



# National Transportation Safety Board

Washington, D.C. 20594  
**Safety Recommendation**

Date: January 6, 1993  
In reply refer to: A-92-133

Honorable Thomas C. Richards  
Administrator  
Federal Aviation Administration  
Washington, D.C. 20591

On June 8, 1992, a Beech 1900 operated by G.P. Express Airlines crashed on its final approach to Anniston Metropolitan Airport, Anniston, Alabama. Two crewmembers and four passengers were on board: the captain and two passengers were killed; and the first officer and the two remaining passengers suffered serious injuries. The aircraft, which was destroyed on impact, was equipped with a cockpit voice recorder (CVR) manufactured by B+D Instruments and Avionics. Although the quality of the recording was generally good for the entire flight from Atlanta, Georgia, recovery of critical crew conversations was hampered by the simultaneous recording of the audio signals from the crewmembers' intercom microphones and radio transmissions on the same CVR channel.

On June 7, 1992, a Construcciones Aeronauticas S. A. (CASA) 212 operated by Executive Air Charter, Inc., crashed on its final approach to Eugenio Maria De Hosto Airport, San Juan, Puerto Rico, killing the five persons on board: two flight crewmembers and three passengers. The aircraft was equipped with a CVR manufactured by Loral Data Systems-Fairchild Aviation Recorders. Although the quality of the recording was good, determination of critical crew conversations was hampered by the simultaneous recording of the crew intercom signals and radio transmissions on the same CVR channel.

Federal regulations require a four channel CVR to be installed on each U.S.-registered turbine-powered aircraft and rotocraft that requires two pilots for operation and that is certificated to carry six or more passengers operating under 14 CFR Part 91 and 135. The four CVR channels consist of one channel connected to an open cockpit area microphone, and three radio/intercom channels that are connected to the audio selector panels of the captain, first officer, and second officer. The open cockpit area microphone records detected sounds and conversations in the cockpit, and the radio/intercom channels record audio information selected by the individual crewmembers. In an aircraft with no flight station for a second officer, the third radio/intercom channel is either connected to the aircraft's public address (PA) system or is left unused.

In 1987, the Safety Board asked the Federal Aviation Administration (FAA) to expand the requirement for the use of cockpit voice recorders on commuter and certain general aviation aircraft (Safety Recommendation A-87-81) and to require the use of "hot" boom microphones on all new CVR installations (A-87-89). In response to the recommendations, the FAA required all aircraft on which CVRs are installed after October 11, 1991, to be equipped with individual "hot" boom microphones and that each crewmember must wear a "hot" microphone when operating the aircraft below 18,000 feet.<sup>1</sup> Audio signals from the individual "hot" boom microphones are recorded on the corresponding crew radio/intercom channel of the CVR, regardless of the crew switch positions. Information recorded from the boom microphones supplements and enhances the information that is obtained from the cockpit area microphone. Since October 1991, the Safety Board has investigated several transport category aircraft accidents and incidents in which the CVR recorded signals from the "hot" boom microphones. The information substantially aided the Safety Board in its determination of the causes of these accidents and incidents.

Most turboprop airplanes, including the Beech 1900 and the CASA 212, are required to be equipped with a crew intercom system to contend with high levels of cockpit noise. The intercom system is used by the flightcrew for conversations during normal and emergency operations. The CVR records the crew intercom audio, the "hot" microphone signal, and the audio information from the aircraft radio transmissions on the crewmember's CVR radio channel. Turboprop airplanes are also equipped with a standard cockpit area microphone, whose output is recorded on a separate CVR channel; however, the high level of in-flight cockpit noise causes the area microphone channel to be ineffective in providing intelligible crew conversations.

During the readout process of the CVRs from the two accident airplanes referred to previously, it was noted that the high density of terminal air traffic control radio transmissions, recorded on the same CVR channel with the cockpit crew intercommunications, hampered the ability to obtain an accurate transcription of the inter-cockpit communications. The "hot" microphone and intercom communications were sometimes obscured by the radio transmissions because the volume levels of the radio and the intercom signals were approximately the same.

A similar problem also has been observed in aircraft with larger, quieter cockpits when crewmembers use "hot" boom microphones in flight. The audio information from the "hot" boom microphone is recorded simultaneously with the radio information on the CVR channel. However, obtaining an accurate transcription is easier because most of the crew conversations recorded through the cockpit area microphone channel of the CVR are intelligible.

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<sup>1</sup> As a result of the action taken by the FAA, the Safety Board classified the recommendations "Closed-- Acceptable Action" in March 1989.


The Safety Board is concerned that the benefits gained from recording inter-cockpit communications detected by the new "hot" boom microphones and crew intercom system are being reduced or eliminated by overlapping and competing radio transmissions being recorded on the same CVR channel as the "hot" and intercom audio sources.

All commuter and newly manufactured transport category aircraft currently in service are being operated by two pilots. Thus, the CVR radio/intercom channel provided for the second officer's radio is unused. The Safety Board believes that the inter-cockpit communications of the crew should be recorded on this unused channel of the CVR.

Therefore, the National Transportation Safety Board recommends that the Federal Aviation Administration:

Require, for aircraft that must be operated by two crewmembers and be equipped with a four-channel cockpit voice recorder (CVR), the exclusive use of the third CVR radio channel to record only audio signals from the cockpit crew intercom system and the two "hot" boom microphones. (Class II, Priority Action) (A-92-133)

Chairman VOGT, Vice Chairman COUGHLIN, and Members LAUBER, HART, and HAMMERSCHMIDT concurred in this recommendation.



By: Carl W. Vogt  
Chairman

