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ENCOURAGING THE USE OF HELICOPTER FLIGHT RECORDING SYSTEMS

(Presented by New Zealand)

EXECUTIVE SUMMARY

Simple flight recording technology, in the form of cockpit video recorders, is becoming increasingly affordable and available to a broader proportion of the global light helicopter fleet. There are significant safety benefits to be realised by the widespread implementation of this technology and attendant helicopter flight data monitoring (HFDM) programmes, but some barriers remain to voluntary uptake.

This paper discusses some of the key barriers identified in the course of sector engagement work in New Zealand, and proposes several measures that could be employed by regulators to help overcome these.

<i>Strategic Objectives:</i>	This working paper relates to Strategic Objective of Safety
<i>Financial implications:</i>	Nil
<i>References:</i>	Nil

1. INTRODUCTION

1.1 Light helicopters, which make up the vast majority of the world's rotary wing aircraft fleet, are not typically equipped with flight data recorders (FDRs) and cockpit voice recorders (CVRs) as it is often not practicable to do so. However, an alternative practical means of recording flight parameters is to use a forward-facing video camera within the cockpit that captures views through the windscreen, of aircraft instruments and of pilot control inputs. A cockpit video recorder can also perform the function of a CVR.

1.2 The flight data that can be captured using a cockpit video recorder is less comprehensive than is possible with a traditional FDR, but is invaluable for providing safety investigators with key pre-crash information that would otherwise be unavailable to them. This can be the deciding factor of whether the root cause of a crash can be determined. This category of equipment is referred to within Annex 6 — *Operation of Aircraft to the Convention* as “flight recorders”.

1.3 There is also value to operators in using cockpit video footage as a tool to enhance the safety of everyday operations. In order to achieve this, a more holistic approach is needed beyond simply installing a camera from which footage is extracted after a crash or serious incident. This approach is broadly known as helicopter flight data monitoring (HFDM) and involves the ongoing use of camera footage and other flight data as part of a broader safety management framework.

1.4 A considerable number of operators throughout the world have implemented HFDM on a voluntary basis to improve their safety performance and compliance with operational procedures. These operators have reported significant benefits from their use of HFDM to understand how their aircraft are being flown and to identify potential problems before they arise.

2. REALISING BENEFITS OF HELICOPTER FLIGHT RECORDING SYSTEMS

2.1 Video capture and storage technology has advanced considerably in recent years, and equipment capable of robustly recording video footage for extended periods of time is now readily available and relatively inexpensive. This has resulted in cockpit video systems being fitted to a growing number of helicopters, both as original equipment manufacturer (OEM) and as aftermarket fitment, particularly on larger helicopters.

2.2 Despite this, there are still significant benefits to be gained from more widespread fitment of cockpit video recording systems to the thousands of in-service helicopters in the global fleet. The most obvious and direct practical benefit to States is in more effective accident investigations, but it takes a long time for these benefits to flow through to regulatory and operational changes that improve overall safety.

2.3 Flight data monitoring (FDM) programmes are well-recognised globally as an important safety tool for large aircraft operations, but many of the benefits of such programmes can also be derived by smaller helicopter operators using cockpit video recording systems.

2.4 If operators implement HFDM programmes alongside the fitment of cockpit video recorders, there are likely to be significant additional safety benefits. This arises from improved operator oversight of operational safety. In particular, richer data available to operators can enable operational safety improvements to be identified and implemented before a serious accident or incident occurs. It can also provide higher quality of operational training through better feedback and review.

2.5 These benefits would generally accrue in proportion to the number of aircraft equipped with cockpit video recorders and the number of operators with HFDM programmes. It is not necessary for all of a State's helicopter fleet to be equipped to achieve meaningful improvements in post-crash information and operator safety, but greater uptake will result in greater benefit.

3. BARRIERS TO HFDM PROGRAMME UPTAKE

3.1 If cockpit video cameras are implemented for the sole purpose of post-crash analysis, it can be expected that there will be fewer safety benefits than if an operator HFDM programme is also in place. Therefore, to derive the most value from camera technology, it is desirable to maximise HFDM uptake over basic cockpit video camera fitment. However, due to the operator-centric nature of HFDM, regulation is unlikely to be the most effective tool to increase operator uptake of such programmes.

3.2 There are some barriers to voluntary uptake of HFDM programmes that are based on the use of cockpit video recorders, such as:

3.2.1 **Pilot resistance.** Pilots are concerned about their employer obtrusively monitoring their actions and penalising them for minor infractions. Some pilots also view HFDM as an invasion of their perceived right to privacy in their workplace.

3.2.2 **Fear of inappropriate use of data by the regulator.** Operators are concerned that the regulator may use camera footage to initiate or inform regulatory enforcement action where there may not otherwise be adequate evidence to do so. By making it easier to determine the cause of an accident or incident, the reasoning is that it will also be easier (and therefore more common) for the regulator to take formal enforcement action.

3.2.3 **Lack of knowledge of operational benefits and how to achieve them.** Some operators are aware of the potential benefits to their operations of implementing HFDM programmes. This lack of awareness is likely to impact how operators view cockpit video recording technology, in light of the more immediate and obvious downsides such as cost, pilot resistance and the potential misuse of footage. If operators have an overall negative view of cockpit video recording, they would be much less likely to implement it on a voluntary basis and would be highly resistant to any suggestion of mandatory implementation.

3.2.4 **Risk of leaked footage.** There is a concern among some operators of the potential for footage to be leaked, either via the regulator or accidentally by the operator. This could significantly harm the operator's reputation, particularly if the footage is viewed out of context or misinterpreted by laypeople. This could be a significant impediment to the routine use of cockpit video recorders, which would prevent benefits from being realised.

4. OVERCOMING BARRIERS AND ENCOURAGING UPTAKE

4.1 There are a number of regulatory and non-regulatory measures that can be employed to help address the barriers to uptake and to encourage greater use of HFDM. These include:

4.1.1 **Legal protections and Just Culture.** To provide assurance to operators and pilots that cockpit video footage is protected and will not be used inappropriately, information on legal protections set out in national legislation could be communicated to the sector. This could be supported by the development

of clear operational policies for regulatory staff to enable consistent application of protections and to provide an additional degree of assurance to the sector. Closely related to the question of legal protections is the need for highly visible application of Just Culture principles by the regulator when using information obtained from cockpit video recorders.

4.1.2 **Promotion of benefits.** To raise awareness of the operator benefits of HFDM systems and so encourage their uptake, there would be value in promotional activities to help “sell” the concept of cockpit video cameras and HFDM to the sector. Regulators can support this either directly by producing and disseminating promotional material, or by providing support to industry groups.

4.1.3 **Best practice guidance.** In cases where an operator has made the decision to implement an HFDM programme, this may be hampered by a lack of knowledge of how to do so effectively and with an appropriate level of data security. To overcome this, regulators can help support and coordinate the dissemination of best practice guidance material produced by industry groups or in collaboration with operators. Operators who have successfully implemented HFDM may be willing to share their experience with others. This information is shared in a coordinated manner, other operators will be better placed to implement effective programmes of their own.

4.1.4 **Government Procurement Rules.** One powerful non-legislative tool for achieving safety outcomes is the ability for government and its agencies to set rules for the procurement of goods and services used. For example, a local or national government, as a user of helicopter services, can require that any helicopter used by a government employee or for a government purpose must be operated under an HFDM programme. This would encourage operators to implement HFDM programmes in order to be considered for government contracts.

4.2 Despite the direct benefits to operators of flight recording technology, it is possible that the level of voluntary uptake, particularly among higher-risk operators, might not be sufficient to address the primary problem of a lack of information to support incident and accident investigations.

4.3 If this situation eventuates, the option of mandating cockpit video recorders in light helicopters as a post-crash investigation tool, while potentially not as beneficial as widespread voluntary uptake of HFDM, could also be considered by regulators.

5. CONCLUSION

5.1 Helicopter flight recording systems are becoming increasingly affordable and are now a viable option for achieving significantly better accident investigation outcomes for both new and in-service light helicopters. If implemented as part of an HFDM programme, further safety benefits can potentially be achieved, providing operators with compelling reasons for voluntary uptake of such programmes.

5.2 Despite this, there are a number of barriers to uptake that need to be overcome in order to achieve a high level of voluntary uptake and the attendant safety benefits. Regulators have a role to play in this, and relatively simple measures can support the widespread implementation of cockpit video-based flight recording systems and HFDM programmes.

5.3 States and ICAO are encouraged to consider ways of supporting helicopter operators in an accelerated uptake of HFDM programmes using cockpit video recording systems.