



National Transportation Safety Board

Vehicle Recorder Division

Cockpit Voice Recorder Handbook for Aviation Accident Investigations

Office of Research and Engineering
Office of Aviation Safety
Washington, DC 20594

A Reference for NTSB Staff

FOREWORD

This handbook provides general information to assist the investigator-in-charge, group chairmen, and other National Transportation Safety Board (NTSB) staff who may encounter a cockpit voice recorder (or other audio device that will be treated similarly) during the course of an aviation accident investigation. It provides guidance on the procedures, laws, and standard practices surrounding the cockpit voice recorder and its audio data within an investigation.

The Vehicle Recorder Division (RE-40) will be responsible for keeping this handbook updated. The handbook's revision date will be indicated in the upper left corner of each page. Although the intent of the handbook is to provide guidance for handling a cockpit voice recorder and its data, the handbook may not cover all situations, and any staff questions or concerns may be directed to the chief of the Vehicle Recorder Division (RE-40) for immediate assistance.

This handbook is intended to provide information and guidance to NTSB employees who are involved in the cockpit voice recorder portion of an aviation accident investigation. This handbook is not regulatory in nature and does not create any rights in any of the parties to an NTSB investigation or any other person. Deviation from the guidance offered in this handbook will at times be necessary to meet the specific needs of an investigation.

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1 Director Authority

- 1.1. The directors of the Offices of Research and Engineering and Aviation Safety, in consultation with the Office of General Counsel, as appropriate, have the discretion to grant approval for exceptions to the cockpit voice recorder (CVR) standard practices and procedures.

2 Applicable Recorded Audio Data

- 2.1. A CVR is a crash protected flight recorder installed on board an aircraft that contains a recording of the audio in the flight deck. The recording media may be digital memory or magnetic tape. The guidelines in this handbook referring to CVR audio or recordings do not necessarily apply to other non-audio types of data that may be stored in the same physical recording unit, such as datalink information or flight data recordings, as part of a combination recorder installation.
- 2.2. This handbook provides guidance on the procedures, laws, and standard practices regarding CVRs and CVR recordings and may be generally applicable to any and all audio that is recorded on board an aircraft. Any audio recording that is recovered from an aircraft following an accident or incident is initially given the same protection and security of a CVR or CVR recording.
- 2.3. National Transportation Safety Board (NTSB) on-scene staff shall secure any device that they reasonably believe may record audio found within the cockpit installed in the aircraft. Devices that record audio include but are not limited to camcorders, video recorders/cameras, digital cameras, personal electronic devices, handheld tape recorders, personal digital audio recorders, and flight test equipment. If a CVR was installed on an accident aircraft, any magnetic tape or digital memory chips found in the wreckage could contain recorded audio and shall be secured by NTSB staff.
- 2.4. Audio from alternate audio devices shall not be read out or played on scene and the equipment or recording medium shall be secured by the NTSB to prevent read-out or damage.
- 2.5. In the event that audio from an alternate audio device is recovered, the investigator-in-charge (IIC) shall immediately contact the chief of the Vehicle Recorder Division (RE-40) for guidance.

3 CVR Recording Disclosure and Access

- 3.1. CVR recordings and transcripts contain highly sensitive material, and premature or unauthorized release of information by NTSB employees is grounds for disciplinary action. All NTSB staff and Members who obtain information concerning the contents of a CVR recording or written transcript, regardless of reason or source, are bound by

federal CVR nondisclosure laws (refer to 49 *United States Code (USC)* Section 1114(c)–*Disclosure, availability, and use of information*).

- 3.2. The CVR specialist, the directors of the Offices of Research and Engineering and Aviation Safety, and the IIC are the only staff automatically authorized to listen to a CVR recording.
- 3.3. The CVR specialist assigned to the accident ordinarily has complete access to the CVR recording, data, and information at all times. Other NTSB recorder specialists may be called upon to assist with a CVR recording, when necessary.

4 CVR Recorder Recovery: From On Scene to the NTSB Laboratory

- 4.1. Upon notification of an accident or incident in which a CVR is installed on the aircraft, the IIC shall attempt to ensure that the CVR has been deactivated as soon as possible by pulling the circuit breaker or by other appropriate means, in consultation with the operator's director of safety.
- 4.2. The IIC should consider whether the CVR might contain information relevant to the investigation, taking into consideration that the CVR can be 30 minutes or 2 hours in duration. It is possible for the events from an accident or incident to be overwritten when power is applied to the aircraft for an extended time following an event (through its own power or external power). However, some aircraft have an automatic shutoff logic that removes power to the CVR (even if the aircraft remains powered). With a CVR part number, the Vehicle Recorder Division (RE-40) may assist in determining the duration of a CVR installed.
- 4.3. The CVR shall not be read out or played on scene or at the operator's facility. The CVR shall not be opened and the recording medium shall not be removed until it reaches the Recorder Laboratory at NTSB headquarters.
- 4.4. The CVR must be shipped to NTSB headquarters in a manner that protects it from damage (that is, inside a cardboard or wooden box, wrapped in either foam or bubble-wrap or in a container filled with foam peanuts).
- 4.5. If the CVR is recovered in water, it shall immediately be packed in water (fresh, if possible) and not be allowed to dry out. Packaging may be accomplished by sealing the recorder (in water) inside a plastic beverage container with silicon adhesive or a similar sealant.
- 4.6. If there is a possibility of biohazard contamination material being present on the equipment, the IIC shall notify the chief of the Vehicle Recorder Division (RE-40) before shipping and the package should be marked accordingly.
- 4.7. The IIC should attempt to ensure that the underwater locator beacon (ULB) is removed and properly disposed of or returned to the operator prior to shipping. If the ULB cannot be disposed of or returned, contact the chief of the Vehicle Recorder Division (RE-40) for guidance.

- 4.8. The IIC shall contact the chief of the Vehicle Recorder Division (RE-40) to coordinate the shipment of the CVR to NTSB headquarters. The Recorder Laboratory Request form should be included in the shipment and forwarded electronically to the chief of the Vehicle Recorder Division (RE-40).
- 4.9. The CVR may be sent to Washington on board a commercial airplane. This usually needs to be coordinated with the captain of the flight. The IIC must also arrange for NTSB headquarters staff to meet the arriving flight. If necessary, the CVR shall be packaged appropriately.
- 4.10. Preliminary accident information, the recorder model, the recorder serial number, and the recorder condition shall be sent as soon as available to the chief of the Vehicle Recorder Division (RE-40). If the unit has sustained damage, photographs and a description of the extent of the damage should be included as well as relevant information such as the duration and intensity of fire, if known. If possible, the recorders should be photographed before they are removed from the wreckage, and those photographs should be included in the correspondence. The IIC is responsible for complying with appropriate evidence control procedures for all items sent to the Recorder Laboratory in accordance with NTSB evidence management policy.

5 CVR Arrival at the NTSB Laboratory

- 5.1. The chief of the Vehicle Recorder Division (RE-40) assigns the CVR to a CVR specialist.
- 5.2. The CVR specialist is responsible for handling and securing the CVR, the original recording medium, and any copies.
- 5.3. The CVR specialist is responsible for extracting the recording from the CVR using the appropriate procedures, tools, and equipment. This is not ordinarily a group activity.
- 5.4. During the recovery, the recording is copied in its entirety from the original media without alterations or filters. This task is accomplished prior to the initial audition and is not ordinarily a group activity.
- 5.5. The CVR recording (original or copy) shall not be brought to any other facility for investigative work without the specific approval from the directors of the Offices of Research and Engineering and Aviation Safety.
- 5.6. The CVR specialist checks the recording to determine if useable audio information has been recorded (CVRs may be erased or overwritten or may malfunction and contain no useable audio). Useable audio is defined as any audio that is recorded by the CVR that may assist the investigation, and includes, but is not limited to the accident events, preaccident or postaccident activities or discussions, and aircraft noises and environmental sounds.

- 5.7. The CVR specialist notifies the chief of the Vehicle Recorder Division (RE-40) of the condition of the audio in the recording who will notify the directors of the Offices of Research and Engineering and Aviation Safety, as necessary.
- 5.8. The CVR specialist shall ensure that the recording is backed up on the appropriate laboratory server.
- 5.9. Although most subsequent audio work is accomplished using the digital copy of the original recording, the original recording may be used, if necessary.

6 CVR Initial Audition

- 6.1. If the recording contains useable audio, the CVR specialist conducts an initial audition with the directors of the Offices of Research and Engineering and Aviation Safety (or their designees). The purpose of the initial audition is to do the following:
 - 6.1.1. Convey any critical information that might assist in the field phase of the investigation to the IIC and other appropriate on-scene staff.
 - 6.1.2. Determine whether a CVR group should be convened. This decision shall be made in consultation with the IIC.
 - 6.1.3. Determine the scope of the resulting CVR product. The directors of the Offices of Research and Engineering and Aviation Safety will determine what portion of the recording will be documented and whether a transcription of the recording or a summary will be produced. These decisions shall be made in consultation with the IIC.
- 6.2. The briefing for the IIC shall be held directly over a landline telephone or an NTSB issued mobile phone and not routed through a conferencing facility. The CVR recording shall never be played over the telephone nor its contents transferred via email.

7 Planning the CVR Group Meeting

- 7.1. If a CVR group is to be formed, the IIC must coordinate with the recorder specialist to select a date for a recorder group meeting at NTSB headquarters in Washington, DC. The group meeting does not necessarily occur immediately after the recorder is sent to headquarters. The CVR specialist is the group chairman for the CVR portion of the investigation and shall be included in any correspondence and discussions that pertain to all group chairmen participating in the investigation.
- 7.2. The IIC shall notify the party coordinators that a recorder group is convening and request proposed group members. These representatives must be available from the beginning of the recorder group activities and for the anticipated duration of the recorder group work. Substitutions are generally not permitted once the group begins its work, and the entire group must participate for the duration of the work. The IIC must ensure

- that only parties that can provide a technical contribution to the CVR group are invited. The Federal Aviation Administration (FAA) must be invited and typically the airframe manufacturer, pilot union, and operator are also invited. Ordinarily, only one representative per party is on the CVR group. The CVR group should include at least one pilot typed or current in the accident aircraft model. Typically, other individuals on the CVR group include those familiar with the crew's voices, aircraft operations, and company procedures. The party coordinator is not automatically qualified to be a CVR group member.
- 7.3. The accident/incident flight crew may not participate on the CVR group.
 - 7.4. The IIC must provide the name, affiliation, position, and other information relevant to the proposed group member's technical qualification for the CVR group. The directors of the Offices of Aviation Safety and Research and Engineering must approve the proposed party representatives.
 - 7.5. The time to transcribe a CVR varies depending on the scope of the investigation and will likely take more than 1 day. Longer recorders and more complex investigations may take several days.
 - 7.6. For a regional investigation, if the FAA's regional flight standards district office representative is unavailable for the CVR group meeting, the IIC shall contact the FAA's Accident Investigation and Prevention Division (AVP-100 at FAA headquarters) as soon as possible. An AVP-100 investigator is assigned to represent the FAA or the FAA may choose to decline participation. The CVR group chairman shall contact the AVP-100 division before the day of the group meeting to ensure that they have been notified of the CVR group activities.
 - 7.7. The IIC may attend the CVR group meeting, but his or her presence is not required.
 - 7.8. If any or all of the parties decline to participate in the recorder group, the NTSB will still extract necessary factual information and issue a factual report

8 The CVR Group Meeting

- 8.1. The recorder group chairman's primary role is to lead the CVR group. The group chairman will also provide technical expertise in handling the audio recording and equipment and facilitate the extraction of factual data as well as focus group activities during the meeting.
- 8.2. The CVR group chairman shall explain the CVR disclosure laws and policies. In particular, CVR group members are prohibited from releasing CVR information to the public. However, the NTSB may decide to publicly release information regarding CVR activity.
- 8.3. CVR disclosure policy does not prohibit a party from implementing safety-of-flight related changes within its organization as a result of its participation in a CVR group, however, the NTSB requires approval by the IIC and the directors of the Offices of

- Research and Engineering and Aviation Safety of the subject matter prior to any disclosure of CVR information to the group member's organization. It is the CVR group member's responsibility to notify the CVR group chairman prior to disclosure. Disclosure of information to a group member's respective organization shall include only information that is directly related to safety. At no time shall CVR remarks, comments, or conversations be disclosed to any person, party, or organization.
- 8.4. The group members must sign the CVR Audition Log, *CVR Nondisclosure Agreement*, and *Statement of Party Representatives to NTSB Investigation* (see attached). The FAA does not sign the party representative form.
 - 8.5. Quotes and statements from the CVR recording are prohibited from being discussed with anyone—except the CVR group members during the CVR group meeting.
 - 8.6. Group members on a break shall not discuss the CVR or its contents while away from the CVR listening room.
 - 8.7. At the beginning of the CVR group meeting, before starting the transcription process, the CVR group chairman should play the recording in its entirety without stopping.
 - 8.8. The CVR group is a tool to help in the investigation. Only the facts (that is, words and sounds) are to be ascertained by the group—no analysis or interpretation shall be introduced into the transcript.
 - 8.9. Any notes taken during the meeting are collected by the CVR group chairman at the end of the group meeting and destroyed. No notes shall be taken out of the CVR listening room.
 - 8.10. During group activities, mobile devices may be used for reference to electronic manuals, charts, and so on. Group members may not text or make phone calls on their devices. Storage lockers are available for mobile devices in the Recorder Laboratory.
 - 8.11. The CVR group chairman, in coordination with the directors of the Offices of Research and Engineering and Aviation Safety, has the right to excuse any member who is disruptive to the process or is in violation of the CVR nondisclosure policies and laws.
 - 8.12. The CVR group chairman shall keep the IIC and the directors of the Offices of Research and Engineering and Aviation Safety apprised of the CVR group activities.
 - 8.13. The CVR group may reconvene at a later date at the request of the CVR group chairman. The decision to reconvene the group must be authorized by the IIC and the directors of the Offices of Research and Engineering and Aviation Safety.
 - 8.14. If the CVR group reconvenes, all members must be invited to return, but may decline the invitation. Except in extenuating circumstances, substitutes are not allowed during a reconvening of a CVR group. Approval for a substitute must be obtained in advance from the directors of the Offices of Research and Engineering and Aviation Safety, via the CVR group chairman.

- 8.15. The individual group members may only listen to the CVR recording in a group setting.

9 CVR Transcription

- 9.1. The CVR group transcribes or summarizes the recording as approved by the directors of the Offices of Research and Engineering and Aviation Safety in consultation with the IIC.
- 9.2. A transcript is a chronological transcription of audio events at the specific time they occur and includes the source of each event. A summary is an overview description of events in the audio recording and may include timing of select audio events and/or limited direct quotes.
- 9.3. The group strives for consensus in factually documenting audio events. In discerning an audio event, if a disagreement arises among the group members, the differing observations may be documented in the transcript. Inclusion of differing observations within the final product is at the discretion of the directors of the Offices of Research and Engineering and Aviation Safety.
- 9.4. Non-verbal audio and other CVR noise events that are distinctly identifiable are noted as “sound similar to...” within the transcript. Typical noise events identified in a transcript include engine sounds, crew seat movement, windshield wiper motors, and aircraft aural warnings. Latched/detent handle movement, such as flaps, slats and gear handles, are sometimes generically identified as a “sound similar to latched/detent handle movement.” Care shall be exercised when associating generic noises, such as clicks, clacks, and thumps, with a specific action or event. In general, any noise, or series of noises, associated with a specific event or action must be distinctive and readily identifiable by itself out of context from the CVR recording.
- 9.5. It is possible for an audio event to be recorded on several channels by several microphone sources. The sound source identified in the transcript is the source with the clearest audio.
- 9.6. All conversation recorded (within the portions of the recording specified by the directors and the IIC prior to the group meeting) is transcribed for the draft sent to the directors of the Offices of Research and Engineering and Aviation Safety. The CVR group does not decide the relevance of crew conversation. The directors of the Offices of Research and Engineering and Aviation Safety will evaluate the transcript for any non-pertinent conversation.
- 9.7. The transcript is punctuated and formatted to standard NTSB transcript style.
- 9.8. All draft paper copies of the CVR factual report, transcript, or summary, shall have the appropriate Coversheet for CVR Factual Report/Transcript and Review Log (see attachment B) attached, until the report is placed in the public docket. Aside from minor editorial corrections by the CVR specialist, any significant changes to the transcript

require group consultation and consensus via telephone or through reconvening the CVR group at NTSB headquarters.

- 9.9. The transcript timestamps may be correlated to the local or UTC time of the accident or any other appropriate correlation data point as determined by the recorder specialist. If applicable, the timing and correlation is coordinated with other NTSB group chairmen involved in the investigation. Ordinarily, timing and correlation is not a group activity.

10 The CVR Factual Report

- 10.1. The CVR factual report typically contains information about the CVR type, operation, damage, recording extraction methods, audio quality (see attached *CVR Quality Rating Scale*), and a summary of transcribed audio events.
- 10.2. If a CVR group convenes to prepare a transcript, the transcript is attached to the CVR factual report.
- 10.3. The directors of the Offices of Research and Engineering and Aviation Safety, or their designees, review the factual report and/or transcript. Any non-pertinent or expletive remarks or conversations may be edited or deleted from the transcript, and appropriately annotated, as deemed necessary by the directors of the Offices of Research and Engineering and Aviation Safety, before public release.
- 10.4. All notes, preliminary transcript drafts, and copies are destroyed when the content of the CVR transcript has been finalized.

11 Sound Spectrum Study

- 11.1. A CVR Sound Spectrum Study, which is a separate investigative effort from the CVR group, may also be conducted if necessary. This type of study reviews the frequency and energy content of the audio, which under ideal conditions, can be used to determine information about engine speeds, gear mesh noises, airplane groundspeed, and many other characteristics. The IIC, in consultation with the chief of the Vehicle Recorder Division (RE-40), will determine if a Sound Spectrum Study effort will be conducted.
- 11.2. The chief of the Vehicle Recorder Division (RE-40) will assign a recorder specialist to perform the study. This specialist may not necessarily be the same individual as the CVR specialist.
- 11.3. Sound Spectrum studies are often conducted as independent efforts by the recorder specialist. However, a group may be formed if additional technical expertise is necessary. Party representatives that can provide a technical contribution may be assigned to the CVR Sound Spectrum group and this may be a different party representative than the one on the CVR group. The party coordinator is not automatically qualified to be a recorder group member. Proposed party members must be

approved by the directors of the Offices of Research and Engineering and Aviation Safety.

- 11.4. If any or all parties decline to participate in the Sound Spectrum group, the NTSB will still extract necessary information and issue a report.

12 NTSB Staff CVR Review and Official Use of CVR Data

- 12.1. All NTSB staff and Members who obtain information concerning the contents of a CVR recording or written transcript, regardless of reason or source, are bound by federal CVR nondisclosure laws.
- 12.2. The directors of the Offices of Research and Engineering and Aviation Safety, in coordination with the chief of the Vehicle Recorder Division (RE-40), will coordinate requests for Board Members and their special assistants, to review CVR recordings immediately prior to the public release of the CVR transcript, or in preparation for Board Meetings at which the accident report involving that CVR recording will be discussed.
- 12.3. All NTSB staff are required to have approval from the IIC and the directors of the Offices of Research and Engineering and Aviation Safety prior to reviewing a CVR recording, a CVR transcript, or CVR notes.
 - 12.3.1. Staff should forward their request to the CVR group chairman stating their role in the investigation, why access is needed, and the level of access required (recording or transcript). If a group is planned, but has not yet occurred, additional justification for access prior to the group activity should be included in the request.
 - 12.3.2. If the IIC approves, the CVR group chairman will add information regarding the accident including an accident synopsis and the status of the transcript and the docket. The CVR group chairman will then forward the request to the directors of the Offices of Research and Engineering and Aviation Safety for approval.
 - 12.3.3. Approval to listen to the recording during subsequent review sessions is covered by the initial approval.
- 12.4. All Board Members and staff are required to sign the CVR Audition Log before each audition.
- 12.5. The IIC and other authorized staff may review the transcript, but at no time may any of the information from the CVR recording, notes, or written transcript be shared with or distributed (verbally or in writing) to the party members or unauthorized staff until the public release of the CVR factual report with transcript.
- 12.6. Notes may not be taken from the CVR listening room without authorization from the directors of the Offices of Research and Engineering and Aviation Safety. Notes may be secured by the CVR specialist or destroyed.

- 12.7. A paraphrased version of the CVR transcript (or portion thereof) for the purposes of data or time correlation, overlaying on an engineering animation, or gathering additional information may be formulated for use during the course of the investigation. The directors of the Offices of Research and Engineering and Aviation Safety must approve this information and will dictate who has access to it and how it shall be distributed. Electronic transfer of this information may be approved.
- 12.8. To the extent possible, the transcript shall not leave the CVR listening room prior to public release, except in the following instances:
 - 12.8.1. With approval from the directors of the Offices of Research and Engineering and Aviation Safety, and in consultation with the IIC and CVR group chairman, authorized staff may recreate portions of the CVR recording or transcript, in their report, as necessary for the investigation.
 - 12.8.2. Staff must obtain explicit approval from the directors of the Offices of Research and Engineering and Aviation Safety to take CVR notes or portions of the transcript outside of the CVR listening room. At all times, the authorized staff must ensure the security of CVR-related portions of their reports and CVR notes. When finished with any CVR notes, the notes shall be returned to the CVR group chairman for storage or destruction.
 - 12.8.3. No unauthorized copies of the CVR factual report or CVR transcript shall be made. An authorized copy may be given to NTSB staff on a case-by-case basis with explicit written approval from the directors of the Offices of Research and Engineering and Aviation Safety. Under no circumstances will electronic copies be transmitted. The CVR group chairman shall clearly mark the authorized copy to indicate that it is a draft copy or a copy of the final prereleased report. The transcript must be marked “DUPLICATE” or “COPY,” indicating that it is not the original. A coversheet shall be attached to the report or transcript (see attached *Coversheet for CVR Factual Report/Transcript and Review Log*) and the authorized staff shall sign the coversheet’s review log. The coversheet must also clearly indicate that the copy must be returned to the CVR group chairman. The name of the NTSB staff that has been authorized to use the copy must also be clearly stated on the coversheet. The copy must be returned to the CVR group chairman for destruction.
- 12.9. Staff may only use quotes from a transcript in their factual reports after the transcript has been placed in the public docket. To facilitate internal and party review of group chairman or IIC draft factual reports, the directors of the Offices of Research and Engineering and Aviation Safety may approve paraphrased text to be used in lieu of direct quotes from the transcript. Paraphrased sections in draft reports can be replaced with direct quotes when the transcript is released to the public.

13 Regional Investigations: Receipt of Factual Report with a Transcript—Prior to Public Release

- 13.1. After the report review process, the CVR specialist may release the factual report with transcript to the IIC upon notification to IIC's regional chief, deputy regional chief, and chief of the Vehicle Recorder Division (RE-40). A coversheet shall be attached to the factual report and transcript (see attached *Coversheet for CVR Factual Report/Transcript*).
- 13.2. The report shall be mailed in a sealed envelope, using a shipping service that has tracking capabilities, directly to the regional IIC.
- 13.3. The IIC is required to provide an anticipated return date for the factual report to the recorder specialist as soon as possible after receipt of the transcript.
- 13.4. It is the IIC's responsibility to ensure that the written transcript is physically secured (that is, it is stored in a locked file cabinet).
- 13.5. The IIC may refer to the CVR transcript in the preparation of the factual report, but at no time may any of the information contained in the written transcript be shared or distributed to the party members until public release.
- 13.6. No unauthorized copies of the transcript shall be made.
- 13.7. It is the responsibility of the regional chief to ensure that the docket containing the CVR factual report is officially opened to the public prior to the transmission of any draft factual report containing CVR content for party or headquarters review.
- 13.8. The IIC is required to return the CVR factual report to the recorder specialist upon completion of use. The transcript shall be mailed in a sealed envelope, using a shipping service that has tracking capabilities, directly to the recorder specialist. Notification of the release shall be sent to the recorder specialist with the tracking details indicating its return and notifying the regional chief, deputy regional chief, and chief of the Vehicle Recorder Division (RE-40).

14 Public Release of the CVR Factual Report and Transcript

- 14.1. After the report review process, the CVR specialist maintains the security of the factual report and transcript. The release of the factual report with transcript into the public docket is coordinated through the recorder specialist, the chief of the Vehicle Recorder Division (RE-40) and the IIC. The CVR factual report will not be placed into the docket management system (DMS) until the majority of the factual reports are ready to be publically released. The recorder specialist will place a placeholder in DMS as soon as practical after the initial audition. The placeholder will remain in DMS until it is replaced by the CVR factual report immediately before the report is released to the public. (See *Docket Management System CVR Report Placeholder*.)

- 14.2. For the case of a CVR factual report without an attached transcript, the factual report may be released to the IIC after the report review process. This report may be placed in DMS at any time prior to the docket's release to the public.
- 14.3. Per 49 USC Section 1114(c), a factual report with a transcript is released to the public only under the following circumstances (see 49 USC Section 1114(c)—*Disclosure, availability, and use of information*).
 - 14.3.1. In the event that a public hearing is held, the CVR factual report with the attached transcript shall be released into the public docket at the time of the public hearing. The general public, including parties to the investigation, may not receive the CVR transcript prior to the time of the public hearing.
 - 14.3.2. In the event that a public hearing is not held, the CVR factual report is released into the public docket only when the majority of the factual reports are placed into the docket. The general public, including parties to the investigation, may not receive the CVR transcript prior to the time the transcript is placed into the public docket.
- 14.4. The CVR factual report with transcript may be sent to the party coordinators at the time of public release.

15 Flight Crew and Other CVR Review

- 15.1. The IIC is responsible for notifying the accident/incident flight crew of the opportunity to listen to the recording and review the CVR product. The crew review is a courtesy extended to the crew; it is not a requirement.
- 15.2. A recorder specialist will supervise the crew's review of the CVR recording and transcript.
- 15.3. After the crew's review, additions or changes shall not be made to the CVR transcript. Changes or comments from the crew may be noted in the CVR factual report.
- 15.4. A CVR group member may be permitted to accompany a crewmember during the CVR review, if requested by the crewmember.
- 15.5. Any notes taken during the CVR review are collected by the recorder specialist. No copy of the transcript or notes shall leave the CVR listening room.
- 15.6. All individuals who review a CVR recording are required to sign the CVR Audition Log.
- 15.7. At the crewmember's discretion, each crewmember may listen separately or together.
- 15.8. All other non-NTSB staff provided the opportunity to listen to a CVR recording must obtain explicit approval from the directors of the Offices of Research and Engineering and Aviation Safety.

- 15.9. Any individual, including a crewmember, who reviews a CVR recording must sign the CVR Nondisclosure Agreement form (attachment B).

16 Release of the Recorder and Audio Recording

- 16.1. The IIC shall supply the CVR specialist with the recorder's return organization and address. Ordinarily with minor accidents and incidents, the owner/operator at the time of the accident or incident is the rightful return organization. However, there are instances when the rightful return organization is less apparent, such as when the insurance company has control of the wreckage, or there are fractional owners, or if the aircraft is leased. If there is uncertainty regarding the proper return organization, the IIC and CVR specialist shall consult with the NTSB General Counsel, who can resolve any issues regarding who shall receive the CVR and original CVR recording.
- 16.2. The CVR unit—without the original recording medium—may be returned to the owner (or authorized recipient) after the recorder specialist determines that there are no issues related to its operation.
- 16.3. Typically with a solid-state recorder, the actual recording unit and its memory cannot be easily separated. Therefore, the entire CVR is considered the original recording medium.
- 16.4. It is possible that the return organization for the CVR unit (the recorder box) is not the same organization that shall receive the original CVR recording medium.
- 16.5. The original recording medium shall not be released until the probable cause has been issued or the investigation is otherwise completed or as authorized by the directors of the Offices of Research and Engineering and Aviation Safety on a case-by-case basis.
- 16.6. Prior to returning an original recording medium, the CVR specialist must obtain specific approval from the directors of the Offices of Research and Engineering and Aviation Safety. The CVR specialist shall notify the IIC of its return.
- 16.7. The recorder specialist will use a shipping method that allows tracking and is in accordance with NTSB evidence collection and management policy.
- 16.8. Copies of the CVR recording shall not be released to the owner, or any other party without the approval of the directors of the Offices of Research and Engineering and Aviation Safety, in consultation with the Office of General Counsel, as appropriate.

17 Military Investigations or Other Federal Agencies

- 17.1. On occasion the NTSB is asked to assist with the recovery and read out of a CVR involved in a military or other federal accident investigation. The specific tasks requested by the military or federal agency are evaluated by the directors of the Offices of Research and Engineering and Aviation Safety, who will determine the scope of the assistance to be provided by the Vehicle Recorder Division (RE-40). The CVR specialist

may download the CVR, produce audio copies of the recording, perform a sound spectrum study, prepare a transcript, or run a CVR group.

- 17.2. Normally, the original and copies of the recording and reports are returned to the investigating agency. The NTSB will not generally retain any copies.

18 NTSB Led Investigation with Foreign Representatives

- 18.1. When the NTSB conducts an investigation that involves a foreign operator/manufacturer, NTSB CVR procedures and policies will apply.
- 18.2. If a CVR group will convene, the IIC shall identify to the CVR specialist the proposed participants from the foreign government and their technical advisors to avoid unauthorized access to the recording or written transcript. Proposed participants are subject to approval by the directors of the Offices of Research and Engineering and Aviation Safety prior to the CVR group meeting.
- 18.3. The NTSB and the French *Bureau d'Enquêtes et d'Analyses* (BEA) have a Memorandum of Agreement that defines the cooperation between the two countries (see attached *NTSB and BEA Memorandum of Agreement*).

19 Foreign Led Investigations with NTSB Participation or Assistance

- 19.1. Under International Civil Aviation Organization Annex 13, when the NTSB is asked to participate or assist in an investigation that is conducted by a foreign government, the NTSB laboratory may be used for the CVR portion of the investigation.
- 19.2. If the NTSB assists a foreign government in its accident investigation and the services of a CVR specialist are required, the NTSB's accredited representative shall coordinate the requested services through the directors of the Offices of Research and Engineering and Aviation Safety. Assistance in the CVR portion of a foreign investigation may include downloading the CVR, producing audio copies of the recording, preparing a transcript, or running a CVR group.
- 19.3. Any subsequent sound spectrum analysis of the CVR recording shall be arranged through the NTSB's accredited representative in consultation with the Director of Research and Engineering. Sound spectrum work may require additional NTSB staff and resources, and it shall not be assumed that the work is automatically included as part of the CVR activities.
- 19.4. The point of contact for the foreign investigation (the IIC or the designee) is introduced to the CVR specialist. It shall be made clear to all participants involved with the CVR activities that the CVR specialist shall only be coordinating with the foreign government through the individual designated as the point of contact.

- 19.5. The NTSB accredited representative shall identify to the CVR specialist the participants from the foreign government and their technical advisors to avoid unauthorized access to the recording or written transcript.
- 19.6. The CVR specialist shall keep the NTSB's accredited representative and the foreign government's IIC or designee apprised of any CVR activities or actions.
- 19.7. When assisting in a foreign government's investigation, the CVR specialist may inform the investigating government's IIC or designee of the CVR policies and procedures that are used by the NTSB. However, if the foreign government wishes to use its own policies or procedures, the CVR specialist shall try to comply. In the absence of specific guidance from the investigating government, pertinent NTSB CVR standard practices and procedures apply.
- 19.8. The foreign government's IIC may decide to develop a transcript in its own language and may or may not choose to do an English translation.
- 19.9. Generally, the investigating government may require a brief report of procedures performed, along with a written transcript of the CVR recording, if applicable.
- 19.10. Access to audio copies, written transcripts, and reports is at the discretion of the foreign government's IIC.
- 19.11. The original recording and recorder shall be returned to the foreign government's IIC or designee. The NTSB shall not retain copies of the CVR recording.
- 19.12. The NTSB accredited representative is responsible for coordinating logistics for foreign officials outside of CVR group activities. The NTSB and the French (BEA) have a memorandum of agreement that defines the cooperation between the two countries (see attached *NTSB and BEA Memorandum of Agreement*).

**ATTACHMENT A: Statement of Party Representatives to
NTSB Investigation**



NTSB Investigation No. _____

Date of Accident: _____

Accident Location: _____

CERTIFICATION OF PARTY REPRESENTATIVE¹

I acknowledge that I am participating in the above-referenced accident or incident investigation, on behalf of my employer who has been named a party to the National Transportation Safety Board (NTSB) safety investigation, for the purpose of providing technical assistance to the NTSB’s evidence documentation and fact-finding activities. I understand that as a party participant, I and my organization shall be responsive to the direction of NTSB personnel and may lose party status for conduct that is prejudicial to the investigation or inconsistent with NTSB policies or instructions. No information pertaining to the accident, or in any manner relevant to the investigation, may be withheld from the NTSB by any party or party participant.

I further acknowledge that I have familiarized myself with the attached copies of the NTSB Accident/Incident Investigation Procedures (49 C.F.R. Part 831) and “Information and Guidance for Parties to NTSB Accident and Incident Investigations,” and will comply, and, if the party coordinator for my party, take all reasonable steps to ensure that the employees and participants of my organization comply, with these requirements.. This includes, but is not limited to, the provisions of 49 C.F.R. §§ 831.11 and 831.13, which, respectively, specify certain criteria for participation in NTSB investigations and limitations on the dissemination of investigation information.

No party coordinator or representative may occupy a legal position or be a person who also represents claimants or insurers. I certify that my participation is not on behalf of either claimants or insurers, and that, although factual information obtained as a result of participating in the NTSB investigation may ultimately be used in litigation (at the appropriate time, and in a manner that is not inconsistent with the provisions of 49 C.F.R. § 831.13 and 49 U.S.C. § 1154), my participation is to assist the NTSB safety investigation and not for the purposes of preparing for litigation. I also certify that, after the NTSB Investigator-in-Charge (IIC) releases the parties and party participants from the restrictions on dissemination of investigative information specified in 49 C.F.R. § 831.13, neither I nor my party’s organization will in any way assert in civil litigation arising out of the accident any claim of privilege for information or records received as a result of my participation in the NTSB investigation.

Signature

Date

Name & Title

Party Organization/Employer

¹ In aviation investigations this form may also be referred to as “Statement of Party Representatives to NTSB Investigation.”

ATTACHMENT B: CVR Nondisclosure Agreement

831.11 Parties to the investigation.

(a) *All Investigations, regardless of mode.* (1) The investigator-in-charge designates parties to participate in the investigation. Parties shall be limited to those persons, government agencies, companies, and associations whose employees, functions, activities, or products were involved in the accident or incident and who can provide suitable qualified technical personnel actively to assist in the investigation. Other than the FAA in aviation cases, no other entity is afforded the right to participate in Board investigations.

(2) Participants in the investigation (*i.e.*, party representatives, party coordinators, and/or the larger party organization) shall be responsive to the direction of Board representatives and may lose party status if they do not comply with their assigned duties and activity proscriptions or instructions, or if they conduct themselves in a manner prejudicial to the investigation.

(3) No party to the investigation shall be represented in any aspect of the NTSB investigation by any person who also represents claimants or insurers. No party representative may occupy a legal position (see §845.13 of this chapter). Failure to comply with these provisions may result in sanctions, including loss of status as a party.

(4) Title 49, United States Code §1132 provides for the appropriate participation of the FAA in Board investigations, and §1131(a)(2) provides for such participation by other departments, agencies, or instrumentalities. The FAA and those other entities that meet the requirements of paragraph (a)(1) of this section will be parties to the investigation with the same rights and privileges and subject to the same limitations as other parties, provided however that representatives of the FAA need not sign the “Statement of Party Representatives to NTSB Investigation” (see paragraph (b) of this section).

(b) *Aviation investigations.* In addition to compliance with the provisions of paragraph (a) of this section, and to assist in ensuring complete understanding of the requirements and limitations of party status, all party representatives in aviation investigations shall sign “Statement of Party Representatives to NTSB Investigation” immediately upon attaining party representative status. Failure timely to sign that statement may result in sanctions, including loss of status as a party.

831.13 Flow and dissemination of accident or incident information.

(a) Release of information during the field investigation, particularly at the accident scene, shall be limited to factual developments, and shall be made only through the Board Member present at the accident scene, the representative of the Board's Office of Public Affairs, or the investigator-in-charge.

(b) All information concerning the accident or incident obtained by any person or organization participating in the investigation shall be passed to the IIC through appropriate channels before being provided to any individual outside the investigation. Parties to the investigation may relay to their respective organizations information necessary for purposes of prevention or remedial action. However, no information concerning the accident or incident may be released to any person not a party representative to the investigation (including non-party representative employees of the party organization) before initial release by the Safety Board without prior consultation and approval of the IIC.

**ATTACHMENT C: Coversheet for CVR Factual
Report/Transcript and Review Log**

CVR Factual and Transcript

DO NOT LEAVE UNATTENDED

RETURN TO: CVR Group Chairman: _____ PHONE: _____

NTSB Accident Number: _____ IIC: _____

CVR DRAFT REPORT AND TRANSCRIPT TRACKING:								_____ Hours to Complete			
DRAFT				FINAL				<input type="checkbox"/> Review delegated to RE40			
Routing Symbol	Author					Routing Symbol	RE40	RE1	AS1	RE40	
Date						Date					
Initials						Initials					

CVR Transcript Review Log

Prior to public release of this CVR report/transcript, the following procedures are applicable:

- **THIS DOCUMENT IS FOR OFFICIAL USE ONLY. DUPLICATION IS PROHIBITED.**
- ACCESS TO THIS TRANSCRIPT SHALL BE AUTHORIZED ONLY BY AS-1 AND RE-1.
- THIS DOCUMENT IS NOT TO BE LEFT UNSECURED OR UNATTENDED.
- THE CVR GROUP CHAIRMAN IS RESPONSIBLE FOR KEEPING THIS TRANSCRIPT SECURE. THE INVESTIGATOR-IN-CHARGE OR OTHER NTSB STAFF AUTHORIZED BY AS-1 AND RE-1 MAY TEMPORARILY CHECK OUT THIS DOCUMENT FROM THE CVR GROUP CHAIRMAN AFTER SIGNING THE REVIEW LOG.
- A TRANSCRIPT REVIEW LOG SHALL BE MAINTAINED TO RECORD WHO HAS HAD ACCESS TO THIS TRANSCRIPT.
- THIS DOCUMENT AND ITS CONTENTS ARE NOT TO BE SHARED WITH ANY UNAUTHORIZED INDIVIDUALS, INCLUDING UNAUTHORIZED SAFETY BOARD STAFF.

Print Name	Signature	Date/Time OUT	Date/Time IN
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

ATTACHMENT D: CVR Quality Rating Scale

CVR Quality Rating Scale

The levels of recording quality are characterized by the following traits of the cockpit voice recorder (CVR) information:

- | | |
|--------------------------|---|
| Excellent Quality | Virtually all of the crew conversations could be accurately and easily understood. The transcript that was developed may indicate only one or two words that were not intelligible. Any loss in the transcript is usually attributed to simultaneous cockpit/radio transmissions that obscure each other. |
| Good Quality | Most of the crew conversations could be accurately and easily understood. The transcript that was developed may indicate several words or phrases that were not intelligible. Any loss in the transcript can be attributed to minor technical deficiencies or momentary dropouts in the recording system or to a large number of simultaneous cockpit/radio transmissions that obscure each other. |
| Fair Quality | The majority of the crew conversations were intelligible. The transcript that was developed may indicate passages where conversations were unintelligible or fragmented. This type of recording is usually caused by cockpit noise that obscures portions of the voice signals or by a minor electrical or mechanical failure of the CVR system that distorts or obscures the audio information. |
| Poor Quality | Extraordinary means had to be used to make some of the crew conversations intelligible. The transcript that was developed may indicate fragmented phrases and conversations and may indicate extensive passages where conversations were missing or unintelligible. This type of recording is usually caused by a combination of a high cockpit noise level with a low voice signal (poor signal-to-noise ratio) or by a mechanical or electrical failure of the CVR system that severely distorts or obscures the audio information. |
| Unusable | Crew conversations may be discerned, but neither ordinary nor extraordinary means made it possible to develop a meaningful transcript of the conversations. This type of recording is usually caused by an almost total mechanical or electrical failure of the CVR system. |

ATTACHMENT E: Federal CVR Legislation and Regulations

Federal CVR Legislation and Regulations

The following codes are referenced in this section: 49 *USC* Section 1114, 49 *CFR* 831.11, 49 *CFR* 831.13, 14 *CFR* 23.1457, 14 *CFR* 25.1457, 14 *CFR* 27.1457, 14 *CFR* 29.1457, 14 *CFR* 121.359, 14 *CFR* 135.151, 14 *CFR* 91.609, and 49 *USC* Section 1154. **Please check the appropriate sections and codes to obtain current regulations.***

From 49 *USC* Section 1114(c)—Disclosure, availability, and use of information

(c) COCKPIT RECORDINGS AND TRANSCRIPTS.—(1) The Board may not disclose publicly any part of a cockpit voice or video recorder recording or transcript of oral communications by and between flight crew members and ground stations related to an accident or incident investigated by the Board. However, the Board shall make public any part of a transcript or any written depiction of visual information the Board decides is relevant to the accident or incident—

(A) if the Board holds a public hearing on the accident or incident, at the time of the hearing; or

(B) if the Board does not hold a public hearing, at the time a majority of the other factual reports on the accident or incident are placed in the public docket.

(2) This subsection does not prevent the Board from referring at any time to cockpit voice or video recorder information in making safety recommendations.

From 49 *CFR* 831.11—Parties to the investigation

(a) *All Investigations, regardless of mode.* (1) The investigator-in-charge designates parties to participate in the investigation. Parties shall be limited to those persons, government agencies, companies, and associations whose employees, functions, activities, or products were involved in the accident or incident and who can provide suitable qualified technical personnel actively to assist in the investigation. Other than the FAA in aviation cases, no other entity is afforded the right to participate in Board investigations.

(2) Participants in the investigation (*i.e.*, party representatives, party coordinators, and/or the larger party organization) shall be responsive to the direction of Board representatives and may lose party status if they do not comply with their assigned duties and activity proscriptions or instructions, or if they conduct themselves in a manner prejudicial to the investigation.

(3) No party to the investigation shall be represented in any aspect of the NTSB investigation by any person who also represents claimants or insurers. No party representative may occupy a legal position (see §845.13 of this chapter). Failure to comply with these provisions may result in sanctions, including loss of status as a party.

(4) Title 49, United States Code §1132 provides for the appropriate participation of the FAA in Board investigations, and §1131(a)(2) provides for such participation by other departments, agencies, or instrumentalities. The FAA and those other entities that meet the requirements of

* The sections cited are current as of January 2016. Updated versions of the *United States Code* and the *Code of Federal Regulations* can be found at www.gpo.gov and www.ecfr.gov.

paragraph (a)(1) of this section will be parties to the investigation with the same rights and privileges and subject to the same limitations as other parties, provided however that representatives of the FAA need not sign the “Statement of Party Representatives to NTSB Investigation” (see paragraph (b) of this section).

(b) *Aviation investigations.* In addition to compliance with the provisions of paragraph (a) of this section, and to assist in ensuring complete understanding of the requirements and limitations of party status, all party representatives in aviation investigations shall sign “Statement of Party Representatives to NTSB Investigation” immediately upon attaining party representative status. Failure timely to sign that statement may result in sanctions, including loss of status as a party.

From 49 CFR 831.13(b)–Flow and dissemination of accident or incident information

(b) All information concerning the accident or incident obtained by any person or organization participating in the investigation shall be passed to the IIC through appropriate channels before being provided to any individual outside the investigation. Parties to the investigation may relay to their respective organizations information necessary for purposes of prevention or remedial action. However, no information concerning the accident or incident may be released to any person not a party representative to the investigation (including non-party representative employees of the party organization) before initial release by the Safety Board without prior consultation and approval of the IIC.

From 14 CFR 23.1457–Airworthiness Standards: Normal, Utility, Acrobatic, and Commuter Category Airplanes – Cockpit Voice Recorders

(a) Each cockpit voice recorder required by the operating rules of this chapter must be approved and must be installed so that it will record the following:

(1) Voice communications transmitted from or received in the airplane by radio.

(2) Voice communications of flight crewmembers on the flight deck.

(3) Voice communications of flight crewmembers on the flight deck, using the airplane's interphone system.

(4) Voice or audio signals identifying navigation or approach aids introduced into a headset or speaker.

(5) Voice communications of flight crewmembers using the passenger loudspeaker system, if there is such a system and if the fourth channel is available in accordance with the requirements of paragraph (c)(4)(ii) of this section.

(6) If datalink communication equipment is installed, all datalink communications, using an approved data message set. Datalink messages must be recorded as the output signal from the communications unit that translates the signal into usable data.

(b) The recording requirements of paragraph (a)(2) of this section must be met by installing a cockpit-mounted area microphone, located in the best position for recording voice communications originating at the first and second pilot stations and voice communications of other crewmembers on the flight deck when directed to those stations. The microphone must be so located and, if necessary, the preamplifiers and filters of the recorder must be so adjusted or supplemented, so that the intelligibility of the recorded communications is as high as practicable when recorded under flight cockpit noise conditions and played back. Repeated aural or visual playback of the record may be used in evaluating intelligibility.

(c) Each cockpit voice recorder must be installed so that the part of the communication or audio signals specified in paragraph (a) of this section obtained from each of the following sources is recorded on a separate channel:

(1) For the first channel, from each boom, mask, or handheld microphone, headset, or speaker used at the first pilot station.

(2) For the second channel from each boom, mask, or handheld microphone, headset, or speaker used at the second pilot station.

(3) For the third channel—from the cockpit-mounted area microphone.

(4) For the fourth channel from:

(i) Each boom, mask, or handheld microphone, headset, or speaker used at the station for the third and fourth crewmembers.

(ii) If the stations specified in paragraph (c)(4)(i) of this section are not required or if the signal at such a station is picked up by another channel, each microphone on the flight deck that is used with the passenger loudspeaker system, if its signals are not picked up by another channel.

(5) And that as far as is practicable all sounds received by the microphone listed in paragraphs (c)(1), (2), and (4) of this section must be recorded without interruption irrespective of the position of the interphone-transmitter key switch. The design shall ensure that sidetone for the flight crew is produced only when the interphone, public address system, or radio transmitters are in use.

(d) Each cockpit voice recorder must be installed so that:

(1)(i) It receives its electrical power from the bus that provides the maximum reliability for operation of the cockpit voice recorder without jeopardizing service to essential or emergency loads.

(ii) It remains powered for as long as possible without jeopardizing emergency operation of the airplane.

(2) There is an automatic means to simultaneously stop the recorder and prevent each erasure feature from functioning, within 10 minutes after crash impact; and

(3) There is an aural or visual means for preflight checking of the recorder for proper operation;

(4) Any single electrical failure external to the recorder does not disable both the cockpit voice recorder and the flight data recorder;

(5) It has an independent power source—

(i) That provides 10 ± 1 minutes of electrical power to operate both the cockpit voice recorder and cockpit-mounted area microphone;

(ii) That is located as close as practicable to the cockpit voice recorder; and

(iii) To which the cockpit voice recorder and cockpit-mounted area microphone are switched automatically in the event that all other power to the cockpit voice recorder is interrupted either by normal shutdown or by any other loss of power to the electrical power bus; and

(6) It is in a separate container from the flight data recorder when both are required. If used to comply with only the cockpit voice recorder requirements, a combination unit may be installed.

(e) The recorder container must be located and mounted to minimize the probability of rupture of the container as a result of crash impact and consequent heat damage to the recorder from fire.

(1) Except as provided in paragraph (e)(2) of this section, the recorder container must be located as far aft as practicable, but need not be outside of the pressurized compartment, and may not be located where aft-mounted engines may crush the container during impact.

(2) If two separate combination digital flight data recorder and cockpit voice recorder units are installed instead of one cockpit voice recorder and one digital flight data recorder, the combination unit that is installed to comply with the cockpit voice recorder requirements may be located near the cockpit.

(f) If the cockpit voice recorder has a bulk erasure device, the installation must be designed to minimize the probability of inadvertent operation and actuation of the device during crash impact.

(g) Each recorder container must:

(1) Be either bright orange or bright yellow;

(2) Have reflective tape affixed to its external surface to facilitate its location under water; and

(3) Have an underwater locating device, when required by the operating rules of this chapter, on or adjacent to the container which is secured in such manner that they are not likely to be separated during crash impact.

From 14 CFR 25.1457–Airworthiness Standards: Transport Category Airplanes–Cockpit Voice Recorders

(a) Each cockpit voice recorder required by the operating rules of this chapter must be approved and must be installed so that it will record the following:

(1) Voice communications transmitted from or received in the airplane by radio.

(2) Voice communications of flight crewmembers on the flight deck.

(3) Voice communications of flight crewmembers on the flight deck, using the airplane's interphone system.

(4) Voice or audio signals identifying navigation or approach aids introduced into a headset or speaker.

(5) Voice communications of flight crewmembers using the passenger loudspeaker system, if there is such a system and if the fourth channel is available in accordance with the requirements of paragraph (c)(4)(ii) of this section.

(6) If datalink communication equipment is installed, all datalink communications, using an approved data message set. Datalink messages must be recorded as the output signal from the communications unit that translates the signal into usable data.

(b) The recording requirements of paragraph (a)(2) of this section must be met by installing a cockpit-mounted area microphone, located in the best position for recording voice communications originating at the first and second pilot stations and voice communications of other crewmembers on the flight deck when directed to those stations. The microphone must be so located and, if necessary, the preamplifiers and filters of the recorder must be so adjusted or supplemented, that the intelligibility of the recorded communications is as high as practicable when recorded under flight cockpit noise conditions and played back. Repeated aural or visual playback of the record may be used in evaluating intelligibility.

(c) Each cockpit voice recorder must be installed so that the part of the communication or audio signals specified in paragraph (a) of this section obtained from each of the following sources is recorded on a separate channel:

(1) For the first channel, from each boom, mask, or hand-held microphone, headset, or speaker used at the first pilot station.

(2) For the second channel from each boom, mask, or hand-held microphone, headset, or speaker used at the second pilot station.

(3) For the third channel—from the cockpit-mounted area microphone.

(4) For the fourth channel, from—

(i) Each boom, mask, or hand-held microphone, headset, or speaker used at the station for the third and fourth crew members; or

(ii) If the stations specified in paragraph (c)(4)(i) of this section are not required or if the signal at such a station is picked up by another channel, each microphone on the flight deck that is used with the passenger loudspeaker system, if its signals are not picked up by another channel.

(5) As far as is practicable all sounds received by the microphone listed in paragraphs (c)(1), (2), and (4) of this section must be recorded without interruption irrespective of the position of the interphone-transmitter key switch. The design shall ensure that sidetone for the flight crew is produced only when the interphone, public address system, or radio transmitters are in use.

(d) Each cockpit voice recorder must be installed so that—

(1)(i) It receives its electrical power from the bus that provides the maximum reliability for operation of the cockpit voice recorder without jeopardizing service to essential or emergency loads.

(ii) It remains powered for as long as possible without jeopardizing emergency operation of the airplane.

(2) There is an automatic means to simultaneously stop the recorder and prevent each erasure feature from functioning, within 10 minutes after crash impact;

(3) There is an aural or visual means for preflight checking of the recorder for proper operation;

(4) Any single electrical failure external to the recorder does not disable both the cockpit voice recorder and the flight data recorder;

(5) It has an independent power source—

(i) That provides 10 ± 1 minutes of electrical power to operate both the cockpit voice recorder and cockpit-mounted area microphone;

(ii) That is located as close as practicable to the cockpit voice recorder; and

(iii) To which the cockpit voice recorder and cockpit-mounted area microphone are switched automatically in the event that all other power to the cockpit voice recorder is interrupted either by normal shutdown or by any other loss of power to the electrical power bus; and

(6) It is in a separate container from the flight data recorder when both are required. If used to comply with only the cockpit voice recorder requirements, a combination unit may be installed.

(e) The recorder container must be located and mounted to minimize the probability of rupture of the container as a result of crash impact and consequent heat damage to the recorder from fire.

(1) Except as provided in paragraph (e)(2) of this section, the recorder container must be located as far aft as practicable, but need not be outside of the pressurized compartment, and may not be located where aft-mounted engines may crush the container during impact.

(2) If two separate combination digital flight data recorder and cockpit voice recorder units are installed instead of one cockpit voice recorder and one digital flight data recorder, the combination unit that is installed to comply with the cockpit voice recorder requirements may be located near the cockpit.

(f) If the cockpit voice recorder has a bulk erasure device, the installation must be designed to minimize the probability of inadvertent operation and actuation of the device during crash impact.

(g) Each recorder container must—

(1) Be either bright orange or bright yellow;

(2) Have reflective tape affixed to its external surface to facilitate its location under water; and

(3) Have an underwater locating device, when required by the operating rules of this chapter, on or adjacent to the container which is secured in such manner that they are not likely to be separated during crash impact.

From 14 CFR 27.1457—Airworthiness Standards: Normal Category Rotorcraft—Cockpit Voice Recorders

(a) Each cockpit voice recorder required by the operating rules of this chapter must be approved, and must be installed so that it will record the following:

(1) Voice communications transmitted from or received in the rotorcraft by radio.

(2) Voice communications of flight crewmembers on the flight deck.

(3) Voice communications of flight crewmembers on the flight deck, using the rotorcraft's interphone system.

(4) Voice or audio signals identifying navigation or approach aids introduced into a headset or speaker.

(5) Voice communications of flight crewmembers using the passenger loudspeaker system, if there is such a system, and if the fourth channel is available in accordance with the requirements of paragraph (c)(4)(ii) of this section.

(6) If datalink communication equipment is installed, all datalink communications, using an approved data message set. Datalink messages must be recorded as the output signal from the communications unit that translates the signal into usable data.

(b) The recording requirements of paragraph (a)(2) of this section may be met:

(1) By installing a cockpit-mounted area microphone located in the best position for recording voice communications originating at the first and second pilot stations and voice communications of other crewmembers on the flight deck when directed to those stations; or

(2) By installing a continually energized or voice-actuated lip microphone at the first and second pilot stations.

The microphone specified in this paragraph must be so located and, if necessary, the preamplifiers and filters of the recorder must be adjusted or supplemented so that the recorded communications are intelligible when recorded under flight cockpit noise conditions and played back. The level of intelligibility must be approved by the Administrator. Repeated aural or visual playback of the record may be used in evaluating intelligibility.

(c) Each cockpit voice recorder must be installed so that the part of the communication or audio signals specified in paragraph (a) of this section obtained from each of the following sources is recorded on a separate channel:

(1) For the first channel, from each microphone, headset, or speaker used at the first pilot station.

(2) For the second channel, from each microphone, headset, or speaker used at the second pilot station.

(3) For the third channel, from the cockpit-mounted area microphone, or the continually energized or voice-actuated lip microphone at the first and second pilot stations.

(4) For the fourth channel, from:

(i) Each microphone, headset, or speaker used at the stations for the third and fourth crewmembers; or

(ii) If the stations specified in paragraph (c)(4)(i) of this section are not required or if the signal at such a station is picked up by another channel, each microphone on the flight deck that is used with the passenger loudspeaker system if its signals are not picked up by another channel.

(iii) Each microphone on the flight deck that is used with the rotorcraft's loudspeaker system if its signals are not picked up by another channel.

(d) Each cockpit voice recorder must be installed so that:

(1)(i) It receives its electrical power from the bus that provides the maximum reliability for operation of the cockpit voice recorder without jeopardizing service to essential or emergency loads.

(ii) It remains powered for as long as possible without jeopardizing emergency operation of the rotorcraft.

(2) There is an automatic means to simultaneously stop the recorder and prevent each erasure feature from functioning, within 10 minutes after crash impact;

(3) There is an aural or visual means for preflight checking of the recorder for proper operation;

(4) Whether the cockpit voice recorder and digital flight data recorder are installed in separate boxes or in a combination unit, no single electrical failure external to the recorder may disable both the cockpit voice recorder and the digital flight data recorder; and

(5) It has an independent power source—

(i) That provides 10 ±1 minutes of electrical power to operate both the cockpit voice recorder and cockpit-mounted area microphone;

(ii) That is located as close as practicable to the cockpit voice recorder; and

(iii) To which the cockpit voice recorder and cockpit-mounted area microphone are switched automatically in the event that all other power to the cockpit voice recorder is interrupted either by normal shutdown or by any other loss of power to the electrical power bus.

(e) The record container must be located and mounted to minimize the probability of rupture of the container as a result of crash impact and consequent heat damage to the record from fire.

(f) If the cockpit voice recorder has a bulk erasure device, the installation must be designed to minimize the probability of inadvertent operation and actuation of the device during crash impact.

(g) Each recorder container must be either bright orange or bright yellow.

(h) When both a cockpit voice recorder and a flight data recorder are required by the operating rules, one combination unit may be installed, provided that all other requirements of this section and the requirements for flight data recorders under this part are met.

From 14 CFR 29.1457—Airworthiness Standards: Transport Category Rotorcraft—Cockpit Voice Recorders

(a) Each cockpit voice recorder required by the operating rules of this chapter must be approved, and must be installed so that it will record the following:

(1) Voice communications transmitted from or received in the rotorcraft by radio.

(2) Voice communications of flight crewmembers on the flight deck.

(3) Voice communications of flight crewmembers on the flight deck, using the rotorcraft's interphone system.

(4) Voice or audio signals identifying navigation or approach aids introduced into a headset or speaker.

(5) Voice communications of flight crewmembers using the passenger loudspeaker system, if there is such a system, and if the fourth channel is available in accordance with the requirements of paragraph (c)(4)(ii) of this section.

(6) If datalink communication equipment is installed, all datalink communications, using an approved data message set. Datalink messages must be recorded as the output signal from the communications unit that translates the signal into usable data.

(b) The recording requirements of paragraph (a)(2) of this section may be met—

(1) By installing a cockpit-mounted area microphone, located in the best position for recording voice communications originating at the first and second pilot stations and voice communications of other crewmembers on the flight deck when directed to those stations; or

(2) By installing a continually energized or voice-actuated lip microphone at the first and second pilot stations.

The microphone specified in this paragraph must be so located and, if necessary, the preamplifiers and filters of the recorder must be so adjusted or supplemented, that the recorded communications are intelligible when recorded under flight cockpit noise conditions and played back. The level of intelligibility must be approved by the Administrator. Repeated aural or visual playback of the record may be used in evaluating intelligibility.

(c) Each cockpit voice recorder must be installed so that the part of the communication or audio signals specified in paragraph (a) of this section obtained from each of the following sources is recorded on a separate channel:

(1) For the first channel, from each microphone, headset, or speaker used at the first pilot station.

(2) For the second channel, from each microphone, headset, or speaker used at the second pilot station.

(3) For the third channel, from the cockpit-mounted area microphone, or the continually energized or voice-actuated lip microphones at the first and second pilot stations.

(4) For the fourth channel, from—

(i) Each microphone, headset, or speaker used at the stations for the third and fourth crewmembers; or

(ii) If the stations specified in paragraph (c)(4)(i) of this section are not required or if the signal at such a station is picked up by another channel, each microphone on the flight deck that is used with the passenger loudspeaker system if its signals are not picked up by another channel.

(iii) Each microphone on the flight deck that is used with the rotorcraft's loudspeaker system if its signals are not picked up by another channel.

(d) Each cockpit voice recorder must be installed so that—

(1)(i) It receives its electrical power from the bus that provides the maximum reliability for operation of the cockpit voice recorder without jeopardizing service to essential or emergency loads.

(ii) It remains powered for as long as possible without jeopardizing emergency operation of the rotorcraft.

(2) There is an automatic means to simultaneously stop the recorder and prevent each erasure feature from functioning, within 10 minutes after crash impact;

(3) There is an aural or visual means for preflight checking of the recorder for proper operation;

(4) Whether the cockpit voice recorder and digital flight data recorder are installed in separate boxes or in a combination unit, no single electrical failure external to the recorder may disable both the cockpit voice recorder and the digital flight data recorder; and

(5) It has an independent power source—

(i) That provides 10 ± 1 minutes of electrical power to operate both the cockpit voice recorder and cockpit-mounted area microphone;

(ii) That is located as close as practicable to the cockpit voice recorder; and

(iii) To which the cockpit voice recorder and cockpit-mounted area microphone are switched automatically in the event that all other power to the cockpit voice recorder is interrupted either by normal shutdown or by any other loss of power to the electrical power bus.

(e) The record container must be located and mounted to minimize the probability of rupture of the container as a result of crash impact and consequent heat damage to the record from fire.

(f) If the cockpit voice recorder has a bulk erasure device, the installation must be designed to minimize the probability of inadvertent operation and actuation of the device during crash impact.

(g) Each recorder container must be either bright orange or bright yellow.

(h) When both a cockpit voice recorder and a flight data recorder are required by the operating rules, one combination unit may be installed, provided that all other requirements of this section and the requirements for flight data recorders under this part are met.

From 14 CFR 121.359—Operating Requirements: Domestic, Flag, and Supplemental Operations—Cockpit Voice Recorders

(a) No certificate holder may operate a large turbine engine powered airplane or a large pressurized airplane with four reciprocating engines unless an approved cockpit voice recorder is installed in that airplane and is operated continuously from the start of the use of the checklist (before starting engines for the purpose of flight), to completion of the final checklist at the termination of the flight.

(b) [Reserved]

(c) The cockpit voice recorder required by paragraph (a) of this section must meet the following application standards:

(1) The requirements of part 25 of this chapter in effect on August 31, 1977.

(2) After September 1, 1980, each recorder container must—

(i) Be either bright orange or bright yellow;

(ii) Have reflective tape affixed to the external surface to facilitate its location under water; and

(iii) Have an approved underwater locating device on or adjacent to the container which is secured in such a manner that they are not likely to be separated during crash impact, unless the cockpit voice recorder, and the flight recorder required by §121.343, are installed adjacent to each other in such a manner that they are not likely to be separated during crash impact.

(d) No person may operate a multiengine, turbine-powered airplane having a passenger seat configuration of 10-19 seats unless it is equipped with an approved cockpit voice recorder that:

(1) Is installed in compliance with §23.1457(a)(1) and (2), (b), (c), (d)(1)(i), (2) and (3), (e), (f), and (g); or §25.1457(a)(1) and (2), (b), (c), (d)(1)(i), (2) and (3), (e), (f), and (g) of this chapter, as applicable; and

(2) Is operated continuously from the use of the checklist before the flight to completion of the final checklist at the end of the flight.

(e) No person may operate a multiengine, turbine-powered airplane having a passenger seat configuration of 20 to 30 seats unless it is equipped with an approved cockpit voice recorder that—

(1) Is installed in accordance with the requirements of §23.1457 (except paragraphs (a)(6), (d)(1)(ii), (4), and (5)) or §25.1457 (except paragraphs (a)(6), (d)(1)(ii), (4), and (5)) of this chapter, as applicable; and

(2) Is operated continuously from the use of the checklist before the flight to completion of the final checklist at the end of the flight.

(f) In complying with this section, an approved cockpit voice recorder having an erasure feature may be used, so that at any time during the operation of the recorder, information recorded more than 30 minutes earlier may be erased or otherwise obliterated.

(g) For those aircraft equipped to record the uninterrupted audio signals received by a boom or a mask microphone, the flight crewmembers are required to use the boom microphone below 18,000 feet mean sea level. No person may operate a large turbine engine powered airplane or a large pressurized airplane with four reciprocating engines manufactured after October 11, 1991, or on which a cockpit voice recorder has been installed after October 11, 1991, unless it is equipped to record the uninterrupted audio signal received by a boom or mask microphone in accordance with §25.1457(c)(5) of this chapter.

(h) In the event of an accident or occurrence requiring immediate notification of the National Transportation Safety Board under part 830 of its regulations, which results in the termination of the flight, the certificate holder shall keep the recorded information for at least 60 days or, if requested by the Administrator or the Board, for a longer period. Information obtained from the record is used to assist in determining the cause of accidents or occurrences in connection with investigations under part 830. The Administrator does not use the record in any civil penalty or certificate action.

(i) By April 7, 2012, all turbine engine-powered airplanes subject to this section that are manufactured before April 7, 2010, must have a cockpit voice recorder installed that also—

(1) Meets the requirements of §23.1457(d)(6) or §25.1457(d)(6) of this chapter, as applicable;

(2) Retains at least the last 2 hours of recorded information using a recorder that meets the standards of TSO-C123a, or later revision; and

(3) Is operated continuously from the use of the checklist before the flight to completion of the final checklist at the end of the flight.

(4) If transport category, meets the requirements in §25.1457(a)(3), (a)(4), and (a)(5) of this chapter.

(j) All turbine engine-powered airplanes subject to this section that are manufactured on or after April 7, 2010, must have a cockpit voice recorder installed that also—

(1) Is installed in accordance with the requirements of §23.1457 (except for paragraph (a)(6) or §25.1457 (except for paragraph (a)(6)) of this chapter, as applicable;

(2) Retains at least the last 2 hours of recorded information using a recorder that meets the standards of TSO-C123a, or later revision; and

(3) Is operated continuously from the use of the checklist before the flight to completion of the final checklist at the end of the flight.

(4) For all airplanes manufactured on or after December 6, 2010, also meets the requirements of §23.1457(a)(6) or §25.1457(a)(6) of this chapter, as applicable.

(k) All airplanes required by this part to have a cockpit voice recorder and a flight data recorder, that install datalink communication equipment on or after December 6, 2010, must record all datalink messages as required by the certification rule applicable to the airplane.

From 14 CFR 135.151—Operating Requirements: Commuter and On Demand Operations and Rules Governing Persons On Board Such Aircraft—Cockpit Voice Recorder

(a) No person may operate a multiengine, turbine-powered airplane or rotorcraft having a passenger seating configuration of six or more and for which two pilots are required by certification or operating rules unless it is equipped with an approved cockpit voice recorder that:

(1) Is installed in compliance with §23.1457(a)(1) and (2), (b), (c), (d)(1)(i), (2) and (3), (e), (f), and (g); §25.1457(a)(1) and (2), (b), (c), (d)(1)(i), (2) and (3), (e), (f), and (g), §27.1457(a)(1) and (2), (b), (c), (d)(1)(i), (2) and (3), (e), (f), and (g); or §29.1457(a)(1) and (2), (b), (c), (d)(1)(i), (2) and (3), (e), (f), and (g) of this chapter, as applicable; and

(2) Is operated continuously from the use of the check list before the flight to completion of the final check list at the end of the flight.

(b) No person may operate a multiengine, turbine-powered airplane or rotorcraft having a passenger seating configuration of 20 or more seats unless it is equipped with an approved cockpit voice recorder that—

(1) Is installed in accordance with the requirements of §23.1457 (except paragraphs (a)(6), (d)(1)(ii), (4), and (5)); §25.1457 (except paragraphs (a)(6), (d)(1)(ii), (4), and (5)); §27.1457 (except paragraphs (a)(6), (d)(1)(ii), (4), and (5)); or §29.1457 (except paragraphs (a)(6), (d)(1)(ii), (4), and (5)) of this chapter, as applicable; and

(2) Is operated continuously from the use of the check list before the flight to completion of the final check list at the end of the flight.

(c) In the event of an accident, or occurrence requiring immediate notification of the National Transportation Safety Board which results in termination of the flight, the certificate holder shall keep the recorded information for at least 60 days or, if requested by the Administrator or the Board, for a longer period. Information obtained from the record may be used to assist in

determining the cause of accidents or occurrences in connection with investigations. The Administrator does not use the record in any civil penalty or certificate action.

(d) For those aircraft equipped to record the uninterrupted audio signals received by a boom or a mask microphone the flight crewmembers are required to use the boom microphone below 18,000 feet mean sea level. No person may operate a large turbine engine powered airplane manufactured after October 11, 1991, or on which a cockpit voice recorder has been installed after October 11, 1991, unless it is equipped to record the uninterrupted audio signal received by a boom or mask microphone in accordance with §25.1457(c)(5) of this chapter.

(e) In complying with this section, an approved cockpit voice recorder having an erasure feature may be used, so that during the operation of the recorder, information:

(1) Recorded in accordance with paragraph (a) of this section and recorded more than 15 minutes earlier; or

(2) Recorded in accordance with paragraph (b) of this section and recorded more than 30 minutes earlier; may be erased or otherwise obliterated.

(f) By April 7, 2012, all airplanes subject to paragraph (a) or paragraph (b) of this section that are manufactured before April 7, 2010, and that are required to have a flight data recorder installed in accordance with §135.152, must have a cockpit voice recorder that also—

(1) Meets the requirements in §23.1457(d)(6) or §25.1457(d)(6) of this chapter, as applicable; and

(2) If transport category, meet the requirements in §25.1457(a)(3), (a)(4), and (a)(5) of this chapter.

(g)(1) No person may operate a multiengine, turbine-powered airplane or rotorcraft that is manufactured on or after April 7, 2010, that has a passenger seating configuration of six or more seats, for which two pilots are required by certification or operating rules, and that is required to have a flight data recorder under §135.152, unless it is equipped with an approved cockpit voice recorder that also—

(i) Is installed in accordance with the requirements of §23.1457 (except for paragraph (a)(6)); §25.1457 (except for paragraph (a)(6)); §27.1457 (except for paragraph (a)(6)); or §29.1457 (except for paragraph (a)(6)) of this chapter, as applicable; and

(ii) Is operated continuously from the use of the check list before the flight, to completion of the final check list at the end of the flight; and

(iii) Retains at least the last 2 hours of recorded information using a recorder that meets the standards of TSO-C123a, or later revision.

(iv) For all airplanes or rotorcraft manufactured on or after December 6, 2010, also meets the requirements of §23.1457(a)(6); §25.1457(a)(6); §27.1457(a)(6); or §29.457(a)(6) of this chapter, as applicable.

(2) No person may operate a multiengine, turbine-powered airplane or rotorcraft that is manufactured on or after April 7, 2010, has a passenger seating configuration of 20 or more seats, and that is required to have a flight data recorder under §135.152, unless it is equipped with an approved cockpit voice recorder that also—

(i) Is installed in accordance with the requirements of §23.1457 (except for paragraph (a)(6)); §25.1457 (except for paragraph (a)(6)); §27.1457 (except for paragraph (a)(6)); or §29.1457 (except for paragraph (a)(6)) of this chapter, as applicable; and

(ii) Is operated continuously from the use of the check list before the flight, to completion of the final check list at the end of the flight; and

(iii) Retains at least the last 2 hours of recorded information using a recorder that meets the standards of TSO-C123a, or later revision.

(iv) For all airplanes or rotorcraft manufactured on or after December 6, 2010, also meets the requirements of §23.1457(a)(6); §25.1457(a)(6); §27.1457(a)(6); or §29.457(a)(6) of this chapter, as applicable.

(h) All airplanes or rotorcraft required by this part to have a cockpit voice recorder and a flight data recorder, that install datalink communication equipment on or after December 6, 2010, must record all datalink messages as required by the certification rule applicable to the aircraft.

From 14 CFR 91.609—General Operating and Flight Rules—Flight Recorders and Cockpit Voice Recorders

(a) No holder of an air carrier operating certificate or an operating certificate may conduct any operation under this part with an aircraft listed in the holder's operations specifications or current list of aircraft used in air transportation unless that aircraft complies with any applicable flight recorder and cockpit voice recorder requirements of the part under which its certificate is issued except that the operator may—

(1) Ferry an aircraft with an inoperative flight recorder or cockpit voice recorder from a place where repair or replacement cannot be made to a place where they can be made;

(2) Continue a flight as originally planned, if the flight recorder or cockpit voice recorder becomes inoperative after the aircraft has taken off;

(3) Conduct an airworthiness flight test during which the flight recorder or cockpit voice recorder is turned off to test it or to test any communications or electrical equipment installed in the aircraft; or

(4) Ferry a newly acquired aircraft from the place where possession of it is taken to a place where the flight recorder or cockpit voice recorder is to be installed.

(b) Notwithstanding paragraphs (c) and (e) of this section, an operator other than the holder of an air carrier or a commercial operator certificate may—

(1) Ferry an aircraft with an inoperative flight recorder or cockpit voice recorder from a place where repair or replacement cannot be made to a place where they can be made;

(2) Continue a flight as originally planned if the flight recorder or cockpit voice recorder becomes inoperative after the aircraft has taken off;

(3) Conduct an airworthiness flight test during which the flight recorder or cockpit voice recorder is turned off to test it or to test any communications or electrical equipment installed in the aircraft;

(4) Ferry a newly acquired aircraft from a place where possession of it was taken to a place where the flight recorder or cockpit voice recorder is to be installed; or

(5) Operate an aircraft:

(i) For not more than 15 days while the flight recorder and/or cockpit voice recorder is inoperative and/or removed for repair provided that the aircraft maintenance records contain an entry that indicates the date of failure, and a placard is located in view of the pilot to show that the flight recorder or cockpit voice recorder is inoperative.

(ii) For not more than an additional 15 days, provided that the requirements in paragraph (b)(5)(i) are met and that a certificated pilot, or a certificated person authorized to return an aircraft to service under §43.7 of this chapter, certifies in the aircraft maintenance records that additional time is required to complete repairs or obtain a replacement unit.

(c)(1) No person may operate a U.S. civil registered, multiengine, turbine-powered airplane or rotorcraft having a passenger seating configuration, excluding any pilot seats of 10 or more that has been manufactured after October 11, 1991, unless it is equipped with one or more approved flight recorders that utilize a digital method of recording and storing data and a method of readily retrieving that data from the storage medium, that are capable of recording the data specified in appendix E to this part, for an airplane, or appendix F to this part, for a rotorcraft, of this part within the range, accuracy, and recording interval specified, and that are capable of retaining no less than 8 hours of aircraft operation.

(2) All airplanes subject to paragraph (c)(1) of this section that are manufactured before April 7, 2010, by April 7, 2012, must meet the requirements of §23.1459(a)(7) or §25.1459(a)(8) of this chapter, as applicable.

(3) All airplanes and rotorcraft subject to paragraph (c)(1) of this section that are manufactured on or after April 7, 2010, must meet the flight data recorder requirements of §23.1459, §25.1459,

§27.1459, or §29.1459 of this chapter, as applicable, and retain at least the last 25 hours of recorded information using a recorder that meets the standards of TSO-C124a, or later revision.

(d) Whenever a flight recorder, required by this section, is installed, it must be operated continuously from the instant the airplane begins the takeoff roll or the rotorcraft begins lift-off until the airplane has completed the landing roll or the rotorcraft has landed at its destination.

(e) Unless otherwise authorized by the Administrator, after October 11, 1991, no person may operate a U.S. civil registered multiengine, turbine-powered airplane or rotorcraft having a passenger seating configuration of six passengers or more and for which two pilots are required by type certification or operating rule unless it is equipped with an approved cockpit voice recorder that:

(1) Is installed in compliance with §23.1457(a)(1) and (2), (b), (c), (d)(1)(i), (2) and (3), (e), (f), and (g); §25.1457(a)(1) and (2), (b), (c), (d)(1)(i), (2) and (3), (e), (f), and (g); §27.1457(a)(1) and (2), (b), (c), (d)(1)(i), (2) and (3), (e), (f), and (g); or §29.1457(a)(1) and (2), (b), (c), (d)(1)(i), (2) and (3), (e), (f), and (g) of this chapter, as applicable; and

(2) Is operated continuously from the use of the checklist before the flight to completion of the final checklist at the end of the flight.

(f) In complying with this section, an approved cockpit voice recorder having an erasure feature may be used, so that at any time during the operation of the recorder, information recorded more than 15 minutes earlier may be erased or otherwise obliterated.

(g) In the event of an accident or occurrence requiring immediate notification to the National Transportation Safety Board under part 830 of its regulations that results in the termination of the flight, any operator who has installed approved flight recorders and approved cockpit voice recorders shall keep the recorded information for at least 60 days or, if requested by the Administrator or the Board, for a longer period. Information obtained from the record is used to assist in determining the cause of accidents or occurrences in connection with the investigation under part 830. The Administrator does not use the cockpit voice recorder record in any civil penalty or certificate action.

(h) All airplanes required by this section to have a cockpit voice recorder and a flight data recorder, that are manufactured before April 7, 2010, must by April 7, 2012, have a cockpit voice recorder that also—

(1) Meets the requirements of §23.1457(d)(6) or §25.1457(d)(6) of this chapter, as applicable; and

(2) If transport category, meets the requirements of §25.1457(a)(3), (a)(4), and (a)(5) of this chapter.

(i) All airplanes or rotorcraft required by this section to have a cockpit voice recorder and flight data recorder, that are manufactured on or after April 7, 2010, must have a cockpit voice recorder installed that also—

(1) Is installed in accordance with the requirements of §23.1457 (except for paragraphs (a)(6) and (d)(5)); §25.1457 (except for paragraphs (a)(6) and (d)(5)); §27.1457 (except for paragraphs (a)(6) and (d)(5)); or §29.1457 (except for paragraphs (a)(6) and (d)(5)) of this chapter, as applicable; and

(2) Retains at least the last 2 hours of recorded information using a recorder that meets the standards of TSO-C123a, or later revision.

(3) For all airplanes or rotorcraft manufactured on or after April 6, 2012, also meets the requirements of §23.1457(a)(6) and (d)(5); §25.1457(a)(6) and (d)(5); §27.1457(a)(6) and (d)(5); or §29.1457(a)(6) and (d)(5) of this chapter, as applicable.

(j) All airplanes or rotorcraft required by this section to have a cockpit voice recorder and a flight data recorder, that install datalink communication equipment on or after April 6, 2012, must record all datalink messages as required by the certification rule applicable to the aircraft.

(k) An aircraft operated under this part under deviation authority from part 125 of this chapter must comply with all of the applicable flight data recorder requirements of part 125 applicable to the aircraft, notwithstanding such deviation authority.

From 49 USC Section 1154—Discovery and use of cockpit and surface vehicle recordings and transcripts

(a) TRANSCRIPTS AND RECORDINGS.—(1) Except as provided by this subsection, a party in a judicial proceeding may not use discovery to obtain—

- (A) any part of a cockpit or surface vehicle recorder transcript that the National Transportation Safety Board has not made available to the public under section 1114(c) or 1114(d) of this title; and
- (B) a cockpit or surface vehicle recorder recording.

(2)(A) Except as provided in paragraph (4)(A) of this subsection, a court may allow discovery by a party of a cockpit or surface vehicle recorder transcript if, after an in camera review of the transcript, the court decides that—

- (i) the part of the transcript made available to the public under section 1114(c) or 1114(d) of this title does not provide the party with sufficient information for the party to receive a fair trial; and
- (ii) discovery of additional parts of the transcript is necessary to provide the party with sufficient information for the party to receive a fair trial.

(B) A court may allow discovery, or require production for an in camera review, of a cockpit or surface vehicle recorder transcript that the Board has not made available under section 1114(c) or 1114(d) of this title only if the cockpit or surface vehicle recorder recording is not available.

(3) Except as provided in paragraph (4)(A) of this subsection, a court may allow discovery by a party of a cockpit or surface vehicle recorder recording if, after an in camera review of the recording, the court decides that—

(A) the parts of the transcript made available to the public under section 1114(c) or 1114(d) of this title and to the party through discovery under paragraph (2) of this subsection do not provide the party with sufficient information for the party to receive a fair trial; and

(B) discovery of the cockpit or surface vehicle recorder recording is necessary to provide the party with sufficient information for the party to receive a fair trial.

(4)(A) When a court allows discovery in a judicial proceeding of a part of a cockpit or surface vehicle recorder transcript not made available to the public under section 1114(c) or 1114(d) of this title or a cockpit or surface vehicle recorder recording, the court shall issue a protective order—

(i) to limit the use of the part of the transcript or the recording to the judicial proceeding; and
(ii) to prohibit dissemination of the part of the transcript or the recording to any person that does not need access to the part of the transcript or the recording for the proceeding.

(B) A court may allow a part of a cockpit or surface vehicle recorder transcript not made available to the public under section 1114(c) or 1114(d) of this title or a cockpit or surface vehicle recorder recording to be admitted into evidence in a judicial proceeding, only if the court places the part of the transcript or the recording under seal to prevent the use of the part of the transcript or the recording for purposes other than for the proceeding.

(5) This subsection does not prevent the Board from referring at any time to cockpit or surface vehicle recorder information in making safety recommendations.

(6) In this subsection:

(A) RECORDER.—The term “recorder” means a voice or video recorder.

(B) TRANSCRIPT.—The term “transcript” includes any written depiction of visual information obtained from a video recorder.

**ATTACHMENT F: NTSB and BEA Memorandum
of Agreement**

Memorandum of Understanding
between
the National Transportation Safety Board
(NTSB)
United States of America
and
the Bureau d'Enquêtes et d'Analyses
pour la sécurité de l'aviation civile
(BEA)
France

Document Approval

	BEA	NTSB
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APPROVAL	<p>5 May 2011</p> <p>Jean-Paul TROADEC Director of the Bureau d'enquêtes et d'analyses pour la sécurité de l'aviation civile</p>	<p>5 May 2011</p> <p>Deborah A.P. HERSMAN Chairman of the National Transportation Safety Board</p>

Amendments to the Guidelines

EDITION	DATE	REASONS FOR CHANGES	SECTIONS / MODIFIED PAGES
V1	20 March 1985	Initial text on the coordination of CFM-56 technical engine investigations	All
V2	16 November 2000	Additional provisions on notification of accidents and incidents, participation, , access to data, analysis, conclusions, safety recommendations, consultation, confidentiality, media, cooperation, victims and relatives	All
V3	5 May 2011	Introduction of E.U. Regulation 996/2010	All

Distribution

DISTRIBUTION MODE and FORMAT	ADDRESSEES
Limited distribution / Paper copies	For the BEA: Investigation Department, Engineering Department For the NTSB: Office of Aviation Safety, Office of Research and Engineering, Office of Communications
Limited distribution / Electronic document (BEA Intranet, NTSB electronic library)	BEA NTSB staff

Document oversight

Olivier FERRANTE for the BEA
Frank HILLDRUP for the NTSB

Applicability date

5 May 2011

MEMORANDUM OF UNDERSTANDING

BETWEEN

THE NATIONAL TRANSPORTATION SAFETY BOARD (NTSB)

UNITED STATES OF AMERICA

AND

THE BUREAU D'ENQUETES et D'ANALYSES pour la sécurité de l'aviation civile (BEA)

FRANCE

1. Purpose and Background

The general purpose of this Memorandum of Understanding (hereafter called the "MOU") is to update guidelines for the conduct of international aviation accident and incident investigations between the National Transportation Safety Board (hereafter called the "NTSB") and the Bureau d'Enquêtes et d'Analyses pour la sécurité de l'aviation civile (hereafter called the "BEA"). This MOU is intended to reinforce the cooperation between the BEA and the NTSB to facilitate effective and efficient investigations in order to advance the safety of international civil aviation. The MOU is also intended to improve communication and exchanges of information between the two organizations (hereafter called the "Authorities").

On March 20, 1985, BEA and the NTSB signed a Memorandum of Agreement (MOA) to ensure that the Authorities coordinate their efforts closely during aircraft accident investigations that involve aircraft equipped with CFM 56 engines, which are jointly manufactured by SAFRAN (formerly SNECMA) in France and General Electric Aircraft Engines in the United States.

France and the United States are major States of Design and Manufacture for the world's aircraft. As such, they are obligated to either conduct or participate in numerous investigations throughout the world in accordance with Annex 13 to the Convention on International Civil Aviation. In addition, France and the United States are often asked to provide technical assistance, particularly in the readout and analysis of flight recorders, even for investigations that do not meet the specific conditions of Annex 13. In recognition of the operational and airworthiness responsibilities of the United States and France as major States of Design and Manufacture, the 1985 MOA was revised with broader guidelines on November

16, 2000, that extended to accidents and incidents involving aircraft of a maximum mass of more than 2,250 kg. This MOU is an update to the 2000 guidelines.

2. Scope and Definitions

Article 26 of the Convention on International Civil Aviation and Annex 13 contain language reinforcing the importance for the safety of international air transport that investigations be carried out with the greatest diligence and with the full cooperation of the concerned States.

The text of Annex 13 referred to in this document is that of the tenth edition dated July 2010. France and the United States apply the standards and recommended practices contained in Annex 13 within the limits of the specific differences noted.

Insofar as the information contained in this MOU serves to reinforce joint work between the two Authorities, it is also the spirit of cooperation that is to be applied. In particular, each Authority intends to make its best efforts to overcome difficulties arising due to differences in languages, national cultures, or geographic locations.

For application of this MOU, the definitions of the following words and phrases are to be those specified or addressed in Annex 13:

Accident
Incident
Serious incident
State of Occurrence
State of Design
State of Manufacture
State of Registration
State of the Operator
Investigator-in-charge
Accredited Representative
Adviser
Causes
Draft final report
Differences

3. Authorities

The NTSB is an independent agency of the United States authorized to investigate transportation accidents and incidents, and has the authority to furnish foreign technical assistance to accomplish aviation accident prevention and investigation purposes, and, therefore, enters this MOU pursuant to 49 U.S.C. § 1113(b)(1)(I).

The BEA is the French authority in charge to investigate aviation accidents and serious incidents and has the authority to furnish foreign technical assistance to accomplish aviation accident

prevention and investigation purposes, and therefore this MOU is in accord with Law 99-243 of 29 March 1999 relating to technical investigations into accidents and incidents in civil aviation and with the Regulation (EU) No 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation.

This MOU is not to be used as the authority or means to acquire or procure goods or services; exchange funds, property, or data; or transfer or assign personnel. It is subject to the laws and regulations of the Authorities' States and to international agreements signed by the Authorities' States.

This MOU does not provide funding. Therefore, each Authority intends to bear the expense of its participation in activities described herein unless a formal binding agreement is executed between the Authorities that commits funding prior to any performance of services for which reimbursement is contemplated.

Nothing in this MOU is intended to conflict with the current law or regulation or directives of either Authority. If a term of this MOU is inconsistent with any such authority, then that term should not be applied, but the remaining terms and conditions of this MOU should remain effective so long as the nature of the MOU contemplated by the Authorities is not affected in any manner materially adverse to either Authority. It is the intent of the Authorities that this MOU would be modified as necessary to effect the original intent of the Authorities as closely as possible to the extent permitted by law.

4. Principles of Cooperation and Assistance

The purpose of accident and incident investigations is to determine the facts, conditions, and circumstances of an accident or incident; to analyze and determine the cause(s) or probable cause(s) of such accidents or incidents; to make recommendations to avoid their recurrence; and thus safeguard human lives. It is not to impute fault or exonerate any person or authority. Any safety recommendations produced by BEA or NTSB as a result of accident and incident investigations are intended as a means to improve safety and preclude recurrence.

When either Authority becomes aware of an accident or incident that involves the interests of the other Authority under the provisions of Annex 13, it is to inform that Authority with a minimum of delay and provide all available information consistent with Annex 13 and the laws of the notifying Authority. It is the intent of the Authorities for the notification procedures to apply equally to aircraft and aviation products manufactured in the State of the other Authority but which may have subsidiary support offices in the State of Occurrence.

5. General Procedures

The following procedures relate to investigations of occurrences in which one State is the State of Manufacture, Design, Registration, or the Operator and the other State is the State of Occurrence:

a. Participation in the Investigation

During investigations conducted by either Authority, domestic participants are to participate in the investigation in accordance with the organizational structure prescribed by the investigating Authority.

During investigations conducted by either Authority, international participants are to participate in the investigation as advisers to the accredited representative in accordance with the organizational structure prescribed in Annex 13. In accordance with the provisions contained in E.U. Regulation 996/2010 and Annex 13, the NTSB recognizes the role of the European Aviation Safety Agency (EASA) as an adviser to the BEA, as defined by the BEA accredited representative. BEA will recognize the role of the U.S. Federal Aviation Administration as an adviser to the NTSB, as defined by the NTSB accredited representative.

Normal communication is to be conducted through accredited representative channels. (In situations in which there may be a deputy accredited representative, he/she should be afforded the same rights, in accordance with Annex 13.) The two Authorities are to inform each other of any planned direct communications with an adviser or an organization of the other State.

For public hearings and submissions, the organizational structure may be altered to provide participants with the ability to best represent themselves.

b. Access to Data From an Investigation

The States involved in an investigation, such as the State of Manufacture or the State of the Operator, have international duties, in accordance primarily with Annexes 6, 8, and 13. In order to fulfill these duties, they need to have access to the information. Therefore, the State responsible for conducting the investigation is to provide the accredited representative from the other State access to all available material, as cited in paragraph 5.25 of Annex 13. The accredited representative is to receive the material as soon as practicable. See subsection g. hereafter regarding proprietary or commercially sensitive information.

Such data is to include, but is not to be limited to:

- An electronic copy of the raw, unmanipulated data obtained from the flight data recorder(s) (FDR), including data from all previous flights.
- Computer printouts, data files, and plots of the data, once the accuracy of the data files has been established and agreed to by all participants.
- Data obtained from other onboard equipment (such as maintenance recorders) which should be handled in the same manner as FDR data if it is determined that these data are relevant to the investigation (for example, if they provide more data than the FDR recording).

- A copy of the air traffic control voice recording and transcript of radio communications and any other available recordings.
- Radar data obtained from civilian sources in prescribed format and authorized available military sources.
- Plots of the time correlation between radar, FDR, air traffic control recordings, cockpit voice recorder (CVR) data, and other relevant information. These plots are to be produced in a way that does not disclose protected data from the CVR or image recorders.

To ensure confidentiality of the sensitive information contained in CVRs and image recorders, initial readout, examination, and analysis of the data derived from these recorders should be performed only in the laboratory selected by the State conducting the investigation; participants should be limited strictly to:

- the investigator-in-charge and/or personnel from his/her Authority that he/she designates, as well as technically qualified advisers that he/she designates, based on the procedures of his/her Authority,
- the accredited representative or his/her designee, and
- technically qualified advisers designated by the accredited representative.

Consistent with provisions in Annex 13 concerning the release of investigative information, the distribution of transcripts or reports derived from analyses of CVRs and image recorders is to be prohibited until they have been released by the Authority conducting the investigation. However, the Authorities should proceed in a fully coordinated manner to provide timely and full access to CVR and image recordings and transcripts to the accredited representative or his/her designee and to selected advisers in the laboratory of the Authority conducting the investigation. Working notes are not to be removed from the laboratory.

c. Participation in Analysis, Conclusions, and Development of Safety Recommendations

The Authorities intend to apply the provisions of paragraph 5.25 of Annex 13, particularly paragraphs g) and i), which state that participation confers entitlement to:

- participation in off-scene investigation activities such as component examinations, technical briefings, tests, and simulation; and
- make submissions in respect of the various elements of the investigation.

The investigating Authority has the complete responsibility for analysis and determination of cause(s) or probable cause(s). However, it is strongly recommended that the other Authority provide its contribution on the study of the factual data and be associated with the deliberations related to the analysis, findings, causes, and safety recommendations to the extent permitted under the investigating Authority's guidelines. This can best be achieved by regular contacts and

discussions between the investigator in charge and accredited representatives and by written submissions during the investigation process.

Safety recommendations should be discussed throughout the investigation. Advisers should be part of this process, as coordinated through the accredited representative. Any safety recommendation addressed to EASA or the Federal Aviation Administration (FAA) is to be coordinated with the other investigative Authority. When the investigating Authority plans to issue safety recommendations before the completion of the draft Final Report, that Authority should make every effort to share the content of the safety recommendations with the accredited representative of the other Authority (and other agencies, if appropriate) as soon as practicable. The accredited representative should be consulted during the formulation and drafting of recommendations stemming from the investigation and should have the opportunity provide comments to the investigating Authority within a reasonable period of time based on the degree of urgency of the proposed recommendations. The length of the comment period is to be determined by the investigating Authority.

d. Distribution of Safety Recommendations

Safety Recommendations involving the other State are to be sent to the other Authority, along with copies to the FAA, the Director General of Civil Aviation (DGAC) of France, and EASA.

e. Exchanges of Correspondence and Information

In the event that formal correspondence is necessary, each Authority may choose the most appropriate method to transmit correspondence and documents consistent with prompt receipt. In order to facilitate record keeping and to avoid the loss of correspondence, the recipient should acknowledge receipt of the correspondence in a timely manner.

Either Authority may request information on the progress of investigations by the other Authority. The investigating Authority is to do everything possible to provide the information as expeditiously as possible. This information should be treated with the same rules of confidentiality as those governing the providing Authority and in accordance with the laws of the respective States.

f. Consultation

Regarding consultations on the draft Final Report outlined in Annex 13, each Authority should seek State comments from the other Authority. The accredited representative should disseminate the draft Final Report to his/her advisers and should likewise consolidate comments by the State and forward them to the investigating Authority.

g. Confidentiality

The Authority that receives information from the other Authority should handle the materials according to their confidentiality or proprietary status, within the bounds of the respective laws

of the two States. Drafts, internal, or working documents that have been transmitted are to be considered as proprietary/confidential documents and should be treated as such, except when explicitly required under the laws of the receiving State to be treated differently.

h. Informing the News Media

The Authority conducting the investigation is to be the sole organization that releases information about the investigation to the news media. However, it may be appropriate for the other Authority to release information about participation in an investigation as an accredited representative. After an accident or incident, the news media and relatives of the victims will be contacting their respective authorities. Therefore, the press officers of the BEA and the NTSB should establish working procedures to ensure that information can be mutually developed and coordinated as efficiently as possible. Also, whenever possible, such information should be transmitted by the investigating Authority to the other Authority before it is made public. If there are differences of opinion, efforts should be made to resolve them before the information is released.

6. Specific Procedures Relating to Investigations of Occurrences Involving Aircraft Equipped with CFM56 Engines

The following provisions should be applied to the investigations of occurrences involving CFM56 engines, which are jointly manufactured by France and the United States:

- In the case of an investigation conducted by either Authority, the other Authority should be notified of the event that prompted the investigation, and may elect to designate an accredited representative and advisers to participate in the investigation in accordance with the provisions of Annex 13. If the other Authority elects not to appoint an accredited representative, the other Authority should be provided with timely updates on the progress of the investigation, safety issues developed, and conclusions that arise.
- In the event that an accident or incident occurs in the territory of a third State and the United States or France is the State of Design or Manufacture of the aircraft, the other Authority, which is not the State of Manufacture, the State of Registration or State of the Operator, should provide notification of its plans for participation in the investigation. The other Authority may then elect to designate an accredited representative and appoint advisers to the concerned authority. If the other Authority elects not to take such action, it should be provided timely updates on the progress of the investigation, safety issues that are developed, and conclusions that arise.
- In the event that there is an occurrence in the territory of a third State, for which neither Authority represents the State of Design or Manufacture of the aircraft, the Authorities together should approach the State of Occurrence to determine the most appropriate procedures for representation and participation in the investigation.

7. Other Cooperation Between the Two Authorities

a. Assistance in the Supervision of Examination of a Component Part

The Authority that conducts the investigation may request that the other Authority assist in supervising the examination, testing, or disassembling of component parts that have been removed to the location of a manufacturer or other facility of the other State. The other Authority should provide such assistance to the extent possible. In all cases, the Authority that conducts the investigation should provide updates as soon as practicable to the other Authority of all investigation activities being carried out in the territory of that State and should invite the other Authority to participate.

b. Training of Personnel

To the extent possible, the two Authorities should facilitate exchanges of personnel for training and development, including observer status at major investigation accident sites and subsequent off-scene investigative activities.

c. Conduct of the Authority Invited to Assist a State of Occurrence

When one of the Authorities is requested by the State of Occurrence to provide technical assistance for an investigation in which the other Authority is participating or should be participating under the provisions of Annex 13, the response to the request should be coordinated with the other Authority. The Authorities should work together to ensure that the investigation is conducted in accordance with the spirit and procedures of Annex 13. Specifically, data necessary to fulfill the responsibilities prescribed by Annexes 6 and 8, including FDR and CVR information and copies of the FDR recordings, should be made available to the other Authority as soon as practicable. The Authorities should update and refine data as it becomes available and coordinate to ensure that the best data set is available as the investigation progresses.

d. Future Coordination and Planning

The Authorities' representatives should meet periodically and alternately at their respective facilities to discuss current investigations and any other relevant issues.

The Authorities recognize E.U. Regulation 996/2010 and creation of the European Network of Civil Aviation Investigation Authorities (the "Network"). The Authorities will endeavor to lend mutual support to the Network's goals.

e. Victims and Relatives

The Authorities should coordinate their interactions when dealing with victims and their families to the extent provided for under the laws of each State.

8. Modification

Modifications to this MOU should be in writing. To take into account any changes to international or national rules or policies, the MOU should be reviewed periodically by both Authorities.

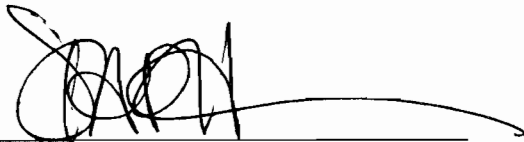
9. Duration

This MOU becomes effective when signed by both Authorities and is to remain in effect until discontinued by either Authority. Regarding investigations in progress, confidentiality of information previously provided under this MOU should survive discontinuation of this MOU, consistent with the national laws of the United States and France.

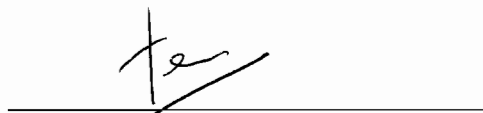
10. Resolution of Difficulties

The Authorities intend to consult, upon the request of either Authority, regarding any matter related to the scope of this MOU and jointly endeavor in a spirit of cooperation to resolve any difficulties or misunderstandings that may arise.

Signed in Le Bourget, France, on May 5, 2011, in two originals in the English language.



Chairman
National Transportation Safety Board



Director
Bureau d'Enquêtes et d'Analyses pour la sécurité
de l'aviation civile

**ATTACHMENT G: Docket Management System
CVR Report Placeholder**



National Transportation Safety Board

Cockpit Voice Recorder Factual Report and Transcript

Note:

This page has been inserted into the docket as a placeholder for the actual CVR Factual Report and Transcript.

Immediately prior to the docket's release to the public, the CVR Factual Report and Transcript shall replace this page.

Please contact the Chief of the Vehicle Recorder Division to release the CVR Factual Report and Transcript into the public docket system.