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DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Parts 91, 121, 125, and 135

[Docket No.: FAA-2023-2270; Amdt. Nos. 91-382, 121-395, 125-77 and 135-149]

RIN 2120-AL92

25-Hour Cockpit Voice Recorder (CVR) Requirement, New Aircraft Production

AGENCY: Federal Aviation Administration (FAA), Department of Transportation (DOT).

ACTION: Final rule.

SUMMARY: This final rule increases the recording time of cockpit voice recorders (CVRs) from the currently mandated 2 hours to 25 hours for all affected future manufactured aircraft. This action provides accident investigators, aircraft operators, and civil aviation authorities with substantially more CVR data to help determine the probable causes of incidents and accidents and prevent future incidents and accidents. The action will also align the Federal Aviation Administration's (FAA) regulations more closely with existing international requirements.

DATES: [Insert date of publication in the Federal Register].

ADDRESSES: For information on where to obtain copies of rulemaking documents and other information related to this final rule, see "How to Obtain Additional Information" in the SUPPLEMENTARY INFORMATION section of this document.

FOR FURTHER INFORMATION CONTACT: For technical questions concerning this action, contact Charisse Green, AFS-340, Aircraft Maintenance Division, Office of Safety Standards, Federal Aviation Administration, 800 Independence Ave. S.W., Washington D.C. 20591; telephone (202) 267-1675; email Charisse.Green@faa.gov.

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I. Authority for this Rulemaking

FAA’s authority to issue rules on aviation safety is found in title 49 of the United States Code. Subtitle I, section 106 describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of FAA’s authority.

This rulemaking is issued under the authority described in subtitle VII, part A, subpart III, section 44701. Under that section, FAA is charged with prescribing

regulations providing minimum standards for other practices, methods, and procedures necessary for safety in air commerce. This regulation is within the scope of that authority since cockpit voice and flight data recorders are the only means available to account for aircraft movement and flight crew actions critical to determining the probable cause of incidents and accidents, including data that could prevent future incidents and accidents.

The 2024 FAA Reauthorization Act¹ (“Act”) states that covered operators may not operate a covered aircraft manufactured later than one year after the enactment date of the Act, May 16, 2025, unless the aircraft has a CVR installed that retains the last 25 hours of recorded information using a recorder that meets the standards of Technical Standard Order *TSO-C123c, Cockpit Voice Recorder Equipment*, or any later revision. “Covered aircraft” is defined by the Act as aircraft operated by an air carrier under 14 CFR part 121 or a transport category aircraft designed for operations by an air carrier or foreign air carrier type-certificated with a passenger seat capacity of 30 or more or an all-cargo or combi derivative of such an aircraft.² “Covered operator” is defined by the Act as an operator of a covered aircraft.³

FAA finds the definition of covered aircraft as found in Section 366(f)(1)(B) pertains to aircraft already required to be equipped and operate a 2-hour capable CVR, specifically where the definition states “all-cargo or combi derivative of such an aircraft.” Extending the applicability to aircraft that are not currently required to carry a CVR would contradict the savings clause provided in Section 366(d). This states “[n]othing in this section shall be construed as rescoping, constraining, or otherwise mandating delays to FAA actions in the notice of proposed rulemaking titled ‘25–Hour Cockpit Voice Recorder (CVR) Requirements, New Aircraft Production,’ issued on December 4, 2023

¹ Securing Growth and Robust Leadership in American Aviation Act. Public Law No. 118-63, Sec. 366. May 16, 2024.

² *Id.* at Sec. 366(f)(1)(A)-(B).

³ *Id.* at Sec. 366(f)(2).

(88 Fed. Reg. 84090).”⁴ Adopting the “all-cargo or combi derivative of such an aircraft” portion of the Act’s definition of covered aircraft as written may be construed to include aircraft not already carrying a CVR. As such, FAA intends for this rule to apply to newly manufactured aircraft operating under part 91, 121, 125, or 135 and configured such that the aircraft must currently comply with the CVR requirements found in the corresponding part. The part of the “covered aircraft” definition adopted by FAA in this action pertains only to aligning the effective date of this rule for those aircraft with the self-enacting effective date of the Act.

As such, regulations pertaining to part 121 operators or operators of transport category aircraft designed for operations by an air carrier or foreign air carrier type-certificated with a passenger seat capacity of 30 or more derive from requirements established by the Act.

II. Executive Summary

A. Purpose of the Regulatory Action

This rulemaking amends the CVR regulations to increase the recording duration of CVRs. Currently, CVRs are required to retain the last two hours of recorded information. Once this 2-hour limit is reached, a CVR overwrites the oldest data to maintain a rolling 2-hour recording. This regulation increases the minimum duration of CVR recordings to 25 hours.

FAA is establishing three compliance timeframes for certain aircraft and operators in response to the Act and comments received on the associated notice of proposed rulemaking with this final rule. First, per the Act, covered aircraft manufactured one year or more after the enactment of the Act, or May 16, 2025, and operating under 14 CFR part 121 or transport category aircraft designed for operations by an air carrier or foreign

⁴ *Id.* at Sec. 366(d).

air carrier type-certificated with 30 or more passenger seats must be equipped with a CVR capable of recording 25 hours of information.⁵ Second, aircraft required to be equipped with a CVR, operating under parts 91, 125, or 135 with a Maximum Certificated Takeoff Weight (MCTOW) of 59,525lbs./27,000 kg with 29 or fewer passenger seats are required to be equipped with a 25-hour CVR one year after the effective date of the final rule. Third, aircraft manufactured on or after three years from the effective date of the final rule, required to be equipped with a CVR, operating under parts 91, 125, or 135, and with a 59,524 lbs./26,999 kg or less MCTOW must be equipped with a CVR capable of recording for 25 hours.

B. Changes Made in this Final Rule

FAA adopts modifications to the published notice of proposed rulemaking⁶ (NPRM). As a result of comments received by aircraft manufacturers, FAA is amending 14 CFR 91.609, 125.227, and 135.151 to reflect longer compliance deadlines for 29 or fewer passenger seat aircraft that are not covered aircraft as defined by the 2024 FAA Reauthorization Act. FAA determined a longer compliance deadline is necessary based on the manufacturers' need to modify their certification plans as these aircraft types did not have a compliance timeframe mandated by the 2024 FAA Reauthorization. FAA does not have the discretion to modify the compliance deadline for covered aircraft (aircraft operating under part 121 or with 30 or more passenger seats) set forth in Sec. 366 of the Act.

C. Summary of the Costs and Benefits

⁵ SEC. 366. 25-HOUR COCKPIT VOICE RECORDER.

(a) IN GENERAL.— (1) COCKPIT VOICE RECORDER FOR NEWLY MANUFACTURED AIRCRAFT.—A covered operator may not operate a covered aircraft manufactured later than the date that is 1 year after the date of enactment of this Act unless such aircraft has a cockpit voice recorder installed that retains the last 25 hours of recorded information using a recorder that meets the standards of Technical Standard Order TSO-C123c, or any later revision.

⁶ 88 FR 84090.

The modified compliance timeframes have been factored into the cost analysis. FAA has also updated the final rule analysis with a refined current fleet estimate, and an updated aerospace forecast and valuation of a statistical life (VSL).

The benefits of the rule are based on a reduction in accident risk. Specifically, the additional audio captured by longer-duration CVRs provides authorities with more information on events and procedures undertaken in the flight deck for investigated incidents. This increased data may lead to new or more informed FAA recommendations or policy changes that could further enhance safety and reduce the risk that an incident becomes an accident. In response to public comments, other potential benefits, such as time savings, have been removed from the analysis due to uncertainty regarding their positive effects.

For costs, FAA assessed the final rule using the incremental cost of equipping a 25-hour capable CVR over a comparable 2-hour unit to all applicable future manufactured aircraft. Market research indicates that the difference between these units is minimal, ranging from near parity to an upper bound of approximately \$5,209 (2024 dollars). Using that upper bound as the price, the updated total cost over 20 years at a seven percent discount rate is estimated to be \$69.7 million, with annualized costs of \$6.6 million (table 1). As technical standards and operational procedures are similar between the 2-hour and 25-hour models, FAA anticipates no other notable costs.

Table 1. Costs over 20 Years by CFR Part by Discount Factor (Millions of 2024\$)

14 CFR Operational Part	Total Costs		Annualized Costs	
	7%	3%	7%	3%
Part 91 ^A	\$36.7	\$54.6	\$3.5	\$3.7
Part 121	\$22.8	\$33.9	\$2.2	\$2.3
Part 125	\$0.2	\$0.3	\$0.0	\$0.0
Part 135	\$10.0	\$15.0	\$0.9	\$1.0
Total	\$69.7	\$103.7	\$6.6	\$7.0
A. Consists of part 91 and 91K Aircraft Note: Columns may not sum to total due to rounding.				

III. Background

A. Summary of the NPRM

On December 4, 2023, FAA published the NPRM for *25-Hour Cockpit Voice Recorder (CVR) Requirement, New Aircraft Production*. FAA proposed to amend the CVR regulations to increase the minimum duration of CVR recordings from two to 25 hours for all newly manufactured aircraft operating under 14 CFR parts 91, 121, 125, and 135, effective one year after the date of the final rule.

B. Statement of the Problem

The current 2-hour recording duration requirement does not meet the National Transportation Safety Board's (NTSB) needs for investigations and subsequent safety recommendations. Since the NTSB issued a Safety Recommendation, it has investigated numerous accidents and incidents where CVR data relevant to the accident or incident has been overwritten because the relevant recording occurred earlier than the available two hours of recording.

NTSB has investigated incidents and accidents across parts 121, 129, and 135 in which CVRs were overwritten affecting investigator ability to obtain pertinent data. In October 2018, NTSB issued Safety Recommendation A-18-030 requesting that FAA increase the recording duration of CVRs to 25 hours. The accompanying recommendation report, *Extended Duration Cockpit Voice Recorders*, ASR1804, lists 14 events in which installed CVRs were overwritten between 2003 and 2018.⁷ ASR1804 also lists events from 2002 to 2017 in which the CVR was overwritten by continued operation of flights beyond two hours after the event. On January 31, 2024, NTSB sent a letter to the Department of Transportation, stating that since 2018 it has investigated at least 14 additional events that were hampered by overwritten CVRs since issuing

⁷ <https://www.nts.gov/investigations/AccidentReports/Reports/ASR1804.pdf>.

recommendations A-18-030 and A-18-031.⁸ NTSB has consistently recommended the implementation of 25-hour capable CVRs across operating parts, not just parts 121 and 135.

C. Cockpit Voice Recorder Capabilities and Investigative Use

Aircraft currently operating under parts 91, 121, 125, and 135 already are required to be equipped with a CVR that records radio transmissions and sounds in the flight deck to aid subsequent investigation should an accident or incident occur. The recorder's flight deck area microphone is usually located on the overhead instrument panel between the two pilots.

CVRs preserve the recent history of sounds in the flight deck and provide unique information such as engine noise, stall warnings, landing gear extension and retraction, and other clicks and pops. These sounds help an investigator to determine parameters such as engine rpm, system failures, speed, and the time at which certain events occur. The CVR also records communications with Air Traffic Control, automated radio weather briefings, conversations between the pilots and ground or cabin crew, flight crew verbalizations of intentions and coordination, as well as the pilots' awareness of the aircraft and flight deck information.⁹

Access to this information allows investigators to investigate accident and incident factors more thoroughly. Incident factors include the flight crew's procedural compliance, distraction, decision-making, workload, fatigue, and situational awareness.

A CVR starts recording when an aircraft is powered up and will continue to record until the aircraft is powered down or the CVR is deactivated. Once a CVR reaches the end of its recording limit, it will overwrite existing data with a new recording.

⁸ [https://www.nts.gov/news/Documents/FAA%2025-Hour%20Cockpit%20Voice%20Recorder%20\(CVR\)%20Requirement,%20New%20Aircraft%20Production.pdf](https://www.nts.gov/news/Documents/FAA%2025-Hour%20Cockpit%20Voice%20Recorder%20(CVR)%20Requirement,%20New%20Aircraft%20Production.pdf)

⁹ NTSB, "Cockpit Voice Recorders (CVR) and Flight Data Recorders (FDR)" (2023), www.nts.gov/news/Pages/cvr_fdr.aspx.

CVRs typically deactivate due to two forms of power loss. The first occurs when the CVR is deactivated after a major or catastrophic event causing a loss of electrical power. When this event occurs, the CVR preserves relevant audio recorded in the two hours prior to the accident. The second form occurs during less severe incidents, such as when the flight crew manually deactivates the CVR immediately upon landing to prevent the relevant audio from being overwritten.

After an accident or incident, the CVR data is transferred to an NTSB lab for retrieval. The NTSB will eventually receive a readout from the CVR software.

Since CVRs were implemented in 1966, recording capabilities have significantly increased from the original duration of 30 minutes. The latest designs employ more easily expandable solid-state memory and use a fault tolerant digital recording technique with an incorporated battery so recording can continue until the end of flight, even when the aircraft's electrical system fails.

The technical limit for recording time has expanded such that 25 hours is now well within CVR capability.

D. National Transportation Safety Board (NTSB) Recommendation

On October 10, 2018, the NTSB published an Aviation Safety Recommendation Report titled “Extended Duration Cockpit Voice Recorders” (Safety Recommendation A-18-030). Safety Recommendation A-18-030 recommends that FAA require all newly manufactured aircraft that must have a CVR be fitted with and operate a CVR capable of recording the last 25 hours of audio. This recommendation stems from an aircraft incident that occurred in July 2017 at San Francisco International Airport, in which the flight crew of an Air Canada Airbus A320 was cleared to land on a set runway, but instead lined up with a parallel taxiway. After descending to an altitude of 100 feet above ground level (AGL), the aircraft overflew an airplane on the taxiway. The incident aircraft subsequently overflew a second airplane on the taxiway before starting to climb.

During the investigation of the incident, the NTSB found it difficult to gather relevant information, as the CVR data was overwritten before Air Canada officials learned of the severity of the event. The report stated that, had the NTSB been able to obtain the overwritten data, investigators would have been able to assess the timing and content of the flight crew's conversations during final approach, conversations during and after the go-around, and the flight crew's crew resource management (CRM), workload, and fatigue based on verbalizations or flight deck sounds. In this instance, the NTSB identified several serious safety issues; however, this investigation lacked direct evidence of the flight crew's decision making, coordination, and perception of its environment.

E. ICAO and EASA Adoption of a 25-Hour Cockpit Voice Recorder Requirement

The European Union Aviation Safety Agency (EASA) requires CVRs capable of recording for 25 hours for any aircraft, manufactured after January 1, 2021, with a maximum takeoff weight over 27,000 kg (59,525 lbs.).¹⁰

Similarly, in 2016, the International Civil Aviation Organization (ICAO) adopted a new standard calling for the installation of CVRs capable of recording the last 25 hours of aircraft operation on all aircraft manufactured after January 1, 2021 with a maximum certificated takeoff mass of over 27,000 kg (59,525 lbs.) and engaged in commercial transport.^{11,12}

F. 2024 FAA Reauthorization Act

On May 16, 2024, the Act was signed into law. The Act states that covered operators may not operate a covered aircraft manufactured later than one year after the

¹⁰ Commission Regulation 2015/2338, 2015 O.J. Amending Regulation (EU) No 965/2012 as regards requirements for flight recorders, underwater locating devices and aircraft tracking systems.

¹¹ Annex 6 Part 1, 6.3.2.3.2.

¹² ICAO defines "Commercial air transport operator" as [a]n operator that, for remuneration, provides scheduled or non-scheduled air transport services to the public for the carriage of passengers, freight or mail. This category also includes small-scale operators, such as air taxis and commercial business operators, that provide commercial air transport services. Glossary – International Civil Aviation Organization. July 8, 2013.

enactment date of the Act, or May 16, 2025, unless the aircraft has a CVR installed that retains the last 25 hours of recorded information using a recorder that meets the standards of Technical Standard Order TSO-C123c, “Cockpit Voice Recorder Equipment,” or any later revision. “Covered aircraft” is defined by the Act as aircraft operated by an air carrier under 14 CFR part 121 or a transport category aircraft designed for operations by an air carrier or foreign air carrier type-certificated with a passenger seat capacity of 30 or more or an all-cargo or combi derivative of such an aircraft. “Covered operator” is defined by the Act as an operator of a covered aircraft.

Covered aircraft as defined by the Act differs from the proposal set forth in the NPRM, which more broadly proposed that all newly manufactured aircraft required to be equipped with a CVR operating under parts 91, 121, 125, and 135 must be equipped with a CVR capable of retaining the last 25 hours of recorded information within one year of the effective date of the final rule.

To promote harmony with international requirements and in response to comments received, FAA has determined it will require that all aircraft manufactured one year or more after the effective date of the final rule, with a MCTOW of 59,525 lbs. or more and 29 or fewer passenger seats, have a CVR capable of retaining the last 25 hours of recorded information. These aircraft are currently subject to ICAO standards or EASA regulations requiring CVRs capable of retaining 25 hours of recorded information, so there would be no obstacle to compliance with the statutory timeline set forth in Section 366. As discussed in Section IV. C, aircraft manufactured on or after three years from the effective date of the final rule, required to be equipped with a CVR, operating under parts 91, 125, or 135, and with a 59,524 lbs./26,999 kg. or less MCTOW must be equipped with a CVR capable of recording for 25 hours. These aircraft are not currently subject to international standards or EASA regulations requiring CVRs capable of retaining 25 hours of recorded information.

The Act also included a requirement that covered operators operating covered aircraft must equip their covered aircraft with a CVR capable of retaining the last 25 hours of recorded information within six years of the enactment date of the Act. This effectively establishes a retrofit requirement for all covered aircraft.

As discussed in Section IV. A below, Congress included a savings clause in the Act to ensure the proposal found in the NPRM impacting newly manufactured aircraft moved ahead without unnecessary delay.¹³

G. General Overview of Comments

FAA received 114 comment submissions in response to the NPRM from a variety of commenters, including pilot unions, individual pilots, aircraft designers and manufacturers, an aircraft component designer and manufacturer, and private citizens. FAA received comments from the following: Air Line Pilots Association (ALPA),¹⁴ Airlines For America (A4A),¹⁵ Alaska Airlines,¹⁶ Avions de Transport Regional/Aerei da Trasporto Regionale (ATR),¹⁷ Bombardier,¹⁸ Cargo Airline Association (CAA),¹⁹ Coalition of Airline Pilots Association (CAPA),²⁰ Dassault Aviation,²¹ Embraer,²² FedEx,²³ General Aviation Manufacturers Association (GAMA),²⁴ Gulfstream,²⁵

¹³ *Id.* at (d).

¹⁴ Comment ID FAA-2023-2270-0114.

¹⁵ Comment ID FAA-2023-2270-0117.

¹⁶ Comment ID FAA-2023-2270-0110.

¹⁷ Comment ID FAA-2023-2270-0097.

¹⁸ Comment ID FAA-2023-2270-0100.

¹⁹ Comment ID FAA-2023-2270-0105.

²⁰ Comment ID FAA-2023-2270-0109.

²¹ Comment ID FAA-2023-2270-0104.

²² Comment ID FAA-2023-2270-0108.

²³ Comment ID FAA-2023-2270-0096.

²⁴ Comment ID FAA-2023-2270-0115.

²⁵ Comment ID FAA-2023-2270-0106.

Helicopter Association International (HAI),²⁶ Independent Pilots Association (IPA),²⁷ International Brotherhood of Teamsters (IBT),²⁸ L3Harris,²⁹ NTSB,³⁰ Regional Airline Association (RAA),³¹ United Airlines,³² as well as numerous individuals. FAA received comments on multiple aspects of the proposal. The comments and FAA's responses are discussed in Section IV.

H. Differences between the NPRM and the Final Rule

Upon consideration of a number of comments³³ in support of a change to the compliance timeframe for certain operations and the compliance timeline found in the Act, FAA is adopting a three-tiered compliance timeframe for covered aircraft and aircraft not defined as covered aircraft by the Act. Operators of covered aircraft must adhere to the compliance timeframe established by the Act. Operators not covered by the Act will have an extended timeframe to obtain FAA certification. Section IV.C details the compliance path FAA has adopted. Aside from the compliance date and applicability changes discussed herein, FAA adopts the proposed rule as final.

The FAA Reauthorization Act of 2024 reserved 49 U.S.C. 106(g); therefore, FAA revised the affected authority citations in this final rule to remove that U.S.C. section from the list.

IV. Discussion of Comments and the Final Rule

A. Retrofit

²⁶ Comment ID FAA-2023-2270-0102.

²⁷ Comment ID FAA-2023-2270-0101.

²⁸ Comment ID FAA-2023-2270-0118.

²⁹ Comment ID FAA-2023-2270-0107.

³⁰ Comment ID FAA-2023-2270-0098.

³¹ Comment ID FAA-2023-2270-0113.

³² Comment ID FAA-2023-2270-0095.

³³ Commenters in support of changing the compliance date were General Aviation Manufacturers Association (GAMA), Bombardier, Embraer S.A., ATR, Dassault-Aviation, and Gulfstream.

The NPRM proposed to increase the recording time of CVRs from the mandated 2 hours to 25 hours for all newly manufactured aircraft operating under parts 91, 121, 125, and 135, which are required to have a CVR installed.

1. Summary of the Comments

Twenty commenters expressed concern that the lack of a requirement to retrofit the current fleet with 25-hour CVRs would not adequately provide the public with the safety benefits of longer recording CVRs.

These commenters, including the NTSB and L3Harris, as well as 18 other individual commenters, discussed a lack of a retrofit requirement in the NPRM. Most of the public commenters on this issue argued safety should be paramount, so the stated cost of retrofitting did not justify its exclusion from the rule. Four individual commenters expressed interest in a phased approach regarding compliance timeframes for a hypothetical retrofit requirement. NTSB and L3Harris both argued the modeled fleet size, and therefore equipage costs of retrofit, were lower than FAA estimated. Additionally, L3Harris stated CVRs can be simple to exchange in and out of aircraft due to Aeronautical Radio, Incorporated (ARINC) and design standards, and therefore should not impose additional notable costs during retrofit besides the initial equipment purchase costs.

2. FAA Response

After considering public comments, FAA is proceeding only with forward fit in this rule. Retrofitting may increase the speed at which the benefits from newer 25-hour CVR units proliferate into the operating fleet but is not included in the final rule for two reasons. First, in the interim period between the publication of the NPRM and the implementation of the final rule, Congress passed the Act, as discussed in the previous

section,³⁴ which established a retrofit requirement effective six years after its enactment date of May 16, 2024 for covered aircraft. However, the Act also specifically stated nothing in the bill “shall be construed as rescoping, constraining, or otherwise mandating delays” to the NPRM.³⁵ Accordingly, FAA is not rescoping the rule to include a retrofit requirement.

The second reason for not including the retrofit requirement in this final rule is the induced costs need further examination, as retrofitting increases the number of aircraft requiring installation of these CVRs by over two-thirds (estimated 23,273 total CVR equipped aircraft in the current fleet added to the estimated 30,363 aircraft being built in the next 20 years). As operators of the aircraft in the current fleet would be required to purchase and install a new CVR to replace their current unit, the equipment cost per aircraft would be several times higher than for future-built aircraft that only have the incremental cost of using a 25-hour CVR instead of a 2-hour model.

FAA market research showed the cost of a 25-hour CVR can be in the mid-\$20,000s at the lower end. Assuming no replacement, applying a \$25,000 unit cost to purchase a new CVR across the estimated 23,273 aircraft in the current fleet would result in roughly \$581.83 million (undiscounted) in equipment cost, compared to the \$150.74 million (undiscounted) incremental costs for future built aircraft, to upgrade their CVRs. Furthermore, although ARINC standards may allow some retrofitting to be quick and efficient, there is the potential that portions of the fleet would require additional effort to replace the CVR, inducing further costs. As such, FAA is implementing forward fit requirements to begin proliferating 25-hour CVRs into the operating fleet as proposed in the NPRM.

B. Privacy

³⁴ Securing Growth and Robust Leadership in American Aviation Act, Pub. L. 118-63, May 16, 2024.

³⁵ Sec. 366 (e), Pub. L. 118-63.

1. Summary of the Comments

Thirty-seven commenters (which are identified in the subtopics below) have shared concerns about how the increase in recording time could impact flight crew privacy in differing ways, as discussed below.

i. Misuse of Data:

Thirteen individual commenters, as well as the International Brotherhood of Teamsters (IBT), Independent Pilots Association (IPA), Coalition of Airline Pilots Association (CAPA), Air Line Pilots Association (ALPA), and Allied Pilots Association (APA), shared concerns over the misuse of expanded data if the CVR recording time increased to 25 hours. The concerns are associated with the dissemination of data without authorization. An individual commenter detailed concerns over data being accessed by foreign adversaries for inappropriate use. Three individual commenters in agreement with the NPRM proposal thought the ability to obtain usable and useful CVR data for investigative purposes to benefit the safety of the flying public outweighed concerns over flight crew privacy.

ii. Erosion of Crew Resource Management:

Four individual commenters, as well as IBT, shared concerns about how the increase in recording time would impact the flight crew's willingness to communicate openly and the potential for disruption of the free flow of information. In addition, these commenters' concerns center around the potential for conversations to be misinterpreted or misunderstood by employers, which could force flight crews to censor themselves. From their perspective, this could lead to mishaps.

iii. Disciplinary Actions:

Fourteen individual commenters, as well as IPA, commented on the potential for disciplinary, punitive, and criminal actions as a result of capturing more information in the recording by extending the recording time to 25 hours. IPA asserted, contrary to

ICAO Annex 13, other countries are using CVR data to criminalize aviation incidents and accidents. Additionally, United States Federal law enforcement has also been involved in investigations where law enforcement has determined a pilot action was deemed as a criminal act.

Three individual commenters were concerned that extending the 25-hour CVR's data capture capability would result in obtaining data from previous, unrelated flights, thereby opening the flight crews to scrutiny that otherwise would not exist.

Three individual commenters, as well as IBT, discussed concerns about possible disciplinary or punitive actions against the flight crew, as well as civil litigation based on investigative findings.

2. FAA Response

FAA chose to continue with the 25-hour CVR mandate as written in the NPRM. FAA acknowledges the privacy concerns of pilot organizations specifically related to how FAA would use the CVR data collected for investigative purposes. Pursuant to 14 CFR 91.609(g), 121.359(h), 125.227(f), and 135.151(c), FAA is prohibited from using information obtained from the record for the purpose of civil penalties or certificate action.

After an incident or accident, the NTSB often retrieves the CVR from the aircraft or location of the incident or accident. FAA may then obtain CVR data through the NTSB for investigative purposes. When the NTSB does not participate in an investigation, FAA may convene an investigative team and takes possession of the CVR. Upon completion of the investigation, FAA returns the CVR to the owner or operator, as applicable. If the CVR is crash-damaged, FAA returns the device to the insurance company or owner.

When voluntarily supplied, CVRs and the information contained therein are protected by 14 CFR part 193. The regulations in part 193 will also apply to a future

CVR of any duration, including 25-hour CVRs. The current regulations protect CVR information of any duration. Altering the length of the required CVR recording will not impact FAA's handling of acquired CVR information. To date, there have not been any reports of FAA misusing or disseminating the contents of a CVR to non-authorized parties.

Additionally, FAA does not control or regulate the use of the CVR or its data once the CVR is returned to the owner or operator. Use of CVR data by the owner or operator is outside FAA's jurisdiction and beyond FAA's regulatory reach. Moreover, FAA's authority does not extend to how operators intend to use the CVR data in their possession.

FAA is required by statute to proceed with requiring CVRs for certain newly manufactured aircraft to be capable of recording 25 hours of data, and has also identified critically important equities that justify finalizing the proposal for other applicable aircraft, as proposed. FAA has determined the investigative need and safety benefit of this information outweighs the potential privacy concerns of CVR data under the control of FAA. The increased CVR recording duration would further improve current investigative capabilities. This could lead to new or more fully informed FAA recommendations or policy changes that could further enhance safety and reduce the risk that an incident becomes an accident. Concerns over the handling of CVR data outside the possession of FAA should be addressed with the operators that own the CVRs.

Accordingly, FAA adopts the proposal for this topic as final.

C. Compliance

1. Summary of the Comments

Comments from ATR, Bombardier, GAMA, and one individual questioned FAA's proposal to require aircraft operating under part 91 to carry 25-hour CVRs. They believe aircraft operating under part 91, although capable of long-duration flights, are

often used for shorter duration flights and therefore do not need a CVR capable of recording for 25 hours.

Bombardier, Dassault-Aviation, Embraer S.A., and Gulfstream expressed concern that the increase in recording time could impact the certification applications for smaller aircraft operators since existing ICAO standards and EASA regulations do not apply to aircraft under a 27,000 kg MCTOW. Currently, the parallel EASA regulations and ICAO standards only require the installation of 25-hour CVRs on aircraft manufactured after January 1, 2021 that have a MCTOW at or over 59,525 lbs./27,000 kg. Unlike ICAO standards and EASA regulations, the NPRM proposed a compliance date of one year after the effective date of the final rule by operating part instead of MCTOW. This is consistent with past FAA practice of updating CVR regulations by operating part.

GAMA, Bombardier, Embraer S.A., ATR, Dassault-Aviation, and Gulfstream shared concerns with 25-hour CVRs being required on aircraft manufactured one year after the effective date of the rule. The current international 25-hour CVR requirement does not impact aircraft under a 59,525 lbs./27,000 kg MCTOW. These commenters represent aircraft manufacturers with aircraft below the certified takeoff weight threshold used by ICAO and EASA that continue to carry a 2-hour CVR. Thus, including this requirement for these aircraft could potentially increase aircraft certification timelines beyond the 1-year compliance date, according to commenters.

2. FAA Response

Based on the NTSB's and FAA's investigations of accidents and incidents, important data has been overwritten during part 91 operations. There were instances in which a reportable incident occurred in the first leg of a flight, but the aircraft continued onto multiple legs before the incident was reported. This prevented accident investigators from obtaining the data to help determine the cause of the incident.

Bombardier, Dassault-Aviation, Embraer S.A., GAMA, and Gulfstream shared concerns over the proposed compliance timeframe to equip with 25-hour CVRs. They came up with several paths for FAA to consider, but due to the enactment of the Act in the interim period between the NPRM and final rule, FAA no longer has discretion over the compliance timeframe for covered aircraft. Covered aircraft manufactured after May 16, 2025 must comply with this final rule.

FAA agrees with commenters that some aircraft not defined as covered aircraft under the Act warrant an extended compliance time. Accordingly, FAA extends the compliance date for part 91, 125, and 135 operators of newly manufactured aircraft with 29 passenger seats or less. FAA recognizes that the full implementation of this rule includes more aircraft than current ICAO standards and EASA regulations, which necessitates a modification to current certification plans and review processes for aircraft to come into compliance. This is because the rule will be implemented across all operating rules and, unlike international rules and standards, is not limited by aircraft size to only aircraft with a 59,525 lbs./27,000kg or more MCTOW.

Since aircraft with a 59,524 lbs./26,999 kg or less MCTOW or with 29 passenger seats or less were not included under the 25-hour CVR EASA/ICAO regulations and standards or the Act, this final rule provides manufacturers of such aircraft with additional time to complete certification work for compliance. FAA believes three separate compliance timeframes for covered aircraft or aircraft with 29 or fewer passenger seats, either above or below the 59,525 lbs./27,000 kg. MCTOW threshold, are appropriate to account for manufacturer certification, production of CVRs capable of recording for a minimum of 25 hours, and installation.

Accordingly, aircraft manufactured on or after May 16, 2025, operating under part 121 or transport category aircraft with 30 or more passenger seats and required to be

equipped with a CVR are required to be equipped with a CVR capable of retaining the last 25 hours of recorded information on or after May 16, 2025.

Next, part 91, 125, and 135 aircraft with a MCTOW of 59,525 lbs./27,000 kg. or more with 29 or fewer passenger seats and required to be equipped with a CVR are required to be equipped with a CVR capable of retaining the last 25 hours of recorded information on or after one year from the effective date of this rule. This is consistent with the original timeline proposed in the NPRM and consistent with ICAO standards discussed in Section III.E of this final rule.

Aircraft manufactured on or after three years from the effective date of the final rule operating under part 91, 125, or 135 with a MCTOW of 59,524 lbs./26,999 kg. or less that are already required to be equipped with a CVR are required to be equipped with a CVR capable of retaining the last 25 hours of recorded information.

V. Regulatory Notices and Analyses

Federal agencies consider impacts of regulatory actions under a variety of executive orders and other requirements. First, Executive Orders 12866 and 13563 direct that each Federal agency shall propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify the costs. Second, the Regulatory Flexibility Act of 1980 (Pub. L. 96-354) requires agencies to analyze the economic impact of regulatory changes on small entities. Third, the Trade Agreements Act (Pub. L. 96-39) prohibits agencies from setting standards that create unnecessary obstacles to the foreign commerce of the United States. Fourth, the Unfunded Mandates Reform Act of 1995 (Pub. L. 104-4) requires agencies to prepare a written assessment of the costs, benefits, and other effects of proposed or final rules that include a Federal mandate that may result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of \$100 million or more (adjusted annually for inflation) in any one year. The current threshold after adjustment for inflation is \$187

million using the most current (2024) Implicit Price Deflator for the Gross Domestic Product. This portion of the preamble contains FAA's analysis of the economic impacts of this rule.

In conducting these analyses, FAA has determined this rule: is a “significant regulatory action” as defined in section 3(f)(1) of Executive Order 12866, as amended; will not have a significant economic impact on a substantial number of small entities; will not create unnecessary obstacles to the foreign commerce of the United States; and will not impose an unfunded mandate on State, local, or tribal governments, or on the private sector. This final rule is considered an E.O. 14192 regulatory action. Details on the estimated costs of this final rule can be found in the rule's economic analysis.

A. Regulatory Impact Analysis (RIA)

The final rule increases the recording time of CVRs from the mandated 2 hours to a 25-hour recording time for all future manufactured aircraft required to be equipped with a CVR. In addition, in response to public comments, the final rule adds a one-year delayed compliance start date for non-Act covered aircraft at or over a 59,525 lbs. MCTOW, and a three-year delayed compliance start for aircraft that have a 59,524 lbs. or less MCTOW. In addition to factoring in the new compliance start date for the final rule analysis, FAA updated the incremental cost difference between CVR units to 2024 dollars and incorporated the annual updates to the FAA Aerospace Forecast and Department of Transportation (DOT) valuation of a statistical life (VSL). FAA also refined the current fleet totals by further removing some aircraft that may not require a CVR. The resulting final rule analysis has an annualized cost, at a seven percent discount rate, of \$6.6 million. With only minor revisions from the NPRM to the final rule, the RIA has been merged with the preamble of the final rule to help keep all the necessary information contained within one document.

1. Public Comments to the RIA

FAA received 114 public comments on the NPRM, including nine relating to the economic analysis. Below are FAA's responses to the RIA related comments.

i. Cost of Retrofit:

Eighteen individual commenters, as well as NTSB and L3Harris, disagreed with the proposed rule for not including retrofit. While these commenters stated generally the cost of retrofitting was insignificant or unimportant compared to the benefits of increased safety, the NTSB and L3Harris specifically argued the fleet size FAA estimated was higher than it should be and therefore the equipage cost was lower than estimated in the proposed rule. Both entities used Cirium fleet data to estimate their fleet totals.³⁶ L3Harris found 8,243 commercial aircraft and the NTSB found 13,500 aircraft that met the characteristics that require a CVR. Both commenters further argued the other costs besides equipment for retrofitting were negligible.

a. ***FAA Response:***

The updated FAA estimates are 23,273 aircraft in the fleet that meet the criteria that require a CVR. The reason for the discrepancy between fleet estimates appears to be L3Harris only included commercial aircraft, which does not account for portions of 14 CFR part 91 or other noncommercial operations. The NTSB estimate was made by searching Cirium fleet data on all multi-engine turbine powered aircraft with 10 or more passenger seats. However, FAA's internal estimates also include six to nine passenger multi-engine turbine powered aircraft, as these require a CVR when type certificated with two pilots. In addition, there are cargo aircraft with zero passenger seats that still require CVRs, and FAA included these aircraft in its fleet estimate. These two categories account for the roughly 10,000 aircraft difference between the NTSB and FAA applicable fleets.

³⁶ Cirium is a private company that provides aviation data and analytics.

On other costs of retrofitting, FAA agrees with L3Harris and the NTSB that some of the fleet would see those as minimal. Overall technical specifications guiding CVR design and ARINC wiring standards mean modern aircraft can replace their CVR unit without much difficulty during regular maintenance cycles. However, FAA acknowledges this will not be the case for every aircraft, and older portions of the fleet may see notable costs if they require extra time, labor, and parts to retrofit their CVR.

ii. CVR Base Equipment Cost:

L3Harris commented the estimate of \$25,000 for a CVR was too high. They commented the catalog price does not accurately reflect average sales prices, and competition would lower this price.

a. *FAA Response:*

FAA has limited data on prices and therefore continues to use publicly available catalog prices. However, FAA acknowledges there is potential variability in realized pricing after negotiation between operators and vendors.

iii. Aircraft Manufacturer Certification Costs:

Gulfstream commented there may be additional manufacturer costs for certification that should be included in the cost analysis. It recommended FAA conduct a survey of manufacturers to determine how many aircraft types are affected that have not already been updated to 25-hour CVRs and the associated projected cost for certification efforts. It additionally stated FAA should also internally assess what resources and costs were required within their certification offices.

a. *FAA Response:*

FAA acknowledges there may be some potential unquantified costs for manufacturers to certify some of their fleet to the newer CVR models. FAA lacks data to assess both the average costs to certify with new CVR models and how many aircraft types would need to undergo this process. In addition, as these newer generation CVRs

become standard equipment due to congressional requirements and supply chain changeover, it is expected most aircraft would eventually have to certify with them regardless of the rule. Due to these factors, FAA agrees and will add a statement to the cost analysis acknowledging there may be a certification cost to manufacturers that have not previously been required to use a 25-hour CVR, but cannot estimate what those costs amount to and can only assess the impact qualitatively.

On certification, FAA does not anticipate expending additional resources to approve aircraft with 25-hour CVRs, so these actions are considered within normal duty.

iv. CVR Benefits Analysis:

ATR commented on several aspects of the cost-benefit analysis. It argued downloading CVR data is three to five times longer due to larger memory to download, leading to higher maintenance costs and recurring analysis costs. It additionally stated the newer download tools have no direct link with the recorded memory itself as they can analyze both 2- and 25-hour CVRs. It further argued these new recorders require a change of ground support Equipment (CVR interface tools) for operators, meaning additional equipment and potential costs are not accounted for in the analysis.

a. ***FAA Response:***

FAA agrees the amount of data is larger; however, the newer download tools support higher transfer speeds and direct cloud uploads that offset the increase (Universal Serial Bus (USB) 3.0 has a five to ten times faster data transfer than a USB 2.0, for example). Overall, data download times are considered insignificant compared to the weeks or months it takes to complete an incident or accident investigation. However, due to the uncertain nature of the benefits derived from the retrieval tools, these potential time savings have been removed from the analysis.

Regarding ground support equipment, operators would potentially be required to purchase either software or new tools to interface with the 25-hour CVRs. FAA did not

include this cost in the proposal as it lacks data on the costs of these tools (either original manufacture or third party). In addition, operators are already purchasing these tools for 25-hour CVRs being proliferated into the fleet due to EASA and Congressional requirements, and FAA cannot determine how many units would be required to meet the needs of this rule.

v. Uncalculated Benefits of CVRs:

L3Harris commented that the NPRM did not include the financial benefits of having CVR information during incident and accident investigations. Applying data from a Transport Canada Regulatory Impact Analysis to their predicted fleet impacted by retrofit upgrades, L3Harris commented there would be financial benefits of \$31 million on an annualized basis, or \$191 million net present value (NPV) across 10 years, assuming retrofit upgrades over a 4-year period at a seven percent discount rate.

a. *FAA Response:*

While there have been benefits from previous safety improvements due to data collected by CVRs, FAA cannot predict the certainty of a future incident, or that subsequent safety changes generating benefits similar to those cited by L3Harris would solely stem from the CVR data analysis portion of the investigation. Therefore, FAA continues to assess the benefits qualitatively, similar to the Air Transport Canada analysis that only described qualitative CVRs safety benefits that could “include aircraft, airport or operational improvements” and do not, or were not able to, assign a monetary value to these improvements.³⁷

2. Need for the Regulation

This final rule increases the recording duration of CVRs to address the need to increase the duration of CVRs by investigative authorities. With several notable aviation

³⁷ Government of Canada, Regulations Amending the Canadian Aviation Regulations (Parts I and VI – Flight Data Recorder and Cockpit Voice Recorder): SOR/2019-130, Canada Gazette, Part II, Volume 153, Number 11, May 09, 2019.

incidents missing vital information about events in the cockpit due to the CVR data being overwritten, investigative and regulatory agencies are hampered in their ability to analyze the probable causes fully and, thus, could not create effective policies or procedures to address the risks that led to these events. Notable incidents include the following:

Table 2. Safety Events for Which Pertinent CVR Data Were Overwritten (Up to 2018)

Date	Event Type	NTSB#	Location	Event Description
6/21/2018	Incident	OPS18IA015	Chicago, IL	Runway excursion
4/18/2018	Accident	DCA18LA163	Atlanta, GA	Engine fire
7/07/2017	Incident	DCA17IA148	San Francisco, CA	Taxiway line-up and overflight of 4 air carrier airplanes by an Airbus A320 (46-hour notification delay)
5/09/2014	Accident	CEN14LA239	Columbus, OH	Ground engine fire
9/12/2013	Incident	CEN13IA563	Austin, TX	Loss of pitch control during takeoff (4-day notification delay)
7/31/2012	Incident	CEN12IA502	Denver, CO	Bird strike
12/1/2011	Accident	WPR12LA053	Oakland, CA	Enroute turbulence
6/21/2011	Incident	ENG11IA035	Atlanta, GA	Engine fire
2/09/2011	Incident	ENG11IA016	Minneapolis, MN	Tailpipe fire following push back
11/23/2010	Accident	WPR11LA058	Salt Lake City, UT	On ground collision with tow tractor
6/28/2010	Accident	CEN10LA363	Pioneer, LA	En route turbulence
12/31/2009	Incident	DCA10IA015	Charlotte, NC	Wing tip strike during landing
6/29/2007	Incident	LAX07IA198	Los Angeles, CA	Blown tires on takeoff
3/21/2006	Incident	DEN06IA051	Denver, CO	Tail strike on landing
10/16/2003	Accident	MIA04LA004	Tampa, FL	Taxiway excursion
6/03/2002	Accident	DCA02MA039	Subic Bay, Philippines	Abrupt maneuver due to ground proximity warning system alert and elevator damage
6/02/2002	Accident	DCA02MA042	Subic Bay, Philippines	Flight control malfunction during approach

EASA decided to address the issue in 2015 by requiring airplanes over 27,000 kg (59,525 lbs.) manufactured after January 1, 2021 to be equipped with a 25-hour capable CVR.³⁸ ICAO, in 2016, also adopted a new CVR standard matching the EASA requirements.³⁹ The United States Congress also moved to this standard in the FAA

³⁸ European Union Aviation Safety Agency, Commission Regulation 2015/2338, 2015 O.J. Amending Regulation (EU) No 965/2012 as regards requirements for flight recorders, underwater locating devices and aircraft tracking systems, Dec. 11, 2015.

³⁹ Updated ICAO CVR requirements can be found in Section 6.3.2.3 in Annex 6.

Reauthorization Act of 2024, adding requirements for covered operators to forward fit with 25-hour CVRs one year after the law’s enactment.

This rule expands FAA’s ability to understand events and procedures in the cockpit during incidents or accidents. The increased awareness of how pilots operate their aircraft in adverse events will allow FAA to update its guidance and regulations to ensure the best practices to maximize safety in the NAS.

3. Baseline for the Analysis

Operations under 14 CFR parts 91, 121, 125, and 135 are currently required to use a CVR that retains at least the last two hours of recorded information. The economic analysis assesses the incremental costs and benefits of the rule against this baseline. Table 3 below compares the baseline CVR recording length requirements to the final rule. The final rule has revised the compliance start date for applicable non-Act covered aircraft to one year from publication for those with a 59,525 lbs. or more MCTOW and 29 or fewer passenger seats, and by three years for aircraft under the MCTOW. Cost estimates for the final rule were updated to reflect this compliance schedule, 2024-dollar cost of the CVR upgrade, refined fleet estimates, and annual updates to the aerospace forecast and VSL.

Table 3. Summary of Regulatory Changes

14 CFR Operation	Current Requirement	Final Rule
Part 91 § 91.609 (i)(2) Part 125 § 125.227 (g)(2) and (h)(2) Part 135 § 135.151 (g)(1)(iii) and (g)(2)(iii)	Retains at least the last two hours of recorded information using a recorder that meets the standards of TSO-C123a, or later revision.	(i) The last 25 hours of recorded information using a recorder that meets the standards of TSO-C123c, or later revision, if: (A) Manufactured on or after May 16, 2025, for airplanes or rotorcraft for transport category aircraft type-certificated with 30 or more passenger seats; (B) Manufactured on or after one year after the effective date of the rule, for airplanes or rotorcraft with a maximum certified takeoff weight (MCTOW) of 59,525 pounds or more and 29 passenger seats or less; or (C) Manufactured on or after February 2, 2029, for airplane or rotorcraft with a maximum certified takeoff weight (MCTOW) of 59,524 pounds or less; or (ii) The last two hours of recorded information using a recorder that meets the standards of

14 CFR Operation	Current Requirement	Final Rule
		TSO-C123a, or later revision unless the airplane or rotorcraft meets the manufacturing date and requirements found in (i)(2)(A) or (i)(2)(B) of this paragraph.
Part 121 § 121.359 (i)(2) and (j)(2)	Retains at least the last two hours of recorded information using a recorder that meets the standards of TSO-C123a, or later revision	(i) The last 25 hours of recorded information using a recorder that meets the standards of TSO-C123c, or later revision, if manufactured on or after May 16, 2025; or (ii) The last two hours of recorded information using a recorder that meets the standards of TSO-C123a, or later revision if the airplane is manufactured before May 16, 2025;

The final rule affects CVR manufacturers that design and build CVRs to meet the new recording duration. FAA records indicate six domestic manufacturers have currently received a Technical Standard Orders (TSO) Authorization (TSOA) to make a TSO-C123a or later revision CVR.

4. Benefits Analysis

This section describes the benefits qualitatively because FAA lacks data on the level of risk reduction and time savings that would be achieved by the final rule. Specifically, FAA does not have sufficient data to estimate the exact reduction in risk and total subsequent safety benefits.

The benefits of the final rule include the value of changes in safety from the reduction in accident risk. This final rule provides investigative authorities with more data on events and procedures undertaken in the cockpit during runway incursions or other investigated incidents that are lacking due to being overwritten in the currently mandated 2-hour recording loop. This data may lead to new recommendations or policy changes that could further reduce the risk that an incident or incursion becomes an accident. The Department of Transportation (DOT) determined the VSL in 2024 to be

\$13.7 million.⁴⁰ Given this rule's total maximal cost at a seven percent discount rate of \$69.7 million, preventing five fatalities at any time in the next 20 years would generate benefits matching the estimated costs. In response to ATR's comment about the uncertainty of the effects of other potential benefits, such as time savings for updated CVR retrieval tools, FAA has removed that section from the analysis.

5. Costs

FAA estimates this final rule results in the incremental cost increase of equipping a newer 25-hour capable CVR unit over a 2-hour capable unit to all new aircraft. From market research, FAA determined the cost increase between the older and newer units was expected to be minimal, ranging from near parity to an upper bound of approximately \$5,209 (2024 dollars).⁴¹ Even though manufacturers have already designed and certified newer 25-hour capable CVRs as a result of the updated EASA and ICAO requirements, costs would still be incurred. Aircraft over the MCTOW could still use a 2-hour CVR if they only operated in U.S. airspace, but with this final rule operators will also have to upgrade, resulting in the incremental cost being applied to all future manufactured aircraft required to have a CVR in the affected CFR operations. FAA recognizes this cost is likely overestimated due to the following assumptions:

- (1) This model assumes there is a consistent incremental cost to upgrade to the newer 25-hour models over the analysis period, which may not hold true as the newer units become the industry standard, and the older 2-hour variants are phased out of production chains.
- (2) Should there be an incremental cost difference between the 25-hour and 2-hour models, this model assumes the CVR is always purchased at the top \$5,209 price

⁴⁰ U.S. Department of Transportation (DOT), Treatment of the Value of Preventing Fatalities and Injuries in Preparing Economic Analyses. Office of the Secretary of Transportation, 2024.

⁴¹ Updated from 2021 price difference of \$4,500 using the Consumer Price Index for All Urban Consumers (CPI-U).

difference (2024 dollars), even though operators may negotiate deals for better pricing, as L3Harris noted in its public comment.

- (3) The cost model assumes all future-built U.S. aircraft would have to be upgraded to a 25-hour CVR due to the final rule. However, new aircraft intended for international operations would likely already comply due to EASA and ICAO standards, and therefore, these costs are not attributable to this final rule. Since FAA does not have data on the number of aircraft also subject to EASA and ICAO 25-hour standards, these costs could not be excluded from the total.

FAA estimates in this final rule, the applicable fleet will increase from around 23,273 aircraft to 35,535 over 20 years. This change was projected by applying the year-to-year percentage fleet growths from the FAA Aerospace Forecasts.⁴² Specifically, general aviation turbo-jet/fan, turbo-piston, and turbine powered rotorcraft rates from forecast table 28 are applied to their CFR part 91 and 135 respective populations shown below in table 3, while part 121 and 125 jet aircraft are grown from the mainline jet totals in forecast table 21, and piston totals by non-jet regional growth in forecast table 27.

Table 4. CVR Applicable Fleet Makeup by CFR Part^A

14 CFR Operational Part	Turbine Powered Jets	Turbine Powered Piston	Turbine Powered Rotorcraft	Total
Part 91 ^B	10,436	1,125	267	11,828
Part 121	7,706	103	-	7,809
Part 125	68	13	-	81
Part 135	2,269	908	378	3,555
Total	20,479	2,149	645	23,273
A. Based on July 2024 data				
B. Consists of part 91 and 91K Aircraft				
Source: FAA July 2024				

Besides new demand growth, Boeing and Airbus, in their 2023 commercial market outlooks (CMO) estimated somewhere between 75 to 80 percent of the current

⁴² The FY 2024 - 2044 FAA Aerospace Forecast and associated data tables can be found at: https://www.faa.gov/data_research/aviation/aerospace_forecasts.

operating North American commercial fleet will be replaced with new aircraft by 2042.^{43,44} These replacement aircraft are not reflected in the total fleet growth (new aircraft built to handle increased demand), but at the utilized value of 78.3 percent replacement of the current fleet, there are 18,101 new aircraft would still require a 25-hour CVR and therefore add to the total incremental costs. The breakouts by CFR part for the total fleet over 20 years, including both aircraft built for new demand and current fleet replacement, are shown in table 5 below.

Table 5. Estimated Fleet Numbers by CFR Part over 20 Years

14 CFR Operational Part	First Year Fleet^A	Year 20 Estimated Fleet	Future Demand Increase^B	Replaced First Year Fleet^C	Total Aircraft Built^D
Part 91 ^E	11,828	19,191	7,363	9,200	16,563
Part 121	7,809	10,838	3,029	6,074	9,103
Part 125	81	102	21	63	84
Part 135	3,555	5,403	1,848	2,765	4,613
Total	23,273	35,535	12,262	18,101	30,363

- A. FAA estimated current applicable fleet size as of July 2024.
 B. Future demand increase is calculated with the first-year fleet grown over the 20 years by respective propulsion type.
 C. Replacement of first year fleet consists of 77.78 percent of the first-year fleet evenly spread over the 20 years.
 D. Total consists of aircraft built to replace current fleet and increase to handle future demand.
 E. Consists of part 91 and 91K aircraft.
 Note: Columns may not sum to total due to rounding.

The 20-year timeframe is used as the estimated replacement of over 78 percent of aircraft of the fleet, in addition to new aircraft built to handle future demand, should result in a significant portion of the active fleet being equipped with 25-hour CVRs.

FAA estimates the maximal total cost to upgrade these projected newly built aircraft over 20 years to a 25-hour capable CVR, at a seven percent discount rate, to be \$69.7 million, with an annualized cost of \$6.6 million (table 5). These values were based

⁴³ For more information on Boeing’s CMO and replacement ratio (replacement total/current fleet total) see: https://www.boeing.com/resources/boeingdotcom/market/assets/downloads/2023-CMO_Hulst-Presentation.pdf.

⁴⁴ For further information on Airbus’s CMO and replacement ratio see: https://www.airbus.com/sites/g/files/jlcbta136/files/2023-06/GMF%202023-2042%20Presentation_0.pdf.

on the upper bound maximum difference cost of \$5,209 between the two CVR models applied to all newly built aircraft requiring a CVR. Aircraft type certified for 30 or more passenger seats are assumed to begin equipping in 2025 to meet the requirements of the 2024 FAA Reauthorization Act. New aircraft that are type certified for under 30 passengers, but with a 59,525 lbs. or more MCTOW, are expected to begin equipping in the second half of 2026 to meet FAA requirements. All other newly built CVR applicable aircraft are assumed to only begin equipping with 25-hour models in the second half of 2028. Cost estimates are based on these compliance dates, so any aircraft that are built and equipped with a 25-hour CVR ahead of their associated compliance start are not included.

Table 6. Costs over 20 Years by CFR Part by Discount Factor (Millions of 2024\$)

14 CFR Operational Part	Total Costs		Annualized Costs	
	7%	3%	7%	3%
Part 91 ^A	\$36.7	\$54.6	\$3.5	\$3.7
Part 121	\$22.8	\$33.9	\$2.2	\$2.3
Part 125	\$0.2	\$0.3	\$0.0	\$0.0
Part 135	\$10.0	\$15.0	\$0.9	\$1.0
Total	\$69.7	\$103.7	\$6.6	\$7.0
A. Consists of part 91 and 91K Aircraft Note: Columns may not sum to total due to rounding.				

FAA does not anticipate any other notable costs to comply with the final rule. This rule only updates the minimal required recording time and does not change the technical specifications or core operating components. As such, the newer 25-hour models are built with similar dimensions and wiring standards that make them near drop-in replacements. Therefore, operational procedures and subsequent costs should remain equivalent to the 2-hour CVR models.

In a public comment, Gulfstream noted there may be some additional unquantified costs for aircraft manufacturers to certify their products with the new CVRs. FAA lacks data to assess both the average costs to certify with new CVR models and the

number of aircraft models that would need to undergo this process. In addition, as these newer generation CVRs become the standard equipment due to congressional and international requirements alongside supply chain changes, it is expected most aircraft would eventually have to certify with them regardless of the final rule. Due to these factors, FAA agrees there may be a certification cost to manufacturers that have not previously been required to use a 25-hour CVR, but could not estimate those costs.

6. Summary

The final rule increases the mandated minimum recording time for CVRs from 2 to 25 hours for all applicable future manufactured aircraft operating in 14 CFR parts 91, 121, 125, and 135. The estimated maximal total cost of equipping these new aircraft over 20 years, at a seven percent discount rate, is \$69.7 million with annualized costs of \$6.6 million. Benefits are primarily expected from the savings due to potential risk reduction from avoided accidents as investigative authorities have access to more audio data to aid in prescribing preventative measures. However, there is not sufficient data for FAA to estimate the exact reduction in risk. Given the assigned level of VSL of \$13.7 million, should the risk reduction amount to preventing five fatalities in the next 20 years, benefits would match the costs of the final rule.

B. Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) of 1980, (5 U.S.C. 601–612), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (Pub. L. 104–121) and the Small Business Jobs Act of 2010 (Pub. L. 111–240), requires Federal agencies to consider the effects of the regulatory action on small business and other small entities and to minimize any significant economic impact. The term “small entities” comprises small businesses and not-for-profit organizations that are independently owned and operated and are not dominant in their fields, and governmental jurisdictions with populations of less than 50,000.

FAA published an Initial Regulatory Flexibility Analysis (IRFA) in the proposed rule to aid the public in commenting on the potential impacts to small entities. FAA considered public comments in developing the final rule and this Final Regulatory Flexibility Analysis (FRFA). A FRFA must contain the following:

(1) A statement of the need for, and objectives of, the rule;

(2) A statement of the significant issues raised by the public comments in response to the IRFA, a statement of the assessment of the agency of such issues, and a statement of any changes made in the proposed rule as a result of such comments;

(3) The response of the agency to any comments filed by the Chief Counsel for Advocacy of the Small Business Administration (SBA) in response to the proposed rule, and a detailed statement of any change made to the proposed rule in the final rule as a result of the comments;

(4) A description of and an estimate of the number of small entities to which the rule will apply or an explanation of why no such estimate is available;

(5) A description of the projected reporting, recordkeeping, and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for preparation of the report or record;

(6) A description of the steps the agency has taken to minimize the significant economic impact on small entities consistent with the stated objectives of applicable statutes, including a statement of the factual, policy, and legal reasons for selecting the alternative adopted in the final rule and why each of the other significant alternatives to the rule considered by the agency that affect the impact on small entities was rejected.

As described in the RIA, FAA identified six U.S. manufacturers affected by the rule. Based on the Small Business Administration (SBA) 2023 size standard for Other

Aircraft Part and Auxiliary Equipment Manufacturing (NAICS 336413),⁴⁵ and on publicly available data on employment for these entities, all six identified manufacturers exceed the 1,250-employee size maximum for a small business. Therefore, FAA certifies the rule will not have a significant economic impact on a substantial number of small entities because the rule does not impact any small entity.

C. International Trade Impact Assessment

The Trade Agreements Act of 1979 (Pub. L. 96-39), as amended by the Uruguay Round Agreements Act (Pub. L. 103-465), prohibits Federal agencies from establishing standards or engaging in related activities that create unnecessary obstacles to the foreign commerce of the United States. Pursuant to these Acts, the establishment of standards is not considered an unnecessary obstacle to the foreign commerce of the United States, so long as the standard has a legitimate domestic objective, such as the protection of safety and does not operate in a manner that excludes imports that meet this objective. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards.

FAA has assessed the effects of this final rule and determined it promotes the safety of the American public and does not exclude imported aircraft that have a CVR meeting the recording length requirement. As a result, FAA does not consider this final rule as creating an unnecessary obstacle to foreign commerce.

D. Unfunded Mandates Assessment

The Unfunded Mandates Reform Act of 1995 (2 U.S.C. 1531-1538) governs the issuance of Federal regulations that require unfunded mandates. An unfunded mandate is a regulation that requires a State, local, or tribal government or the private sector to incur direct costs without the Federal government having first provided the funds to pay those

⁴⁵ SBA Size Standards, effective March 17, 2023, can be found at <https://www.sba.gov/document/support-table-size-standards>.

costs. FAA determined this rule will not result in the expenditure of \$187 million or more by State, local, or tribal governments, in the aggregate, or the private sector, in any one year.

E. Paperwork Reduction Act

The Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)) requires that FAA consider the impact of paperwork and other information collection burdens imposed on the public. According to the 1995 amendments to the Paperwork Reduction Act (5 CFR 1320.8(b)(2)(vi)), an agency may not collect or sponsor the collection of information, nor may it impose an information collection requirement unless it displays a currently valid Office of Management and Budget (OMB) control number.

This action contains the following amendments to the existing information collection requirements previously approved under OMB Control Number 2120-0700. As required by the Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)), FAA has submitted these proposed information collection amendments to OMB for its review.

Summary: In this final rule, FAA is increasing the recording time of cockpit voice recorders (CVRs) from the current 2-hour to 25-hours for all newly manufactured aircraft that are required to have a CVR installed. This rulemaking will provide accident investigators, aircraft operators, and civil aviation authorities with substantially more CVR data to help find the probable causes of incidents and accidents and use the information to prevent future incidents and accidents. The rule is influenced by a NTSB safety recommendation, as well as EASA's and ICAO's 25-hour CVR requirements and standards. However, this rulemaking will encompass more aircraft than EASA and ICAO as the requirement is set by not only maximum certified takeoff weight, but operation type and passenger capacity as well.

Public Comments: No public comments were received on the proposed rule's burden on information collection.

Additionally, FAA's Aircraft Certification Service and Flight Standards offices collect public comments through feedback links, to include:

- https://www.faa.gov/about/office_org/headquarters_offices/avs/stakeholder_feedback/air
- https://www.faa.gov/about/office_org/headquarters_offices/avs/stakeholder_feedback/afx

Use: The collection of FDR and CVR data is a valuable tool used in the accident investigation process. The data can provide information that may be difficult or impossible to obtain by other means. This assists the NTSB in reconstructing the events leading to an aircraft accident or incident and determining the probable cause. Understanding the probable cause of aviation accidents and incidents allows FAA and aviation industry to improve aircraft design, operation, and maintenance, thus improving aviation safety overall.

This collection of information supports the Department of Transportation's strategic goal for *Safety: Reduce Transportation-Related Fatalities and Serious Injuries Across the Transportation System*.

In addition, FAA has continuous goals of ensuring the National Air Space (NAS) is the safest and most efficient aircraft operating space in the world.⁴⁶ This requirement gives FAA the ability to analyze the events and procedures affecting the aircraft during incidents/accidents.

Respondents (including number of): FAA estimates in the next three years there will be 28,003 operating aircraft that are required to have a CVR and FDR installed. The compliance time for aircraft that have a 59,524 lbs./26,999 kg or less MCTOW to install

⁴⁶ See FAA 2024 Business Plan.

25-hour CVRs is three years after final rule publication, so it is assumed in this estimate that these aircraft will be using older 2-hour CVR models during the 3-year period.

Frequency: The collection is continuous while the aircraft is operating; however, the information is only provided to FAA during an investigation (about 75 cases per year.)

Annual Burden Estimate: FAA estimates the burden to 28,003 respondents (population within the next three years) to this collection of information is 809,105 hours and \$21,996, annually.

F. International Compatibility

In keeping with U.S. obligations under the Convention on International Civil Aviation, it is FAA policy to conform to International Civil Aviation Organization (ICAO) Standards and Recommended Practices to the maximum extent practicable. FAA has reviewed the corresponding ICAO Standards and Recommended Practices and has identified the following differences with these regulations. With the FAA mandate, there are differences in its requirement for 25-hour CVRs for newly manufactured aircraft. ICAO's 25-hour CVR rule is based solely on the certified takeoff weight of the aircraft. Its existing rule requires aircraft over 27,000 kg (59,525 pounds) MCTOW to install a 25-hour CVR. FAA's existing regulatory scheme differentiates aircraft by operation type rather than by weight. For that reason, FAA's mandate will encompass more aircraft, including aircraft that have a MCTOW less than 27,000 kg (59,525 pounds).

The effective date of the rule depends on aircraft's operational part, passenger seat capacity, and MCTOW. Aircraft manufactured on or after May 16, 2025, required to be equipped with a CVR, and a more than 27,000 kg / 59,525 pounds MCTOW, with 30 or more passenger seats, or operating in Part 121 are required to use a 25-hour CVR in alignment with the requirements of the Act. Aircraft manufactured on or after one year from the effective date of the rule, required to be equipped with a CVR, and a more than

27,000 kg / 59,525 pounds MCTOW, with 29 or fewer passenger seats, are required to be equipped with a 25-hour CVR in alignment with the requirements of the Act. Aircraft manufactured three years after the effective date of the rule, operated under parts 91, 125, 135, and with a MCTOW of 59,524 pounds or less, are required to use a 25-hour CVR. FAA intends to file a difference with ICAO.

G. Environmental Analysis

The Department has analyzed the environmental impacts of this final rule pursuant to the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. 4321 et seq.). FAA has determined this rule is categorically excluded pursuant to Paragraph B-2.6(f) of Appendix B to FAA Order 1050.1G, FAA National Environmental Policy Act Implementing Procedures (90 FR 29615, July 3, 2025). Categorical exclusions are categories of actions that the agency has determined normally do not significantly affect the quality of the human environment and therefore do not require either an environmental assessment (EA) or environmental impact statement (EIS). See DOT Order 5610.1D § 9. In analyzing the applicability of a categorical exclusion, the agency must also consider whether extraordinary circumstances are present that would warrant the preparation of an EA or EIS. *Id.* § 9(b). This rulemaking, which amends, restructures, and consolidates the CVR regulations presently located throughout title 14 of the CFR, is categorically excluded pursuant to appendix B-2.6(f) of FAA Order 1050.1G: “Regulations, standards, and exemptions (excluding those that if implemented may cause a significant impact on the human environment).” FAA does not anticipate any environmental impacts, and there are no extraordinary circumstances present in connection with this rulemaking.

VI. Executive Order Determinations

A. Executive Order 13132, Federalism

FAA has analyzed this final rule under the principles and criteria of Executive Order (EO) 13132, Federalism. FAA has determined this action will not have a

substantial direct effect on the States, or the relationship between the Federal Government and the States, or on the distribution of power and responsibilities among the various levels of government, and, therefore, will not have Federalism implications.

B. Executive Order 13175, Consultation and Coordination with Indian Tribal Governments

Consistent with Executive Order 13175, Consultation and Coordination with Indian Tribal Governments,⁴⁷ and FAA Order 1210.20, American Indian and Alaska Native Tribal Consultation Policy and Procedures,⁴⁸ FAA ensures Federally Recognized Tribes (Tribes) are given the opportunity to provide meaningful and timely input regarding proposed Federal actions that have the potential to have substantial direct effects on one or more Indian tribes, on the relationship between the Federal government and Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes; or to affect uniquely or significantly their respective Tribes. At this point, FAA has not identified any unique or significant effects, environmental or otherwise, on tribes resulting from this final rule.

C. Executive Order 13211, Regulations that Significantly Affect Energy Supply, Distribution, or Use

FAA analyzed this final rule under EO 13211, Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use (May 18, 2001). FAA has determined it is not a “significant energy action” under the executive order and is not likely to have a significant adverse effect on the supply, distribution, or use of energy.

D. Executive Order 13609, Promoting International Regulatory Cooperation

⁴⁷ 65 FR 67249 (Nov. 6, 2000).

⁴⁸ FAA Order No. 1210.20 (Jan. 28, 2004), available at <https://www.faa.gov/documentLibrary/media/1210.pdf>.

Executive Order 13609, Promoting International Regulatory Cooperation, promotes international regulatory cooperation to meet shared challenges involving health, safety, labor, security, environmental, and other issues and to reduce, eliminate, or prevent unnecessary differences in regulatory requirements. FAA has analyzed this action under the policies and agency responsibilities of Executive Order 13609, and has determined this action will have no effect on international regulatory cooperation.

E. Executive Order 14192, *Unleashing Prosperity Through Deregulation*

This final rule is considered an E.O. 14192 regulatory action. FAA estimates that this rule generates \$4.9 million in annualized costs at a 7 percent discount rate, discounted relative to year 2024, over a perpetual time horizon.

VII. Additional Information

A. *Electronic Access and Filing*

A copy of the NPRM, all comments received, this final rule, and all background material may be viewed online at <https://www.regulations.gov> using the docket number listed above. A copy of this final rule will be placed in the docket. Electronic retrieval help and guidelines are available on the website. It is available 24 hours each day, 365 days each year. An electronic copy of this document may also be downloaded from the Office of the Federal Register's website at <https://www.federalregister.gov> and the Government Publishing Office's website at <https://www.govinfo.gov>. A copy may also be found at FAA's Regulations and Policies website at https://www.faa.gov/regulations_policies.

Copies may also be obtained by sending a request to the Federal Aviation Administration, Office of Rulemaking, ARM-1, 800 Independence Avenue S.W., Washington, D.C. 20591, or by calling (202) 267-9677. Commenters must identify the docket or notice number of this rulemaking.

All documents FAA considered in developing this final rule, including economic analyses and technical reports, may be accessed in the electronic docket for this rulemaking.

B. Small Business Regulatory Enforcement Fairness Act

The Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996 requires FAA to comply with small entity requests for information or advice about compliance with statutes and regulations within its jurisdiction. A small entity with questions regarding this document may contact its local FAA official, or the person listed under the **FOR FURTHER INFORMATION CONTACT** heading at the beginning of the preamble. To find out more about SBREFA on the Internet, visit https://www.faa.gov/regulations_policies/rulemaking/sbre_act/.

List of Subjects

14 CFR Part 91

Aircraft, Aviation safety.

14 CFR Part 121

Air carriers, Aircraft, Aviation safety, Charter flights, Safety, Transportation.

14 CFR Part 125

Aircraft, Aviation safety.

14 CFR Part 135

Air taxis, Aircraft, Aviation safety.

The Amendment

In consideration of the foregoing, the Federal Aviation Administration amends chapter I of title 14, Code of Federal Regulations as follows:

PART 91—GENERAL OPERATING AND FLIGHT RULES

1. The authority citation for part 91 continues to read as follows:

Authority: 49 U.S.C. 106(f), 40101, 40103, 40105, 40113, 40120, 44101, 44111, 44701, 44704, 44709, 44711, 44712, 44715, 44716, 44717, 44722, 46306, 46315, 46316, 46504, 46506–46507, 47122, 47508, 47528–47531, 47534, Pub. L. 114–190, 130 Stat. 615 (49 U.S.C. 44703 note); Pub. L. 118–383; articles 12 and 29 of the Convention on International Civil Aviation (61 Stat. 1180), (126 Stat. 11).

2. Amend § 91.609 by revising paragraph (i)(2) to read as follows:

§ 91.609 Flight data recorders and cockpit voice recorders.

* * * * *

(i) * * *

(2) Retains at least—

(i) The last 25 hours of recorded information using a recorder that meets the standards of TSO–C123c, or later revision, if:

(A) Manufactured on or after May 16, 2025, for transport category aircraft type-certificated with 30 or more passenger seats, or

(B) Manufactured on or after February 2, 2027, for airplanes or rotorcraft with a maximum certified takeoff weight (MCTOW) of 59,525 pounds or more and type-certificated for 29 or fewer passenger seats; or

(C) Manufactured on or after February 2, 2029, for airplanes or rotorcraft with a maximum certified takeoff weight (MCTOW) of 59,524 pounds or less; or

(ii) The last 2 hours of recorded information using a recorder that meets the standards of TSO-C123a, or later revision, unless the airplane or rotorcraft meets the manufacturing date and requirements found in (i)(2)(i)(A), (i)(2)(i)(B), or (i)(2)(i)(C) of this paragraph.

* * * * *

**PART 121—OPERATING REQUIREMENTS: DOMESTIC, FLAG, AND
SUPPLEMENTAL OPERATIONS**

3. The authority citation for part 121 continues to read as follows:

Authority: 49 U.S.C. 106(f), 40103, 40113, 40119, 41706, 42301 preceding note added by Pub. L. 112–95, sec. 412, 126 Stat. 89, 44101, 44701–44702, 44705, 44709–44711, 44713, 44716–44717, 44722, 44729, 44732; 46105; Pub. L. 111–216, 124 Stat. 2348 (49 U.S.C. 44701 note); Pub. L. 112–95, 126 Stat. 62 (49 U.S.C. 44732 note); Pub. L. 115–254, 132 Stat. 3186 (49 U.S.C. 44701 note); Pub. L. 118-383.

4. Amend § 121.359 by revising paragraphs (i)(2) and (j)(2) to read as follows:

§ 121.359 Cockpit voice recorders.

* * * * *

(i) * * *

(2) Retains at least—

(i) The last 25 hours of recorded information using a recorder that meets the standards of TSO–C123c, or later revision, if manufactured on or after May 16, 2025; or

(ii) The last 2 hours of recorded information using a recorder that meets the standards of TSO-C123a, or later revision, if the airplane is manufactured before May 16, 2025; and

* * * * *

(j) * * *

(2) Retains at least—

(i) The last 25 hours of recorded information using a recorder that meets the standards of TSO–C123c, or later revision, if manufactured on or after May 16, 2025; or

(ii) The last 2 hours of recorded information using a recorder that meets the standards of TSO–C123a, or later revision, if manufactured before May 16, 2025; and

* * * * *

PART 125—CERTIFICATION AND OPERATIONS: AIRCRAFT HAVING A SEATING CAPACITY OF 20 OR MORE PASSENGERS OR A MAXIMUM

PAYLOAD CAPACITY OF 6,000 POUNDS OR MORE; AND RULES

GOVERNING PERSONS ON BOARD SUCH AIRCRAFT

5. The authority citation for part 125 continues to read as follows:

Authority: 49 U.S.C. 106(f), 40113, 44701–44702, 44705, 44710–44711, 44713, 44716–44717, 44722; Pub. L. 118-383.

6. Amend § 125.227 by revising paragraphs (g)(2) and (h)(2) to read as follows:

§ 125.227 Cockpit voice recorders.

* * * * *

(g) * * *

(2) Retains at least—

(i) The last 25 hours of recorded information using a recorder that meets the standards of TSO–C123c, or later revision, if:

(A) Manufactured on or after May 16, 2025, for a transport category aircraft type-certificated with 30 or more passenger seats;

(B) If manufactured on or after February 2, 2027, for airplanes with a maximum certified takeoff weight (MCTOW) of 59,525 pounds or more and type-certificated with 29 or fewer passenger seats; or

(C) If manufactured on or after February 2, 2029, for airplanes with a maximum certified takeoff weight (MCTOW) of 59,524 pounds or less.

(ii) The last 2 hours of recorded information using a recorder that meets the standards of TSO-C123a, or later revision, unless the airplane meets the manufacturing date and requirements found in (g)(2)(i)(A), (g)(2)(i)(B), or (g)(2)(i)(C) of this paragraph; and

* * * * *

(h) * * *

(2) Retains at least—

(i) The last 25 hours of recorded information using a recorder that meets the standards of TSO- C123c, or later revision, if:

(A) Manufactured on or after May 16, 2025, for airplanes with a maximum certified takeoff weight (MCTOW) of 59,525 pounds or more, or a transport category aircraft type-certificated with 30 or more passenger seats;

(B) If manufactured on or after February 2, 2027, for airplanes with a maximum certified takeoff weight (MCTOW) of 59,525 pounds or more type-certificated for 29 or fewer passenger seats; or

(C) If manufactured on or after February 2, 2029, for airplanes with a maximum certified takeoff weight (MCTOW) of 59,524 pounds or less; or

(ii) The last 2 hours of recorded information using a recorder that meets the standards of TSO-C123a, or later revision, unless the airplane meets the manufacturing date and requirements found in (h)(2)(i)(A), (h)(2)(i)(B), or (h)(2)(i)(C) of this paragraph; and

* * * * *

PART 135—OPERATING REQUIREMENTS: COMMUTER AND ON DEMAND OPERATIONS AND RULES GOVERNING PERSONS ON BOARD SUCH AIRCRAFT

7. The authority citation for part 135 continue to read as follows:

Authority: 49 U.S.C. 106(f), 40113, 41706, 44701–44702, 44705, 44709, 44711–44713, 44715–44717, 44722, 44730, 45101–45105; Pub. L. 112–95, 126 Stat. 58 (49 U.S.C. 44730), Pub. L. 118-383.

8. Amend § 135.151 by revising paragraphs (g)(1)(iii) and (g)(2)(iii) to read as follows:

§ 135.151 Cockpit voice recorders.

* * * * *

(g) * * *

(1) * * *

(iii) Retains at least—

(A) The last 25 hours of recorded information using a recorder that meets the standards of TSO–C123c, or later revision, if:

a. Manufactured on or after May 16, 2025, for a transport category aircraft type-certificated for 30 or more passenger seats; or

b. Manufactured on or after February 2, 2027, for airplanes or rotorcraft with a maximum certified takeoff weight (MCTOW) of 59,525 pounds or more or type-certificated for 29 or fewer passenger seats; or

c. Manufactured on or after February 2, 2029, for airplanes or rotorcraft with a maximum certified takeoff weight (MCTOW) of 59,524 pounds or less; or

(B) The last 2 hours of recorded information using a recorder that meets the standards of TSO-C123a, or later revision, unless the airplane or rotorcraft meets the manufacturing date and requirements found in (g)(1)(iii)(A)(a), (g)(1)(iii)(A)(b), or (g)(1)(iii)(A)(c).

* * * * *

(2) * * *

(iii) Retains at least—

(A) The last 25 hours of recorded information using a recorder that meets the standards of TSO–C123c, or later revision, if:

a. Manufactured on or after May 16, 2025, for airplanes or rotorcraft type-certificated for 30 or more passenger seats;

b. Manufactured on or after February 2, 2027, for airplanes or rotorcraft with a maximum certified takeoff weight (MCTOW) of 59,525 pounds or more with 29 or fewer passenger seats; or

c. Manufactured on or after February 2, 2029, for airplanes or rotorcraft with a maximum certified takeoff weight (MCTOW) of 59,524 pounds or less.

(B) The last 2 hours of recorded information using a recorder that meets the standards of TSO-C123a, or later revision, unless the airplane or rotorcraft meets the manufacturing date and requirements found in (g)(2)(iii)(A)(a), (g)(2)(iii)(A)(b), or (g)(2)(iii)(A)(c).

* * * * *

Issued under authority provided by 49 U.S.C. 106(f) and 44701(a) in Washington, D.C.

Christopher J. Rocheleau,

Deputy Administrator.

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