

Investigative Technologies
Aviation Rulemaking Committee
Report Addendum (Tasking 4.I)
[December 22, 2025]

Table of Contents

I.	Executive Summary-----	1
II.	ARC Recommendations – Intent, Rationale, and Approach -----	1
A.	Rotorcraft-----	1
1.	Rotorcraft Recommendation to Address Tasking 4.1 of the Charter -----	1
	Appendix – ARC Member Voting Responses and Ballots-----	5

I. Executive Summary

The Investigative Technologies Aviation Rulemaking Committee (the ARC) represented diverse interests and viewpoints, including those of operators, manufacturers of aircraft and of investigative technologies, labor unions, and industry organizations. The ARC divided into several working groups and subgroups, working collaboratively to develop recommendations to implement and effectively regulate investigative technology systems.

The ARC submitted the final draft of their report to the FAA on August 29, 2025.¹ The FAA requested clarity from the ARC on task 4.1 of the charter as amended in December 2024.² The ARC produced this addendum in response to that request.

II. ARC Recommendations – Intent, Rationale, and Approach

A. Rotorcraft

1. Rotorcraft Recommendation to Address Tasking 4.1³ of the Charter

REC RTR8	The FAA should develop a structured risk-aligned approach to Section 333 implementation to include maintaining current flight data recorders and flight data monitoring requirements, introducing low-cost recorder technologies, and requiring terrain awareness and warning systems equipage for turbine-powered rotorcraft.
-----------------	---

INTENT: Section 333 of the FAA Reauthorization Act of 2024⁴ directs the FAA to assess whether existing safety requirements for flight data recorders (FDRs), flight data monitoring (FDM), and terrain awareness and warning systems (TAWS) remain adequate for turbine-powered rotorcraft certificated for six or more passenger seats, and to recommend regulatory or legislative changes as appropriate.

The intent of this recommendation is to articulate the ARC’s position on needed improvements informed by operational data, National Transportation Safety Board (NTSB) safety recommendations, and advancements in low-cost recording and terrain-warning technologies. The goal is to enhance rotorcraft safety and accident survivability while maintaining regulatory

¹ Investigative Technologies Aviation Rulemaking Committee Final Report (Aug. 29, 2025), p. 4; available at [Investigative-Technologies final-report.pdf](#).

² Amended Investigative Technologies Aviation Rulemaking Committee (Dec. 12, 2024), p. 4; available at [Investigative Technologies ARC \(Word\)](#).

³ Amended Investigative Technologies Aviation Rulemaking Committee (Dec. 12, 2024); available at [Investigative Technologies ARC \(Word\)](#).

⁴ Public Law 118-63: FAA Reauthorization Act of 2024; available at <https://www.govinfo.gov/app/details/PLAW-118publ63>.

approaches that are operationally feasible, scalable across fleet sizes, and aligned with Safety Management System (SMS) principles.

RATIONALE: The ARC's technical review found that existing requirements in 14 CFR parts 91 and 135 for FDRs and FDM remain fundamentally appropriate for the intended level of safety in turbine-powered rotorcraft operations. However, the ARC learned the following in its research:

1. Value of Low-Cost Audio/Image Recording for Smaller Rotorcraft (<10 seats)

Accident investigations involving light-turbine rotorcraft frequently lack usable onboard data due to the absence of traditional FDR or CVR systems. The ARC concluded:

- Modern, low-cost, lightweight audio/image recorders—built to DO-160 environmental standards or equivalent—now provide meaningful investigative value.
- These devices can enable substantial improvements in understanding pilot actions, aircraft attitude, and environmental cues during the accident sequence.
- For aircraft with fewer than 10 seats, such technologies offer a practical alternative where legacy or heavy crash-protected recorders are infeasible.

2. TAWS to Reduce Controlled Flight Into Terrain (CFIT)

CFIT remains one of the most persistent fatal accident categories in helicopter operations. The ARC concluded:

- TAWS/helicopter terrain awareness and warning systems (HTAWS) equipage for newly manufactured turbine-powered rotorcraft should be required to mitigate these events.
- Advances in lightweight, low-cost TAWS systems – particularly those integrated with modern avionics suites – make both forward-fit and retrofit obligations more feasible.
- Based on industry readiness, a retrofit TAWS requirement could be phased in over 5 years following regulatory promulgation without imposing unreasonable burdens.

3. Consistency With NTSB Recommendations

The NTSB has consistently recommended:

- Wider adoption of flight data recording and accessible data sources.
- Broader equipage of TAWS/HTAWS to prevent CFIT.

The ARC's position responds directly to these recommendations but moderates them with operational feasibility and cost-benefit considerations, especially for small part 135 operators.

4. Operational Realities of Parts 91 and 135

The ARC concluded:

- Operators under part 135 already face significant equipage and compliance requirements; additional mandates must be carefully scaled.
- Lightweight audio/image recorders represent a fit-for-purpose improvement without overburdening operators.
- FDM remains a valuable SMS tool, but the core regulatory framework is sufficient; the challenge lies in simplifying implementation rather than expanding mandates.

APPROACH: The ARC proposes the following structured, risk-aligned approach to Section 333 implementation:

1. Maintain Current FDR and FDM Requirements in Parts 91 and 135

No changes are recommended to the existing regulatory thresholds for traditional FDR/FDM systems. These requirements continue to reflect an appropriate balance of risk, cost, and operational constraints.

2. Introduce a Low-Cost Audio/Image Recorder Requirement for Rotorcraft <10 Seats

For turbine-powered rotorcraft certificated with fewer than 10 passenger seats:

- Require installation of a lightweight audio/image recorder meeting DO-160 or TSO-C197 performance levels.
- Permit simplified architectures that are cost-effective and minimally intrusive.
- Support data accessibility for both safety monitoring and accident investigation.

This provides a scalable pathway for improved data availability where conventional recorders are impractical.

3. Require TAWS for All Newly Manufactured Turbine-Powered Rotorcraft

Implement a forward-fit requirement ensuring that all newly produced turbine-powered rotorcraft certificated for six or more passenger seats are equipped with TAWS/HTAWS meeting current minimum operational performance standards.

4. Establish a Five-Year Retrofit Window for TAWS

Given market readiness and maturing low-cost solutions:

- Require retrofit TAWS installation on applicable in-service fleets within 5 years of final rule publication.

- Allow performance-equivalent integrated solutions within modern avionics suites to satisfy this requirement.

5. Align with NTSB Recommendations While Preserving Operator Scalability

Adopt the safety benefits identified by NTSB but implement them through:

- Tiered equipage thresholds.
- Lightweight technology options.
- Integration with SMS and voluntary FDM programs.

This approach ensures both compliance feasibility and maximum safety impact.

Appendix – ARC Member Voting Responses and Ballots

The ARC believes this report fulfills the tasks in the mission of the Charter. Every voting member of the ARC had the opportunity to vote on the report electronically prior to submission to the FAA.⁵

Members were permitted to concur as written, concur with comment/exception, or not concur. All submissions are included in this report.

The ARC completed its deliberations and drafting for this addendum on December 9, 2025. Voting ballots were distributed to the voting ARC members on December 9, 2025. The tallies are as follows:

10 – Concur as Written 0 – Concur with Comment/Exception 0 – Non-Concur 2 – Ballot Not Submitted

Members	Organization	Vote
Jeff Mee	Air Line Pilots Association	Concur as written
Robert Burke	Airbus	Concur as written
Ric Peri	Aircraft Electronics Association	Ballot not submitted
Murray Huling	Aircraft Owners and Pilots Association	Concur as written
Casey York	Boeing	Concur as written
Lauren Beyer	Cargo Air	Concur as written
Kipp Lau	Coalition of Airline Pilots Associations	Concur as written
Jens Hennig	General Aviation Manufacturers Association	Ballot not submitted
George Paul	National Air Carrier Association	Concur as written
Doug Carr	National Business Aviation Association	Concur as written
Erik Strickland	Regional Airline Association	Concur as written
Chris Hill	Vertical Aviation International	Concur as written

⁵ The designated ARC representatives for AIA Aerospace and Airlines for America were no longer with their organizations as of the deliberation and voting period for this addendum. Accordingly, these organizations were not included in the balloting process.

Investigative Technologies Aviation Rulemaking Committee

ARC Member Ballot

1. Your Name *

Jeffrey Mee

2. What member organization are you representing? *

ALPA

3. Statement of Concurrence/ Non-Concurrence: *

- ☒ I concur with the addendum as written.
- ☐ I concur with the addendum with comment or exception.
- ☐ No, I do not concur with the addendum (**Letter of Dissent must be provided - must be on company letterhead and may not exceed 2 pages in length**)

4. If concurring with comment or exception, please provide comment or exception in the text box below. You may submit a separate paper on company/organization letterhead to becca.fribush@reg-group.com if additional space is required (may not exceed 2 pages in length).

5. As a voting member and full participant of the Investigative Technologies Aviation Rulemaking Committee, I hereby acknowledge that I have reviewed the Addendum and recommendations. My response is recorded on this ballot. Below is my virtual signature. (Please type your full name) *

Jeffrey Mee

Investigative Technologies Aviation Rulemaking Committee

ARC Member Ballot

1. Your Name *

Robert Burke

2. What member organization are you representing? *

Airbus

3. Statement of Concurrence/ Non-Concurrence: *

☒

I concur with the addendum as written.

☐

I concur with the addendum with comment or exception.

☐

No, I do not concur with the addendum (**Letter of Dissent must be provided - must be on company letterhead and may not exceed 2 pages in length**)

4. If concurring with comment or exception, please provide comment or exception in the text box below. You may submit a separate paper on company/organization letterhead to becca.fribush@reg-group.com if additional space is required (may not exceed 2 pages in length).

5. As a voting member and full participant of the Investigative Technologies Aviation Rulemaking Committee, I hereby acknowledge that I have reviewed the Addendum and recommendations. My response is recorded on this ballot. Below is my virtual signature. (Please type your full name) *

Robert H Burke

ARC Member Ballot Investigative Technologies Aviation Rulemaking Committee

ARC Member Ballot

1. Your Name *

Murray Huling

2. What member organization are you representing? *

AOPA

3. Statement of Concurrence/ Non-Concurrence: *

- ☒ I concur with the addendum as written.
- ☐ I concur with the addendum with comment or exception.
- ☐ No, I do not concur with the addendum **(Letter of Dissent must be provided - must be on company letterhead and may not exceed 2 pages in length)**

4. If concurring with comment or exception, please provide comment or exception in the text box below. You may submit a separate paper on company/organization letterhead to becca.fribush@reg-group.com if additional space is required (may not exceed 2 pages in length).

5. As a voting member and full participant of the Investigative Technologies Aviation Rulemaking Committee, I hereby acknowledge that I have reviewed the Addendum and recommendations. My response is recorded on this ballot. Below is my virtual signature. (Please type your full name) *

Murray Huling

Investigative Technologies Aviation Rulemaking Committee

ARC Member Ballot

1. Your Name *

Casey York

2. What member organization are you representing? *

The Boeing Co.

3. Statement of Concurrence/ Non-Concurrence: *

- ☒ I concur with the addendum as written.
- ☐ I concur with the addendum with comment or exception.
- ☐ No, I do not concur with the addendum (**Letter of Dissent must be provided - must be on company letterhead and may not exceed 2 pages in length**)

4. If concurring with comment or exception, please provide comment or exception in the text box below. You may submit a separate paper on company/organization letterhead to becca.fribush@reg-group.com if additional space is required (may not exceed 2 pages in length).

5. As a voting member and full participant of the Investigative Technologies Aviation Rulemaking Committee, I hereby acknowledge that I have reviewed the Addendum and recommendations. My response is recorded on this ballot. Below is my virtual signature. (Please type your full name) *

Casey York

Investigative Technologies Aviation Rulemaking Committee

ARC Member Ballot

1. Your Name *

Lauren Beyer

2. What member organization are you representing? *

Cargo Airline Association

3. Statement of Concurrence/ Non-Concurrence: *

☒

I concur with the addendum as written.

☐

I concur with the addendum with comment or exception.

☐

No, I do not concur with the addendum (**Letter of Dissent must be provided - must be on company letterhead and may not exceed 2 pages in length**)

4. If concurring with comment or exception, please provide comment or exception in the text box below. You may submit a separate paper on company/organization letterhead to becca.fribush@reg-group.com if additional space is required (may not exceed 2 pages in length).

5. As a voting member and full participant of the Investigative Technologies Aviation Rulemaking Committee, I hereby acknowledge that I have reviewed the Addendum and recommendations. My response is recorded on this ballot. Below is my virtual signature. (Please type your full name) *

Lauren Beyer

Investigative Technologies Aviation Rulemaking Committee

ARC Member Ballot

1. Your Name *

Stuart "Kipp" Lau

2. What member organization are you representing? *

Coalition of Airline Pilots Association (CAPA)

3. Statement of Concurrence/ Non-Concurrence: *

- ☒ I concur with the addendum as written.
- ☐ I concur with the addendum with comment or exception.
- ☐ No, I do not concur with the addendum (**Letter of Dissent must be provided - must be on company letterhead and may not exceed 2 pages in length**)

4. If concurring with comment or exception, please provide comment or exception in the text box below. You may submit a separate paper on company/organization letterhead to becca.fribush@reg-group.com if additional space is required (may not exceed 2 pages in length).

5. As a voting member and full participant of the Investigative Technologies Aviation Rulemaking Committee, I hereby acknowledge that I have reviewed the Addendum and recommendations. My response is recorded on this ballot. Below is my virtual signature. (Please type your full name) *

Stuart Lau

Investigative Technologies Aviation Rulemaking Committee

ARC Member Ballot

1. Your Name *

George Paul

2. What member organization are you representing? *

NACA

3. Statement of Concurrence/ Non-Concurrence: *

- ☒ I concur with the addendum as written.
- ☐ I concur with the addendum with comment or exception.
- ☐ No, I do not concur with the addendum (**Letter of Dissent must be provided - must be on company letterhead and may not exceed 2 pages in length**)

4. If concurring with comment or exception, please provide comment or exception in the text box below. You may submit a separate paper on company/organization letterhead to becca.fribush@reg-group.com if additional space is required (may not exceed 2 pages in length).

5. As a voting member and full participant of the Investigative Technologies Aviation Rulemaking Committee, I hereby acknowledge that I have reviewed the Addendum and recommendations. My response is recorded on this ballot. Below is my virtual signature. (Please type your full name) *

George R. Paul

Investigative Technologies Aviation Rulemaking Committee

ARC Member Ballot

1. Your Name *

Doug Carr

2. What member organization are you representing? *

NBAA

3. Statement of Concurrence/ Non-Concurrence: *



I concur with the addendum as written.



I concur with the addendum with comment or exception.



No, I do not concur with the addendum (**Letter of Dissent must be provided - must be on company letterhead and may not exceed 2 pages in length**)

4. If concurring with comment or exception, please provide comment or exception in the text box below. You may submit a separate paper on company/organization letterhead to becca.fribush@reg-group.com if additional space is required (may not exceed 2 pages in length).

5. As a voting member and full participant of the Investigative Technologies Aviation Rulemaking Committee, I hereby acknowledge that I have reviewed the Addendum and recommendations. My response is recorded on this ballot. Below is my virtual signature. (Please type your full name) *

Douglas Carr

Investigative Technologies Aviation Rulemaking Committee

ARC Member Ballot

1. Your Name *

Erik Strickland

2. What member organization are you representing? *

Regional Airline Association

3. Statement of Concurrence/ Non-Concurrence: *

- ☒ I concur with the addendum as written.
- ☐ I concur with the addendum with comment or exception.
- ☐ No, I do not concur with the addendum (**Letter of Dissent must be provided - must be on company letterhead and may not exceed 2 pages in length**)

4. If concurring with comment or exception, please provide comment or exception in the text box below. You may submit a separate paper on company/organization letterhead to becca.fribush@reg-group.com if additional space is required (may not exceed 2 pages in length).

5. As a voting member and full participant of the Investigative Technologies Aviation Rulemaking Committee, I hereby acknowledge that I have reviewed the Addendum and recommendations. My response is recorded on this ballot. Below is my virtual signature. (Please type your full name) *

Erik Strickland

Investigative Technologies Aviation Rulemaking Committee

ARC Member Ballot

1. Your Name *

Chris Hill

2. What member organization are you representing? *

Vertical Aviation International

3. Statement of Concurrence/ Non-Concurrence: *

☒

I concur with the addendum as written.

☐

I concur with the addendum with comment or exception.

☐

No, I do not concur with the addendum (**Letter of Dissent must be provided - must be on company letterhead and may not exceed 2 pages in length**)

4. If concurring with comment or exception, please provide comment or exception in the text box below. You may submit a separate paper on company/organization letterhead to becca.fribush@reg-group.com if additional space is required (may not exceed 2 pages in length).

5. As a voting member and full participant of the Investigative Technologies Aviation Rulemaking Committee, I hereby acknowledge that I have reviewed the Addendum and recommendations. My response is recorded on this ballot. Below is my virtual signature. (Please type your full name) *

Christopher B. Hill