191 and associated AMC/GM. [This would also be applicable to SPO.IDE.A.146 and SPO.IDE.H.146 if retained]. **Justification:** Clarity of terminology. **Proposed Text:** See previous comment for Page 1 'Executive Summary'
response	Partially accepted. Instead of defining the term 'light aeroplane', this term has been removed from the title of CAT.IDE.A.191 and associated AMC and GM paragraphs, and instead these paragraphs have been re-titled. See also reply to comment No 29.

comment	*36* comment by: *UK CAA* **Page No:** 12 **Paragraph No:** CAT.IDE.A.191 **Comment:** There is no mention of requiring a location device for the Flight Recorders as detailed in CAT.IDE.A.190(e), for instance, for non-deployable ones. Under ICAO Annex 6, FRs should have location devices fitted individually whether deployable or not. It is not clear if this is an oversight or an intentional difference from the ICAO standard. The same comment is equally relevant to the proposal for CAT.IDE.H.191, SPO.IDE.A.146 and SPO.IDE.H.146 and should be resolved. **Justification:** Consistency and compliance with ICAO Annex 6
response	Noted. No underwater locating device (ULD) is required because, according to draft AMC1 CAT.IDE.A.191, the flight recorder may be a lightweight flight recorder compliant with ED-155, and the latter industry standard does not specify the fitting of the recorder with a ULD.

comment	*37* comment by: *UK CAA* **Page No:** 13

Paragraph No: CAT.IDE.A.191 (e)

Comment: Within the new regulations, there is an erasure function intended for when any images are recorded by the 'flight recorder'. This is important but so too is the prevention of intended or unintended in-flight erasure and the retention of such recordings until the aircraft is on the ground and in particular during any crash sequence. Amendments to ICAO Annex 6 propose suitable text that could be added to the new rule to accommodate this function. However, erasure functions are not normally applicable to FRs collecting parametric data and this should be carefully considered.

This recommendation is equally applicable to the proposed CAT.IDE.H.191(e). [This would also be applicable to SPO.IDE.A.146(e) and SPO.IDE.H.146(e) if retained].

Justification: To ensure the prevention of loss of recordings during normal operation and during accident sequences.

Proposed Text: Add new sentence at the end of sub-para (e)

"…..or copying techniques. ***The erasure function shall be designed to prevent activation during flight and minimize the probability of an inadvertent activation during an accident."***

response

Noted.

The proposal is to be addressed by certification specifications rather than rules for air operations. For comparison, such requirement can be found in the certification specifications for large aeroplanes and large rotorcraft (see for example CS-25.1457(f) in the CS-25).

In addition, according to point (a)(10) of CAT.GEN.MPA.105, it is the responsibility of the commander to ensure that 'flight recorders are not disabled or switched off during flight'.

comment

67 comment by: *Garmin International*

CAT.IDE.A.191 (c):

Suggest shortening the length of required recording duration: "…at least the preceding 10 hours".

The intent of this amendment is to facilitate accident investigation with better flight data; however, 10 hours of data contains an excess of data for what would be relevant in an investigation since general aviation flights tend to have a duration of a few hours at most.

There are also technical considerations when recording video images. The storage space required for 10 hours of high definition video could become unmanageably large. A shorter required recording duration would support better quality video recordings.

response

Accepted.

10 hours minimum recording duration was proposed in order to ensure that the flight recorder is capable of recording a complete flight on most aeroplane models that are within the scope of CAT.IDE.A.191.

Indeed, as indicated in section 4.1.1.1 of NPA 2017-03, 'Since 2010, almost all accidents and serious incidents that occur over the territory of an EASA MS must be subject to safety investigation'. Experience with the FDR and the CVR required on-board large aeroplanes has shown that in order to record all serious incidents, the recording duration should exceed the maximum duration of a flight. This is because when a serious incident occurs, the flight is usually continued as planned, meaning that hours may elapse between the time of the serious incident and the completion of the flight. It should also be considered that recording starts 'when the aeroplane is capable of moving under its own power' and stops 'after the aeroplane is incapable of moving under its own power' (refer to point (d) of draft CAT.IDE.A.191), which means that the taxi phases before take-off and after landing should also be included the computation of the flight duration. Furthermore, EU air operation rules forbid that a flight recorder is stopped during the flight (refer to Part-CAT, CAT.GEN.MPA.105 point (a)(10)).

The aeroplane models within the scope of CAT.IDE.A.191 are turbine-engine aeroplanes with a MCTOM comprised between 2 250 kg and 5 700 kg and piston-engine aeroplanes with a MOPSC of more than 9 and a MCTOM of less than 5 700 kg.

When examining aeroplane models within the scope of CAT.IDE.A.191, it was found that the majority of aeroplane models have a flight endurance comprised between 3 and 5 hours. In addition, even when considering those aeroplane models with an endurance exceeding 5 hours, they seldom perform commercial flights with duration exceeding 5 hours.

Hence, 5 hours recording duration is considered sufficient recording duration for the flight recorder.

Therefore, the text of point (c) of CAT.IDE.A.191 (and of SPO.IDE.A.146) has been replaced by the following:

'(c) The flight recorder referred to in (a) shall be capable of retaining the flight data or images during at least the preceding 5 hours.'

comment

68 comment by: *Garmin International*

CAT.IDE.A.191 (d):

Regarding the phrases "capable of moving under its own power" and "incapable of moving under its own power": Since the equipment is recording aircraft data provided by avionics or other systems, beginning/ending equipment recording based on avionics power or other electrical bus may be more appropriate.

response

Not accepted.

ICAO Annex 6 prescribes for all types of flight recorders (including the lightweight flight recorders) that they 'start to record prior to the aeroplane moving under its own power and record continuously until the termination of the flight when the aeroplane is no longer capable of moving under its own power' (the same for helicopters).

In addition EUROCAE Document 155 specifies the following in 2.1.5:

'The flight recording systems shall start to record prior to the aircraft moving under its own power and record continuously, in accordance with the requirements of this MOPS, until the termination of the flight when the aircraft is no longer capable of moving under its own power.'

	Hence, the current wording of point (d) of CAT.IDE.A.191 is maintained because it ensures regulatory harmonisation and it also corresponds to industry specifications. In addition, the wording of this point is objective-based, which is more sustainable than a technology-prescriptive wording.
comment	*73* comment by: *Garmin International* CAT.IDE.A.191 (e): The combination of the terms “erasure function” and “modifies the recording” are in conflict. Suggest using language such as “hide”, “hidden”, or “protect” to reduce confusion of an “erasure function” that does not technically erase anything. Additionally, the phrase “erasure function shall be provided…” does not consider the situation where a normal recovery method may not usually be available such as an inaccessible device or a device without a viewing screen.
response	Partially accepted. With regards to the first part of the comment: partially accepted. The word ‘erasure’ is removed in point (e) of CAT.IDE.A.191 and point (e) of CAT.IDE.H.191 to prevent confusion. In addition, a GM is created to clarify the purpose of point (e): refer to comment No 85. With regards to the second part of the comment: noted. The technical possibility for the flight crew to erase image recordings is considered essential for the protection of their privacy. The proposed applicability is for aircraft first issued with an individual CofA on or after [date of publication of the amending regulation + 3 years], which is considered sufficient notice for the industry to find compliant solutions. Regarding the availability of a ‘normal recovery method’, it should be noted that means to recover the recording files from the flight recorder will be needed to perform the recording inspection: refer to draft AMC1 CAT.GEN.MPA.195(b) (section 3.2.1.3 of the NPA).
comment	*86* comment by: *Airbus Helicopters* Same as comment #83
response	Partially accepted. See reply to comment No 83.
comment	*89* comment by: *Airbus Helicopters* Same as comment #84
response	Partially accepted. See reply to comment No 84.

comment	*92* comment by: *Airbus Helicopters* Same as comment #85
response	Partially accepted. See reply to comment No 85.

comment	*110* comment by: *European Cockpit Association* **CAT.IDE.A.191 (b) & (c)** (b) The flight recorder referred to in (a) shall record flight data and/or images sufficient to determine the flight path and aircraft speed. (c) The flight recorder referred to in (a) shall be capable of retaining the flight data or images during at least the preceding 10 hours. ECA's comment Flight recorder shall record print screen of EFIS displays. In aircraft not equipped with EFIS instruments, it is acceptable means of compliance to record images of information presented on analogue instruments. The recording of such images shall not capture the head and shoulders of the flight crew members whilst seated in their normal operating position. ECA's proposed amendment • delete in (b) 'and/or images' • delete in (c) 'images' Reasoning ECA and IFALPA oppose the use of image recordings and support the use of technical alternatives like recording of print screen and switch settings by flight recorders.
response	Partially accepted. The term ‘image’ appears in CAT.IDE.A.191 to include camera-based solutions, which are often more cost-effective and easier to achieve than solutions based on recovering digital information from the aircraft systems and instruments. When considering the cockpit of a light aircraft, it is often not technically possible to capture views of the main instrument displays at the pilot station(s) without capturing parts of the pilot’s body. In order to facilitate the protection of privacy, a requirement to offer an “erasure function” is already included in CAT.IDE.A.191 and CAT.IDE.H.191. In addition, a recommendation has been added in GM paragraphs to CAT.IDE.A.191 and CAT.IDE.H.191 (and corresponding paragraphs in Part-SPO). See reply to comment No 105.

CAT.IDE.H.191 Recording of flight parameters on light helicopters p. 13

comment

64 comment by: *Garmin International*

CAT.IDE.H.191 (c):

Suggest shortening the length of required recording duration: "…at least the preceding 10 hours".

The intent of this amendment is to facilitate accident investigation with better flight data; however, 10 hours of data contains an excess of data for what would be relevant in an investigation since general aviation flights tend to have a duration of a few hours at most.

There are also technical considerations when recording video images. The storage space required for 10 hours of high definition video could become unmanageably large. A shorter required recording duration would support better quality video recordings.

response

Accepted.

10 hours minimum recording duration was determined in order to ensure that the flight recorder is capable of recording a complete flight on most helicopter models which are within the scope of CAT.IDE.H.191, i.e. turbine-engine helicopters with a MCTOM comprised between 2 250 kg and 3 175 kg.

When examining helicopter models within the scope of CAT.IDE.H.191, it was found that most models have a flight endurance comprised between 2 and 4 hours.

In addition, it was determined that when considering aeroplane models in the scope of CAT.IDE.A.191, 5-hour recording duration would be sufficient (see reply to comment No 67). For facilitating the approval of equipment that can be installed on aeroplanes and helicopters, it is considered preferable to require the same recording duration in CAT.IDE.A.191 and in CAT.IDE.H.191.

Therefore, the minimum recording duration required by point (c) of CAT.IDE.H.191 and point (c) of SPO.IDE.H.146 has been reduced to 5 hours.

comment

69 comment by: *Garmin International*

CAT.IDE.H.191 (d):

Regarding the phrases "capable of moving under its own power" and "incapable of moving under its own power": Since the equipment is recording aircraft data provided by avionics or other systems, beginning/ending equipment recording based on avionics power or other electrical bus may be more appropriate.

response

Not accepted.

See reply to comment No 68.

comment

72 comment by: *Garmin International*

	CAT.IDE.H.191 (e): The combination of the terms “erasure function” and “modifies the recording” are in conflict. Suggest using language such as “hide”, “hidden”, or “protect” to reduce confusion of an “erasure function” that does not technically erase anything. Additionally, the phrase “erasure function shall be provided…” does not consider the situation where a normal recovery method may not usually be available such as an inaccessible device or a device without a viewing screen.
response	Partially accepted. See reply to comment No 73.

comment	*83* comment by: *Airbus Helicopters* **Comment** Item (c) states: “*The flight recorder referred to in (a) shall be capable of retaining the flight data or images during at least the preceding 10 hours.*“ This requirement might be interpreted as: if both data and images are recorded, at least the preceding 10 hours should be retained for both. As a matter of fact, retaining 10 hours for an image recorder is not practical. If both data and images are recorded, it should be considered enough to retain 10 hours of flight data, while a period of 2 hours should be enough for images (consistently with ED-155 section III-2.1.3 for Airborne Image Recording Systems). **Recommendation** Add a clarification in GM1 CAT.IDE.H.191 or create a new GM CAT.IDE.H.191(c), e.g.: “*When both flight data and images are recorded, the requirement that the flight recorder shall be capable of retaining at least the preceding 10 hours does not apply to images.*“
response	Partially accepted. The provision on the minimum recording duration required by point (c) of CAT.IDE.H.191 has been modified to require only 5 hours. Given that CAT.IDE.H.191 is meant to be applicable to helicopters first issued with an individual CofA at least 3 years after the date of publication of the amending regulation (which would mean under the most optimistic assumptions, to helicopters produced as of 1 January 2022), it is believed that 5-hour recording duration is not challenging for the industry. See also reply to comment No 64.

comment	*84* comment by: *Airbus Helicopters* **Comment** The proposal is to record flight data and/or images. Audio recording is not considered. Although it is not part of the new ICAO Annex 6 standards, recording of cockpit audio is a key feature for accident investigation. **Recommendation**

	Add a requirement for light helicopters in the scope to be equipped with a recorder capable of recording cockpit audio and retaining at least the preceding 2 hours.
response	Partially accepted. A requirement is not added, but instead a GM paragraph is introduced, where it is advised that the flight recorder is fitted with cockpit audio recording capability and that the recommended duration for audio recording is at least 2 hours. See also reply to comment No 103.

comment	*85* comment by: *Airbus Helicopters* **Comment** The description of the "erasure function" in item (e) may be misleading, especially for unadvertised persons, especially due to the mix of the words "erase" and "modify". **Recommendation** We suggest making this function more explicit, for example by using the wording "bulk erase function" (which is used commonly in ED-112, ED-112A and ED-155), and possibly by clarifying the concept in a GM to CAT.IDE.H.191 (see for example the clarification which is provided in section 3.1.2.2.1 of this NPA, page 18).
response	Partially accepted. The use of the term 'bulk erase' is specific for magnetic-tape recording technology and not relevant any more for a solid-state flight recorder. According to ICAO State Letters AN 11/1.3.32 -18/12 (Adoption of Amendment 43 to Annex 6, Part I) and AN 11/32.3.14-18/14 (Adoption of Amendment 22 to Annex 6, Part III), 'bulk erasure device' will be replaced by 'erasure device' in ICAO Annex 6 Parts I and III. However, the word 'erasure' in point (e) of CAT.IDE.A/H.191 is removed. In addition a GM has been added to clarify the purpose of point (e), with the following text (example for CAT.IDE.A.191): GM1 CAT.IDE.A.191(e) 'FUNCTION TO MODIFY THE RECORDINGS OF IMAGES AND AUDIO The purpose of the function modifying the image recordings and audio recordings is to allow the flight crew to protect their privacy by making the recording of images and audio inaccessible using normal techniques. The activation of this function is subject to the commander's approval (refer to CAT.GEN.MPA.105). However, the equipment manufacturer or a safety investigation authority might still be able to retrieve the recorded data using special techniques.'

comment	*111* comment by: *European Cockpit Association* **CAT.IDE.H.191 (b) & (c)** (b) The flight recorder referred to in (a) shall record flight data and/or images sufficient to determine the flight path and aircraft speed.

(c) The flight recorder referred to in (a) shall be capable of retaining the flight data or images during at least the preceding 10 hours.

ECA's comment
This only applies to CAT.IDE.H.190.

ECA's amendment

- delete in (b) 'and/or images'
- delete in (c) 'images'

Reasoning
ECA and IFALPA oppose the use of image recordings and support the use of technical alternatives like recording of print screen and switch settings by flight recorders.

response

Partially accepted.

See reply to comment 110.

3.1.1.3. Annex VIII (Part-SPO) — SUBPART A — SPO.GEN.145 Handling of flight recorder recordings: preservation, production, protection and use — operations with complex motor-powered aircraft p. 14-15

comment *38* comment by: *UK CAA*

Page No: 14 and 31

Paragraph No: 3.1.1.3 and 3.2.1.4

Comment: In view of UK CAA proposed Options A.3A and A.4A, delete all references to Part-SPO.

Justification: Proportionality and balance of benefits.

response

Not accepted.

See reply to comment No 33.

comment *95* comment by: *Airbus Helicopters*

Comment
The scope of SPO.GEN.145 is limited, through the title of the requirement itself, to “complex motor-powered aircrafts".
However, new equipment requirements extend the need for flight recorders to some “other than complex motor-powered aircraft".
We don’t see any reason to still limit the scope of SPO.GEN.145 to "complex motor-powered aircraft", and not to extend it to all aircraft required to have a flight recorder.

Recommendation
Recommendation is to:

- Remove "*operations with complex motor-powered aircraft*" from the title of SPO.GEN.145,
- Possibly precise the scope, as done in AMC1 SPO.GEN.145(b), by an introductory condition like "*Whenever a flight recorder is required to be carried:*".

response

Partially accepted.

Regarding the first recommendation: accepted.

The mention 'operations with complex motor-powered aircraft' is removed from the title of SPO.GEN.145.

Regarding the second recommendation: not accepted.

When equipment is installed which is not required, maintenance to prevent failure modes of this equipment which might affect the airworthiness of the aircraft may still be necessary. Example: a CVR is installed on a light aeroplane while CVR carriage is not required for this aeroplane. The underwater locating device (ULD) attached to the CVR still needs to be replaced according to the recommendations of the ULD manufacturer in order to prevent any hazard stemming from the ULD lithium battery.

SUBPART D — SECTION 1 — SPO.IDE.A.146 Recording of flight parameters on light aeroplanes p. 16

comment

26 comment by: *General Aviation Manufacturers Association*

GAMA questions the recording duration suggested, as most light-aircraft / general aviation flight don't exceed a few hours. Therefore, can the Agency please clarify the use of the collected data - a new FOQA program, accident investigation etc.

response

Accepted.

The text of point (c) of CAT.IDE.A.191 (and of SPO.IDE.A.146) has been replaced by the following:

'(c) The flight recorder referred to in (a) shall be capable of retaining the flight data or images during at least the preceding 5 hours.'

Please see also the reply to comment No 67.

comment

39 comment by: *UK CAA*

Page No: 16

Paragraph No: SPO.IDE.A.146(a)(2)

Comment: If retained and in the context of the section, it is suggested that the sentence is re-phrased to ensure clarity of the type of operations being conducted.

Additionally, the next sub-paragraph is also numbered (2) which should be changed to (3).

Justification: Clarity of intent.

Proposed Text: Amend (a)(2) to read:

"(2) they are ~~commercially operated~~ ***conducting commercial operations;*** and"

response

Partially accepted.

The text of (a)(2) is modified as follows:

'(2) they are used for commercial operations'.

comment

65 comment by: *Garmin International*

SPO.IDE.A.146 (c):

Suggest shortening the length of required recording duration: "…at least the preceding 10 hours".

The intent of this amendment is to facilitate accident investigation with better flight data; however, 10 hours of data contains an excess of data for what would be relevant in an investigation since general aviation flights tend to have a duration of a few hours at most.

There are also technical considerations when recording video images. The storage space required for 10 hours of high definition video could become unmanageably large. A shorter required recording duration would support better quality video recordings.

response

Accepted.

The minimum recording duration is reduced to 5 hours. See the response to comment No 67.

comment

70 comment by: *Garmin International*

SPO.IDE.A.146 (d):

Regarding the phrases "capable of moving under its own power" and "incapable of moving under its own power": Since the equipment is recording aircraft data provided by avionics or other systems, beginning/ending equipment recording based on avionics power or other electrical bus may be more appropriate.

response

Not accepted.

See the response to comment No 68.

comment

74 comment by: *Garmin International*

	SPO.IDE.A.146 (e): The combination of the terms “erasure function” and “modifies the recording” are in conflict. Suggest using language such as “hide”, “hidden”, or “protect” to reduce confusion of an “erasure function” that does not technically erase anything. Additionally, the phrase “erasure function shall be provided…” does not consider the situation where a normal recovery method may not usually be available such as an inaccessible device or a device without a viewing screen.
response	Partially accepted. See reply to comment No 73.

comment	*87* comment by: *Airbus Helicopters* Same as comment #83
response	Partially accepted. See reply to comment No 83.

comment	*90* comment by: *Airbus Helicopters* Same as comment #84
response	Partially accepted. See reply to comment No 84.

comment	*93* comment by: *Airbus Helicopters* Same as comment #85
response	Partially accepted. See reply to comment No 85.

comment	*96* comment by: *Airbus Helicopters* Typo in numberings of sub-paragraph (a): second (2) should be (3).
response	Accepted. Thank you.

SECTION 2 — SPO.IDE.H.146 Recording of flight parameters on light helicopters p. 16

comment	*40* comment by: *UK CAA*

Page No: 16

Paragraph No: SPO.IDE.H.146(a)(2)

Comment: If retained and in the context of the section, it is suggested that the sentence is re-phrased to ensure clarity of the type of operations being conducted.

Justification: Clarity of intent.

Proposed Text: Amend (a)(2) to read:

"(2) they are ~~commercially operated~~ ***conducting commercial operations;*** and"

response

Partially accepted.

The text of (a)(2) is modified as follows:

'(2) they are used for commercial operations'

comment

66 comment by: *Garmin International*

SPO.IDE.H.146 (c):

Suggest shortening the length of required recording duration: "…at least the preceding 10 hours".

The intent of this amendment is to facilitate accident investigation with better flight data; however, 10 hours of data contains an excess of data for what would be relevant in an investigation since general aviation flights tend to have a duration of a few hours at most.

There are also technical considerations when recording video images. The storage space required for 10 hours of high definition video could become unmanageably large. A shorter required recording duration would support better quality video recordings.

response

Accepted.

The minimum recording duration has been reduced to 5 hours when the flight recorder is installed on board a helicopter.

See also reply to comment No 64.

comment

88 comment by: *Airbus Helicopters*

Same as comment #83

response

Partially accepted.

See reply to comment No 83.

comment

91 comment by: *Airbus Helicopters*

	Same as comment #84
response	Partially accepted. See reply to comment No 84.

comment	*94* comment by: *Airbus Helicopters* Same as comment #85
response	Partially accepted. See reply to comment No 85.

SECTION 2 — SPO.IDE.H.146 Recording of flight parameters on light helicopters p. 17

comment	*71* comment by: *Garmin International* SPO.IDE.H.146 (d): Regarding the phrases “capable of moving under its own power” and “incapable of moving under its own power”: Since the equipment is recording aircraft data provided by avionics or other systems, beginning/ending equipment recording based on avionics power or other electrical bus may be more appropriate.
response	Not accepted. See reply to comment No 68.

comment	*75* comment by: *Garmin International* SPO.IDE.H.146 (e): The combination of the terms “erasure function” and “modifies the recording” are in conflict. Suggest using language such as “hide”, “hidden”, or “protect” to reduce confusion of an “erasure function” that does not technically erase anything. Additionally, the phrase “erasure function shall be provided…” does not consider the situation where a normal recovery method may not usually be available such as an inaccessible device or a device without a viewing screen.
response	Partially accepted. See reply to comment No 73.

3.2.1.3. Draft AMC & GM to Part-CAT (Annex IV) — SUBPART A — SECTION 1 — AMC1 CAT.GEN.MPA.195(b) Handling of flight recorder p. 24

comment	*97* comment by: *Airbus Helicopters* **Comment** The new proposal is that, when no means are available for preflight check, the operator "*should perform an operational check of this flight recorder at time intervals not exceeding 150 flight hours*". The previous recommended period was "*seven calendar days of operation*". A justification is given in section 3.2.2.3.2 page 40, based on the observations that: 'days of operation' is not commonly used metrics, 150 flight hours correspond to more than 7 days of operation assuming the aircraft operates 21 hours a day, which may be the case for large aeroplanes. However, for light aircrafts, 150 flight hours may represent several months, possibly leading to ignore the malfunction of the recorders for a long period. Moreover, 'days of operation' is a relevant metrics in the operational domain. **Recommendation** We recommend going back to the initial text. In case proportionality is still sought for light aircraft, for example considering 2 weeks of operation instead of 1 week, we recommend specifying "*at time intervals not exceeding 150 flight hours or fourteen calendar days of operation, whichever comes first*".
response	Partially accepted. It is recognised that for a light aircraft which is operated only a few hours per day, the time interval between two operational checks might be longer than 7 days (in the case where no means for preflight checking the recorder for proper operation is installed). There are pro's and con's for using 'flight hours' instead of 'days of operation'. In order to offer sufficient flexibility to the operator, the second sentence of point (c) of AMC1 CAT.GEN.MPA.195(b) has been changed as follows: 'When no such means is available for a flight recorder, the operator should perform an operational check of this flight recorder at time intervals not exceeding 150 flight hours or seven calendar days of operation, whichever is considered more suitable by the operator.'

AMC1 CAT.GEN.MPA.195(f)(1) Handling of flight recorder recordings: preservation, production, protection and use p. 25

comment	*112* comment by: *European Cockpit Association* **GM1 CAT.GEN.MPA.195(b)** (e) The inspection of recorded images usually consists of the following: (1) checking that the flight recorder operates correctly for the nominal duration of the recording; (2) examining, where practicable and in compliance with paragraph (f) of CAT.GEN.MPA.195, a sample of images recorded in different flight phases for evidence that the images of each camera are of a quality sufficient for reading the instruments' indications; and (3) preparing and retaining an inspection report

ECA's comment
Only for CAT.IDE.A.191 and CAT.IDE.H.191

ECA's amendment
e) recorded images are limited to CAT.IDE.A.191. The inspection of…

response

Partially accepted.

The scope of point (b) of CAT.GEN.MPA.195 is the continued serviceability of flight recorders when they are required to be carried. The nature of the information to be recorded is out of the scope of point (b) of CAT.GEN.MPA.195. Hence it cannot be recommended in a GM to point (b) of CAT.GEN.MPA.195 that images should only be recorded in certain cases.

It should also be noted that published GM1 CAT.GEN.MPA.195(b) does not refer to equipment requirements in section CAT.IDE of Part-CAT.

However, point (d) of draft GM1 CAT.GEN.MPA.195(b) is modified for a more consistent wording with point (a) and point (c):

'(d) When inspecting images recorded by a flight recorder, the operator needs to ensure compliance with CAT.GEN.MPA.195(f)(3a). The inspection of such images usually consists of the following:

(1) checking that the flight recorder operates correctly for the nominal duration of the recording;

(2) examining, where practicable, a sample of images recorded in different flight phases for evidence that the images of each camera are of a quality sufficient for reading the instruments' indications; and

(3) preparing and retaining an inspection report.'

Point (d) of GM1 SPO.GEN.145(b) is modified in the same manner as point (d) of the new GM1 CAT.GEN.MPA.195(b).

AMC1 CAT.GEN.MPA.195(f)(3) Handling of flight recorder recordings: preservation, production, protection and use p. 25-26

comment

108 comment by: *IATA*

IATA Comments AMC1 CAT.GEN.MPA195(f)(3)

Although image recording might bring useful information for accident investigations, the usage of image recordings for other purposes should be carefully considered by EASA. In commercial operations where Flight Data Monitoring programs are implemented for decades there is enough experience and practice to properly protect the information and the individuals, and the use of the most appropriate data sources for safety analysis and investigation. The facility of video usage might lead to misuse, over-usage, etc. by organizations not having the proper experience. This ease of access to video recordings might lead to negative effects in the implementation of Safety Management Systems.

response | Noted.

See reply to comment No 106.

comment | *113* comment by: *European Cockpit Association*

AMC1 CAT.GEN.MPA.195(f)(3) & AMC1 CAT.GEN.MPA.195(f)(3a)

ECA's comment
These sections must be consistent with the restriction that image recordings are only allowed for CAT.IDE.A.191 and CAT.IDE.H.191.

response | Noted.

The recording of images is not forbidden for other aircraft than those in the scope of CAT.IDE.A.191 and CAT.IDE.H.191.

SUBPART D — SECTION 1 — AMC1 CAT.IDE.A.191 Recording of flight parameters on light aeroplanes p. 28-29

comment | *20* comment by: *General Aviation Manufacturers Association*

Please provide a clearer definition of what is considered a "lightweight" FDR.

response | Not accepted.

Draft GM16 Annex I Definitions already provides an explanation of the terms ‘lightweight flight recorder’ and ‘crash-protected flight recorder’ (see section 3.2.1.1 of the NPA).

comment | *24* comment by: *Embraer S.A.*

The Embraer believes there is no need to record the parameters "time" and "relative time count", concurrently.

The parameters "time" and "relative time count" are related parameters and there is no need to record both of them. It is such that Appendix M to FAA 14 CFR Part 121; Appendix D and E to FAA 14 CFR Part 125; Appendix 8 to Annex 6 to ICAO Convention on International Civil Aviation; and EASA AMC1.1 CAT.IDE.A.190 in the Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Annex IV Commercial air transport operations [Part-CAT] of Commission Regulation (EU) 965/2012 on air operations require just one parameter and not both of them.

The Embraer suggests the following text:

SUBPART D
SECTION 1
AMC1 CAT.IDE.A.191 Recording of flight parameters on light aeroplanes

(...)
(b) If the flight recorder records flight data, it should record at least the following parameters:
~~(1) relative time count,~~
(...)
~~(9) time,~~
~~(10)~~ ground speed,
~~(11)~~ positioning system: track (if available),
~~(12)~~ normal acceleration,
~~(13)~~ longitudinal acceleration, and
~~(14)~~ lateral acceleration."

To:

SUBPART D
SECTION 1
AMC1 CAT.IDE.A.191 Recording of flight parameters on light aeroplanes

(...)
(b) If the flight recorder records flight data, it should record at least the following parameters:
(1) time or relative time count,
(...)
(9) ground speed,
(10) positioning system: track (if available),
(11) normal acceleration,
(12) longitudinal acceleration, and
(13) lateral acceleration."

response

Not accepted.

In the case where flight parameters are obtained by the means of flight data (AMC1 CAT.IDE.A.191, point (b)), the parameter source will necessarily include a GNSS receiver (for latitude, longitude, etc.) which also offers a GNSS time indication.

comment

76 comment by: *Garmin International*

AMC1 CAT.IDE.A.191 (f):

Overall it is not clear what type of equipment would satisfy the proposed amendment, from ED-155 recorders to any other peripheral equipment.

The “operational performance requirements…” meeting ED-155/ED-112 restricts the Draft Regulation Annex 1 definition of “flight recorder”. The presence of this item within the AMC1 heading “Recording of flight parameters…” infers only the parameter performance specifications are required, which is already specified in (e).

Referencing Operational Considerations in ED-155 (I-1.3.2, III-1.3.3, IV-1.3.2) may be more appropriate for this item.

	Additionally, requiring equipment meet ED-155/ED-112 contradicts the alternative means listed in 7.6 Appendix F. Based on the language in CAT.IDE.A.191 (and others), it is assumed that these alternative means are acceptable provided they can meet the recommendations in section 7.6.3. Clarify what is intended by "operational performance requirements" or remove this item.
response	Not accepted. The term 'operational performance requirement' is already used in published AMC to flight recorder provisions and we are not aware of any issue with the interpretation of this term in the industry or among EASA Member States. See for example AMC1 CAT.IDE.A.185 (cockpit voice recorder), AMC1.1 CAT.IDE.A.190, AMC1.2 CAT.IDE.A.190, AMC2 CAT.IDE.A.190 (flight data recorder). In addition, the term 'operational performance requirements' was already used for flight recorders in section 2 of JAR-OPS 1 (see for example ACJ OPS 1.700, ACJ OPS 1.705/1.710, ACJ OPS 1.715): hence this term has been used in air operation requirements for at least 15 years and there is no need to clarify or change it. Point (f) of AMC1 CAT.IDE.A.191 clearly specifies that the operational performance requirements are applicable to the flight recorder and not just to the flight parameters. Some alternative solutions to a flight recorder were indeed reviewed by the rulemaking group and Appendix F of NPA 2017-03 presents a summary of this review. However, these alternative solutions showed limitations such that they could not be retained in the AMC. The recommendations in section 7.6.3 of Appendix F might be used to develop alternative means of compliance for CAT.IDE.A.191 and CAT.IDE.H.191, i.e. others means to comply with CAT.IDE.A.191 and CAT.IDE.H.191 than those defined in the AMC. However, this is out of the scope of this rulemaking task.

GM1 CAT.IDE.A.191 Recording of flight parameters on light aeroplanes p. 29

comment	*41* comment by: *UK CAA* **Page No:** 29 **Paragraph No:** GM1 CAT.IDE.A.191 **Comment:** It is recommended that further information is added explaining that other parameters, as detailed in the relevant ED112A or ED155 standard, or equivalent, be recorded when the equipment is capable of doing so over and above the minimum set out in the AMC. This is equally valid for GM1 CAT.IDE.H.191, [and GM1 SPO.IDE.A.146 and GM1 SPO.IDE.H.146 if retained]. **Justification:** To promote the recording of wider parameters than the bare minimum when the equipment being used is capable.
response	Accepted.

A sentence mentioning the table of parameters in ED-112 and ED-155 documents has been added in GM1 CAT.IDE.A.191, GM1 CAT.IDE.H.191, GM1 SPO.IDE.A.146, GM1 SPO.IDE.H.146: refer to reply to comment No 103.

SECTION 2 — AMC1 CAT.IDE.H.191 Recording of flight parameters on light helicopters p. 29-30

comment

42 comment by: *UK CAA*

Page No: 29/30

Paragraph No: AMC1 CAT.IDE.H.191

Comment: It is strongly recommended that the helicopter main rotor speed be recorded in both section (b) and (c) parameters.

Justification: Helicopter main rotor speed is essential information when determining the flight profile of the helicopter.

response

Partially accepted.

The main rotor speed will not be added to the parameters listed in point (b) of AMC1 CAT.IDE.H.191. This is because these parameters were selected so that they can be obtained by means of standalone sensors (e.g. accelerometric sensor or GNSS receiver). This principle was established in order to limit the cost impact of the recorder installation (refer to NPA 2017-03, subsection 3.2.2.3.1. Since the main rotor speed cannot be obtained by means of a standalone sensor, it should not appear in point (b).

However, FAR Part 27 and CS-27 require the rpm of the main rotor to be displayed by a tachometer (refer to 27.1305, point (k)). Therefore it has been added to the list of flight parameters in point (c) of AMC1 CAT.IDE.H.191 and AMC1 SPO.IDE.H.146.

In addition, since an indication of propulsive thrust or power is required to be installed according to FAR Part 23 and CS-23, and this whatever the type of engine, the following parameter is added to point (c) of AMC1 CAT.IDE.A.191 and AMC1 SPO.IDE.A.146: 'tachometer indication or equivalent indication of propulsive thrust or power'.

comment

43 comment by: *UK CAA*

Page No: 30

Paragraph No: AMC1 CAT.IDE.H.191(c)

Comment: This text appears to have been copied from the aeroplane section but has not been adapted to helicopters.

Justification: Editorial.

Proposed Text: Amend to as follows:

	"(c) If the flight recorder records images, it should capture views of the main instrument displays at the pilot station, or at both pilot stations when the ~~aeroplane~~ ***helicopter*** is certified for operation with a minimum crew of two pilots. The recorded image quality should allow reading the following indications during most of the flight:"
response	Accepted. Thank you.

comment	*61* comment by: *Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)* Change to "helicopter" in AMC1 CAT.IDE.H.191 (c) instead of aeroplane.
response	Accepted. Thank you.

comment	*77* comment by: *Garmin International* AMC1 CAT.IDE.H.191 (f): Overall it is not clear what type of equipment would satisfy the proposed amendment, from ED-155 recorders to any other peripheral equipment. The "operational performance requirements…" meeting ED-155/ED-112 restricts the Draft Regulation Annex 1 definition of "flight recorder". The presence of this item within the AMC1 heading "Recording of flight parameters…" infers only the parameter performance specifications are required, which is already specified in (e). Referencing Operational Considerations in ED-155 (I-1.3.2, III-1.3.3, IV-1.3.2) may be more appropriate for this item. Additionally, requiring equipment meet ED-155/ED-112 contradicts the alternative means listed in 7.6 Appendix F. Based on the language in CAT.IDE.A.191 (and others), it is assumed that these alternative means are acceptable provided they can meet the recommendations in section 7.6.3. Clarify what is intended by "operational performance requirements" or remove this item.
response	Not accepted. See reply to comment No 76.

comment	*98* comment by: *Airbus Helicopters* Typo in item (c): the word "*aeroplane*" should be replaced by "*helicopter*" or "*aircraft*".
response	Accepted.

	Thank you.

3.2.1.4. Draft AMC & GM to Part-SPO (Annex VIII) — AMC1 SPO.GEN.145(b) Handling of flight recorder recordings: preservation, production, protection and use p. 31-32

comment	*38* ❖ comment by: *UK CAA* **Page No:** 14 and 31 **Paragraph No:** 3.1.1.3 and 3.2.1.4 **Comment:** In view of UK CAA proposed Options A.3A and A.4A, delete all references to Part-SPO. **Justification:** Proportionality and balance of benefits.
response	Not accepted. Duplicated comment. See reply to comment No 33.

comment	*99* comment by: *Airbus Helicopters* Same as comment #97
response	Partially accepted. See reply to comment No 97.

AMC1 CAT.GEN.MPA.195(f) Handling of flight recorder recordings: preservation, production, protection and use p. 32

comment	*100* comment by: *Airbus Helicopters* "*AMC1 CAT.GEN.MPA.195(f)*" is an incorrect reference and should be replaced by "*AMC1 SPO.GEN.145(f)*"
response	Accepted. Thank you.

SUBPART D — SECTION 1 — AMC1 SPO.IDE.A.146 Recording of flight parameters on light aeroplanes p. 34-35

comment	*79* comment by: *Garmin International* AMC1 SPO.IDE.A.146 (f):

Overall it is not clear what type of equipment would satisfy the proposed amendment, from ED-155 recorders to any other peripheral equipment.

The "operational performance requirements…" meeting ED-155/ED-112 restricts the Draft Regulation Annex 1 definition of "flight recorder". The presence of this item within the AMC1 heading "Recording of flight parameters…" infers only the parameter performance specifications are required, which is already specified in (e).

Referencing Operational Considerations in ED-155 (I-1.3.2, III-1.3.3, IV-1.3.2) may be more appropriate for this item.

Additionally, requiring equipment meet ED-155/ED-112 contradicts the alternative means listed in 7.6 Appendix F. Based on the language in CAT.IDE.A.191 (and others), it is assumed that these alternative means are acceptable provided they can meet the recommendations in section 7.6.3.

Clarify what is intended by "operational performance requirements" or remove this item.

response Not accepted.

See reply to comment No 76.

SECTION 2 — AMC1 SPO.IDE.H.146 Recording of flight parameters on light helicopters p. 35-37

comment *44* comment by: *UK CAA*

Page No: 35/36

Paragraph No: AMC1 SPO.IDE.H.146

Comment: If retained, it is strongly recommended that the helicopter main rotor speed be specifically recorded in both section (b) and (c) parameters.

Justification: Helicopter main rotor speed is essential information when determining the flight profile of the helicopter.

response Partially accepted.

See reply to comment No 42.

comment *45* comment by: *UK CAA*

Page No: 36

Paragraph No: AMC1 SPO.IDE.H.146(c)

Comment: This text appears to have been copied from the aeroplane section and, if retained, should be adapted for helicopters.

Justification: Editorial.

Proposed Text: Amend as follows:

"(c) If the flight recorder records images, it should capture views of the main instrument displays at the pilot station, or at both pilot stations when the ~~aeroplane~~ ***helicopter*** is certified for operation with a minimum crew of two pilots. The recorded image quality should allow reading the following indications during most of the flight:

response Accepted.

Thank you.

comment *62* comment by: *Swedish Transport Agency, Civil Aviation Department (Transportstyrelsen, Luftfartsavdelningen)*

Change to "helicopter" in AMC1 SPO.IDE.H.146 (c) instead of aeroplane.

response Accepted.

Thank you.

comment *78* comment by: *Garmin International*

AMC1 SPO.IDE.H.146 (f):

Overall it is not clear what type of equipment would satisfy the proposed amendment, from ED-155 recorders to any other peripheral equipment.

The "operational performance requirements…" meeting ED-155/ED-112 restricts the Draft Regulation Annex 1 definition of "flight recorder". The presence of this item within the AMC1 heading "Recording of flight parameters…" infers only the parameter performance specifications are required, which is already specified in (e).

Referencing Operational Considerations in ED-155 (I-1.3.2, III-1.3.3, IV-1.3.2) may be more appropriate for this item.

Additionally, requiring equipment meet ED-155/ED-112 contradicts the alternative means listed in 7.6 Appendix F. Based on the language in CAT.IDE.A.191 (and others), it is assumed that these alternative means are acceptable provided they can meet the recommendations in section 7.6.3.

Clarify what is intended by "operational performance requirements" or remove this item.

response Not accepted.

See the reply to comment No 76.

4.1. What is the issue p. 44-49

comment	*13* comment by: *René Meier, Europe Air Sports* 4.1.1.1. The need for investigation page 44/178 Remark "Since 2010 almost all accidents..." is stated. Earlier, under 2.1. Why we need to change the rules, page 5/178, we find "Since 2010 accidents and serious incidents....". What is correct?
response	Noted. Chapter 2 of the NPA contains a summary of the issue and the proposals, as its title indicate. Therefore, some statements were simplified for this chapter, and in particular the statement in the first sentence of 2.1. Chapter 4 contains a deeper analysis of the issue and of the impact of options. Hence the statement in section 4.1.1.1 is the correct one. In particular, some accidents and serious incidents are outside of the scope of Regulation (EU) 996/2010, such as State flights, flights performed with historic aircraft, non-commercial flights performed with amateur-built aircraft, etc.

4.1.2. Safety risk assessment p. 50-61

comment	*46* comment by: *UK CAA* **Page No:** 52 **Paragraph No:** Text below 4. **Comment:** This paragraph states: "*When applying the proportionality across categories of aircraft and types of operations the following approach is proposed:* · *The target level of equipment should be higher for commercial operations and lower for non-commercial.*" For CAT this may be justifiable and aligns with ICAO Annex 6, but sufficient justification has not been presented to include commercial SPO. Therefore the presumption that light aeroplanes and helicopters for such operations be fitted with FRs is not proven. **Justification:** Proportionate evidence has not been provided to include commercial SPO in the proposed regulations. The Impact Assessment does not adequately substantiate the safety need or benefit for extending the requirement beyond CAT light aeroplanes and helicopters.
response	Not accepted. See reply to comment No 33.

comment	*47* comment by: *UK CAA* **Page No:** 57/58

Paragraph No: Last bullet of 1

Comment: This paragraph summarises the perceived benefit of recordings against noted corrective actions. The information, as presented, does not appear to provide strong evidence of the safety benefits to support any change to the regulations. However, in Annex E under 7.5.3.2 and 7.5.5.2 the note below is shown:

"Note: There is no obligation (or even guidance) to specify, when writing an investigation report, whether the information obtained from a recording was useful to establish a given corrective action. In addition, corrective actions generally relate to several significant events and factors that are established based on the analysis of several sources of data. It is then difficult to assess a posteriori the contribution of a given recording to the identification of corrective action."

This is an important point and one which should be developed more comprehensively to contextualise the findings and explain the limitations of analysing such accident reports especially as the style and nature of such reporting across Europe has had wide variation and depth. Further justification for any change, particularly with regard to the inclusion of commercial SPO, should then be made to substantiate any decisions.

Justification: Clear and substantiated argument for justifying the change to the regulations and the preferred options.

response

Noted.

The content of section 4.1.2.4 of NPA 2017-03 (Assessing the safety risk) and of Appendix E should be considered in their totality.

Section 4.1.2.4 explains why studies of batches of investigation reports were the preferred approach. The rulemaking group was aware of the differences in 'style and nature' among authors of the safety investigation reports, and therefore the four studies presented in Appendix E went well beyond searching statements in the reports regarding the usefulness of in-flight recordings to identify corrective actions. Each investigation report reviewed in Study 1 was screened through 20 questions (presented in table E.1 of Appendix E), each investigation report reviewed in Study 2 was screened through 15 questions (presented in table E.3. See also table E.7 for Study 3 and table E.9 for Study 4).

Hence the considerations reflected in the note of sections 7.5.3.2 and 7.5.5.2 were taken into account in the development of the studies' questions and the analysis of studies' results.

4.1.4. How could the issue/problem evolve p. 62-63

comment

48 comment by: *UK CAA*

Page No: 63

Paragraph No: 2, beginning 'One should also not rely …'

Comment: There would be significant benefit if a way could be found, and specifications developed, that would enable accident investigators to retrieve data from cameras, GNSS

	devices, smartphones etc. and EASA/MS CA's should engage with manufacturers to seek to find a equitable solution. This should be promoted. **Justification:** More proportionate and wider availability of recorded information useful to accident investigations or operator use. In GA there is a greater chance of one of these facilities being used on-board an aircraft during flight.
response	Noted. More and more the portable electronic devices (PEDs) used in general aviation are devices designed for the general public (e.g. smartphone, tablet, action camera) and not specifically for aviation purposes. Although we sympathise with the intent of this comment, the Agency has little leverage to bring these manufacturers to upgrade their equipment so that data can be more easily retrieved after an accident. However, safety promotion of in-flight recording toward light aircraft users is part of the retained option in the impact assessment.

4.3. How it could be achieved — options — 4.3.1. Requiring, facilitating or promoting p. 64-65

comment	*49* comment by: *UK CAA* **Page No:** 64 **Paragraph No:** 4.3.1.1. **Comment:** The ability for a voluntary installation of FR equipment to be conducted under CS-STAN is fully supported. **Justification:** Proportionality.
response	Noted. Thank you.

comment	*50* comment by: *UK CAA* **Page No:** 64 **Paragraph No:** 4.3.1.2. **Comment:** The establishment and promotion of the benefits of FR equipment for all operators is fully supported. **Justification:** Improvement in safety and better understanding of the cost effective use of aircraft.
response	Noted. Thank you.

4.5. What are the impacts — 4.5.1. Safety impact p. 70-75

comment	*51* comment by: *UK CAA* **Page No:** 70/71 **Paragraph No:** Option A.1 **Comment:** This option recognises the limiting factors of promoting in-flight recording and suggests a "fit and forget" approach should be possible which is supported. This proposal has reached a slightly positive impact which seems appropriate. **Justification:** Proportionate/better regulation principles
response	Noted. Thank you.

comment	*52* comment by: *UK CAA* **Page No:** 72 **Paragraph No:** Last bullet on page **Comment:** There appears to be an error in the Annex 6 Part III references in the final sentence which may have been copied from the earlier bullet related to aeroplanes. **Justification:** Accuracy **Proposed Text:** Amend "6.3.1.2.1" in final sentence to read '4.3.1.2.4'.
response	Noted. Thank you.

comment	*53* comment by: *UK CAA* **Page No:** 73 **Paragraph No:** Option A.3 **Comment:** The scale used for ranking the impacts is given as -5 to +5 but there is no indication of the percentage of an issue that would represent a very positive/negative impact. Whilst the suggestion is that 16% more aeroplane accidents would be captured if this option had been implemented, based on a scale of -5 to +5 it is not clearly explained how 16% can be considered to be 'slightly to medium positive'. **Justification:** If not fully justified this would tend to support the promotion and voluntary installation of FR rather than mandatory installation.

response

Noted.

As explained in section 4.4.1 of NPA 2017-03, the methodology applied for the impact assessment is the multi-criteria analysis (MCA). MCA 'applies cost-benefit thinking to cases where there is a need to present impacts that are a mixture of qualitative, quantitative, and monetary data, and where there are varying degrees of certainty'. The applied scale, from very negative (-5) to very positive (+5) is also presented in section 4.4.1.

With regard to options proposing a requirement (options A.4, A.3 for aeroplanes and helicopters, option B.2 for balloons), the criterion for assessing their potential safety impact was based on assessing the proportion of historical accident investigations where the involved aircraft would have been equipped with in-flight recording equipment if the proposed requirement had already been in force.

When the aircraft was from a model in the scope of the proposed requirement:

- in 2% or less of historical accidents (1 out of 50 or less), the safety impact was considered negligible
- in about 10% of historical accidents (1 out of 10), the safety impact was considered slightly positive
- in about 25% of historical accidents or more (1 out of 4 or more), the safety impact was considered medium positive
- for values in between these thresholds, a range of safety impact assessment was proposed, e.g. 'slightly to medium positive' when the proportion was found to be 16%.

Note: as explained in section 4.1.2.4 of NPA 2017-03, 'equipping all light aircraft registered in Europe and within the scope of RMT.0271 & RMT.0271 with in-flight recording equipment would actually result in just a moderate reduction of the number of fatal accidents per year.' Therefore, the safety impact of options proposing an in-flight recording requirement was capped at 'medium positive' (see conclusion of 4.1.2.4 on page 60 of the NPA).

4.5.3. Social impact p. 76-78

comment

54 comment by: *UK CAA*

Page No: 76

Paragraph No: 4.5.3 Option A.0

Comment: There is no assessment on the social impact yet the expectation is that it will be, and therefore is, neutral.

Justification: There should be an assessment and a conclusion.

response

Noted.

Justification of the social impact of Option A.0 is not provided in NPA 2017-03, because option A.0 is the baseline option ('do nothing') for light aeroplanes and light helicopters, and therefore it was considered that the impact of this option on considered aspects is neutral by

default. For the safety impact of Option A.0, a non-neutral impact was assumed and therefore justification was provided in this case (see section 4.5.1).

4.5.4. Economic impact p. 78-86

comment

55 comment by: *UK CAA*

Page No: 78

Paragraph No: 4.5.4 Option A.0

Comment: There is no assessment on the economic impact yet the expectation is that it will be, and therefore is, neutral.

Justification: There should be an assessment and a conclusion

response

Noted.

See reply to comment No 54.

comment

56 comment by: *UK CAA*

Page No: 78/79

Paragraph No: 4.5.4 Economic Impact Option A.1

Comment: This section states that "in only half of the cases where test and research were performed would a limited set of flight parameters (…) be sufficient to avoid performing test and research". In other words, this says that in 'only half' i.e. 50% of cases it would avoid the need for test and research and this only results in a 'slightly positive' expectation, yet under the safety impact assessment a result of 16% produced a 'slightly to medium positive' conclusion.

Justification: More information on the percentages associated with the scale used is needed to ensure consistent application.

response

Noted.

This comment partially quotes a sentence in section 4.5.4 of NPA 2017-03. The whole sentence is:

'Study 1 also showed that test and research are performed in about a quarter of the investigations of light aircraft accidents, and in only half of the cases where test and research were performed would a limited set of flight parameters (such as those recorded by a lightweight flight recorder) be sufficient to avoid performing test and research.'

The logical conclusion is that in ½ × ¼ =⅛ (about 13%) of investigations, Option A.1 would make a difference with regard to test and research activities when considering light aircraft accident investigations (and assuming that all operators and owners in the scope of Option A.1 voluntarily equip their aircraft with in-flight recording equipment).

In addition, the economic impact of Option A.1 on investigation authorities was determined to be 'slightly positive' because the main benefit for them would be to 'accelerate the investigations, in particular by saving on test and research' (see section 4.5.4). In other terms, Option A.1 would save human resource and money for a moderate proportion (about 13%) of investigations of light aircraft accidents. Option A.1 would not have any effect on investigations of large aircraft accidents, which mobilise a large proportion of the resources of a safety investigation authority.

With these considerations, it is rather appropriate to rate the economic impact of Option A.1 slightly positive for the investigation authorities.

comment

57 comment by: *UK CAA*

Page No: 81/82

Paragraph No: Table 11

Comment: As it remains unknown whether the installation of FR equipment will require a major mod, a minor mod or can be done as a standard change, the economic impact remains unknown and may potentially be significant. The summary in Table 13A indicates that whilst there is a slightly positive impact for (+1) for Authorities, there is a greater negative impact on industry.

As the reduction in fatalities is estimated to be moderate and the anticipated increase in the number of accidents captured is only 16%, this would support the promotion of voluntary installation especially for commercial SPO.

Justification: Proportionality

response

Not accepted.

According to table 11 in section 4.5.4 of NPA 2017-03, the total cost per individual aircraft of Option A.2 and A.3 could be up to about 25 000 Euros in the worst case considered by NPA 2017-03 (STC required and aircraft model produced in small series). However, as shown in table 11, if only a minor change is required or if the aircraft model is produced in larger series, the total cost per individual aircraft would significantly decrease.

It should also be noted that Issue 2 of the certification specifications for standard changes and repairs (CS-STAN) was issued since the publication of the NPA. This CS-STAN includes in Subpart B (Standard Changes) a new paragraph CS-SC104a — Installation of lightweight in-flight recording systems. All non-complex aeroplanes and non-complex helicopters are eligible to CS-SC104a. This means in practice that CS-SC104a can be used for most aeroplane and helicopter models in the scope of Option A.3, because these models are not considered complex.

See also reply to comment No 33.

4.5.5. General aviation and proportionality issues p. 87-89

comment	*16* comment by: *René Meier, Europe Air Sports* 4.5.5.1. Impact of the options for aeroplanes and helicopters page 87/178 Option A.2 Remark According to information available to us the MCTOM of the Pilatus PC-6 Porter is 2800 kg, the MCTOM of this aircraft therefore is not less than 2250 kg. (The MCTOM of the other aircraft we did not check.)
response	Noted. The maximum take-off weight of the PC-6 is indeed 2 800 kg. Thank you.

comment	*58* comment by: *UK CAA* **Page No:** 87 **Paragraph No:** 4.5.5.1 Option A:3 **Comment:** This imposes a significant financial burden on CAT and particularly commercial SPO operators using 'light aircraft'. It is difficult to see how the impact of this can be considered to be neutral. **Justification:** Capturing aircraft that may be used for commercial SPO and requiring them to meet the same requirements as for CAT is not warranted. The adoption of the proposed Options A.3A and A.4A are strongly promoted.
response	Noted. See reply to comment No 33.

4.5.6. Impact on better regulation and harmonisation p. 89-93

comment	*59* comment by: *UK CAA* **Page No:** 91 **Paragraph No:** 4.5.6.1 Option A.3 **Comment:** The impact of option A.3 is stated to be slightly positive as it introduces less complexity into the regulations for aeroplanes. However, the overall impact might be better addressed as 'neutral' when considering harmonisation with ICAO and the other effects. Proposed Option A.3A supports a more proportionate approach. **Justification:** The Impact Assessment should accurately reflect the current situation and the effects of the proposed changes in a proportionate way.
response	Noted.

	The harmonisation with ICAO standards is already considered in section 4.5.6.1 of NPA 2017-03, in particular for Option A.3, and the scope of 4.5.6 is broader than alignment with ICAO Annexes: it encompasses aspects such as simplification of the rules, side-effect on other (non-aviation) Union legislation, harmonisation with the requirements of third countries, etc. It is agreed that the scope of section of 4.5.6 may not be obvious for a reader. This comment has been shared internally with a view to improve the template for regulatory impact assessment.

7.4. Appendix D: Promoting the benefits of in-flight recording for light aircraft p. 126-132

comment	*21* comment by: *General Aviation Manufacturers Association* reference 7.4.2.1. Flight parameters: Replace with: "Flight parameters or data-link messaged recorded by a flight recorder shall only be used for purposes other than for the investigation of an accident or in an incident that is subject mandatory reporting if such records are: Used by the operator for airworthiness or maintenance purposes; or In a manner that promotes aviation safety If recorded data is used for commercial use, the use of such records shall be: De-identified; or Disclosed under secure procedures; or Require the explicit permission from the owner/operator." This would enable an operator to volunteer to provide the data, which isn't clearly allowed under the proposed language.
response	Not accepted. Section 7.4.2.1 quotes point (f)(2) of CAT.GEN.MPA.195. The quote of a regulation is not to be distorted.

7.6. Appendix F: Alternatives to dedicated in-flight recording equipment p. 147-161

comment	*14* comment by: *René Meier, Europe Air Sports* 7.6.2.1. Aeroplanes and helicopters page 148/179 Question You state "...and their manufacturers usually provide little assistance to investigation authorities. What could the Agency do to change this, what could we as users do to improve the situation?
response	Noted.

	The Agency has little leverage in this respect: see reply to comment No 48.

7.8. Appendix H: General principles of the safety risk assessment p. 171-174

comment	*15* comment by: *René Meier, Europe Air Sports* 7.8.2. Special considerations related to general aviation page 173/178 1 Control of the risk Remark Many thanks for this statement about the justified high autonomy to be granted to a pilot-in-command.
response	Noted. Thank you.

7.10. Appendix J: Examples of in-flight recording systems p. 178

comment	*17* comment by: *EASAPUBLIC* test
response	Noted.

comment	*19* comment by: *General Aviation Manufacturers Association* The examples for Appareo GAU 3000 and Vision 1000 currently don't meet the ED-155 standard; therefore why have they been included in this list? Are they included as they will meet a later equivalent standard. Please clarify.
response	Noted. Examples of in-flight recording systems provided in section 7.10 of NPA 2017-03 are provided only to illustrate that such systems may already be purchased. They were not checked against compliance with ED-155. Flight recording systems which are fully compliant with ED-155 are expected to have a TSO-C197 approval an ETSO-2C197 approval or an equivalent approval. At this stage, only one flight recorder model is known to the Agency to have such approval, however certification projects are on-going.

comment	*101* comment by: *Airbus Helicopters* For information, MDU 379 from Flight Data Vision is not an in-flight recording systems but a ground device for real-time reading and equipment downloading.
response	Noted.

Thank you.