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FLIGHT RECORDINGS AS EVIDENCE IN CIVIL LITIGATION

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INTRODUCTION

Although advanced technology has brought commercial aviation to the threshhold of the supersonic age, recent headlines reveal that modern aircraft are still subject to such things as pilot error and mechanical failure. In addition to these factors, the increasing speed and altitude at which modern aircraft operate can produce tragic results—major air disasters with attendant loss of life.

In the event of such a disaster, both the flight data recorder and the cockpit voice recorder are invaluable tools for determining the cause of the accident. But the value of these recorders, however, is by no means limited to investigative purposes. The information obtained from these recorders can serve another useful purpose in the litigation that would follow a major accident. The information may establish who was at fault and could be a key evidentiary factor ultimately to determine the rights and liabilities of the parties.

But an attempt to introduce into evidence the information obtained from these recorders poses many problems for the litigant. The problems which are presented and the possible solutions to those problems are the subject of this article.

THE FLIGHT RECORDER AND COCKPIT VOICE RECORDER: DESCRIPTION, USE, AND IMPORTANCE

The increasing speed and altitude at which modern jet aircraft operate and the tremendous impact of a crash make the possibility of surviving witnesses remote at best. In addition, the total or near total destruction of the aircraft and the death of the crew spurred the U.S. governmental agencies to develop regulations requiring the installation of flight recorders in jet aircraft.[1] The need for the additional and valuable information which the flight recorders could supply became readily apparent since investigators often have few clues on which to make their determinations as to the cause of the disaster from the twisted, scattered and burning wreckage:

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* J.D., Boston College School of Law, 1975.

1. *See* Speiser, *Airplane Flight Recorders: A New Source of Evidence*, 2 FORUM 97 (1967).

> Before the advent of suitable recording devices, only a post-mortem analysis of the wreckage and interviews of any available survivors or eye-witnesses could be used to search for the clues of such a tragedy. It is, therefore, only natural that ways were sought to record events leading to such accidents and to preserve such records for thorough analysis.[2]

In 1957, the Civil Aeronautics Board made the first response to this increasing need for an additional investigative aid by adopting amendments to the Civil Air Regulations and requiring that flight recorders be installed in all jet aircraft over 12,500 pounds and operating above 25,000 feet.[3]

The flight recorder[4] is a small recording device that is installed in the aircraft for the purpose of receiving and recording on a rotating tape the impressions made by five styli from information electronically transmitted from various aircraft systems.[5] The regulations provide that the information recorded indicate the time, altitude, airspeed, vertical acceleration, and heading.[6] These recorder records must be retained for at least sixty days,[7] and the recorder must be activated the instant the plane commences its takeoff roll

2. Panel, *Voice Recorders and Flight Recorders*, 36 J. AIR. L. & COMM. 475 (1970) [Hereinafter referred to as Panel]. The cited article is one of many useful and informative articles comprising a symposium on several important aspects of aviation procedure, investigation and litigation.

3. Prior to 1958 the Civil Aeronautics Board (CAB) had authority over both accident investigation and the establishment of aviation regulations. The Federal Aviation Act of 1958, 49 U.S.C. § 1301 *et seq.* (1970), transferred the regulatory function of the CAB to the newly created Federal Aviation Agency, while the CAB retained its investigatory functions. This delegation of authority was in effect until 1966 when Congress passed the Department of Transportation Act, 49 U.S.C. § 1651 *et seq.* (1970), which amended the earlier Federal Aviation Act. The Department of Transportation Act § 6(c), 49 U.S.C. § 1655(c) (1970), declares that the regulatory Federal Aviation Agency was renamed the Federal Aviation Administration (FAA) and transferred to the Department of Transportation. Section 6(d) of the Department of Transportation Act, 49 U.S.C. § 1655(d) (1970), transferred the investigatory function of the CAB to the National Transportation Safety Board (NTSB) in the Department of Transportation. *See generally* Panel, *supra* note 2, at 475-76.

4. The flight recorder is also frequently referred to as the flight data recorder or foil.

5. *See* Speiser, *Airplane Flight Recorders and Related Devices*, in 20 AM. JUR. PROOF OF FACTS 575, 578 (1968). This article describes the highly technical installation, durability and data collection requirements which the regulations have prescribed for these flight recorders.

6. 14 C.F.R. § 121.343(a)(1) (1974).

7. 14 C.F.R. § 121.343(d) (1974).

and continue until it has completed its landing roll.[8] In 1970, the FAA amended the existing regulations to expand the recording capacity beyond the five parameters mentioned above.[9] It was provided that after September 18, 1973, such additional data as pitch, acceleration angle, flap control and position should also be recorded.[10]

But even with this expanded capacity the flight recorder may still be unable to indicate what factors contributed to the crash. Although it was a milestone in unveiling the mysteries surrounding the crash, one author recognized:

> Still it is a mechanical device and although it can retrace the movements of an aircraft with amazing accuracy, it tells nothing of the human element, the actions of the crew and passengers during the fateful few minutes prior to such occasions.[11]

An additional device was needed; one which would provide the investigators with supplemental information, and thus, assist them in narrowing down the number of probable causes involved in the accident. After several years of conducting studies, the Federal Aviation Agency, as it was then called, determined that the recording of spoken words of the flight crew during the flight of an aircraft was feasible. As a result, regulations were issued[12] prescribing that all planes which were equipped with flight recorders also be required to install cockpit voice recorders.[13]

The cockpit voice recorder, like the flight recorder, is subject to stringent federal regulations pertaining to installation and durability. The cockpit data recorder

> must be able to record each crew member's conversation with ground facilities and all conversations on the air-

8. 14 C.F.R. § 121.343(b) (1974).
9. Department of Transportation Act, § 6(c), 49 U.S.C. § 1655(c) (1970), *amending* Federal Aviation Act § 313(a), 49 U.S.C. § 1354(a) (1958). This section empowers the Administrator to conduct investigations, issue orders and to make and amend rules, regulations and procedures, pursuant to the provisions of the Act.
10. 14 C.F.R. § 121.343(a)(2) (1974).
11. Panel, *supra* note 2, at 478.
12. 14 C.F.R. § 25.1457 (1974); 14 C.F.R. § 121.359 (1974).
13. *See* Panel, *supra* note 2, at 479.

> plane's intercommunication system. Most important, direct conversation between crew members in the cockpit had to be recorded. The recorder must be able to retain the last 30 minutes of each conversations; it must also contain provisions to prevent accidental erasure of such recordings after a crash and of course it must survive the severe conditions encountered by modern jet aircraft. . . . The four available recording channels are assigned to record all crew conversations within the cockpit and to record the conversations of the first, second and third crew member with ground radio facilities or over the aircraft communications system.[14]

Presently the FAA records all communications from an aircraft to the control tower twenty-four hours a day. In the event of an accident these tapes are rerecorded and transcripts made of the pertinent communications. The original is preserved for five years.[15] The cockpit voice recorder is intended to act as a supplement rather than a replacement to these ground based recorders by covering crew conversations. This supplemental recorder, therefore, provides evidence which might have heretofore been lost.

> At times, a pilot who is aware of the nature of an emergency that has put his aircraft in danger is too preoccupied with an attempted recovery to radio an explanation to a ground station. The conversation between the pilots and flight engineers, however, or the orders issued by the pilot in command to his other crew members may contain valuable information relating to the cause of the accident.[16]

Thus, the cockpit voice recorder is by far the most conclusive instrument that has so far been made available.[17]

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14. *Id.* The cited passage has summarized the numerous technical requirements pertaining to the cockpit voice recorder in 14 C.F.R. § 25.1457 (1974).

15. *See* Crocker, *Admissibility of FAA Tape Recordings in Aviation Accident Litigation*, 35 INS. COUNSEL J. 259 (1968); Speiser, *Airline Passenger Death Cases*, in 8 AM. JUR. *Trials* § 173 (1965).

16. Speiser, *Airplane Flight Recorders and Related Devices*, in 20 AM. JUR. PROOF OF FACTS 568, 593 (1968).

17. The use of the cockpit voice recorder simultaneously with the flight data recorder allows federal investigators to develop a much clearer picture of events prior to an accident. *See* Panel, *supra* note 2, at 484-85.

The recovery of both the flight and the cockpit voice recorder is of prime importance when the investigation of an airline crash commences.[18] As soon as the operator of an aircraft is involved in an accident,[19] the Bureau of Aviation Safety of the National Transportation Safety Board must be notified.[20] Once notified, the NTSB investigator will go to the scene of the accident, make an immediate effort to recover the flight and cockpit voice recorders, cordon off the area, designate the parties who may participate in the investigation,[21] and sequester the recorder.[22]

Although the recorders' installation is governed by rigid durability requirements,[23] the violent impact of the crash may have damaged the tapes and data foil. The recorders cannot be opened until a member of the investigative staff is present. Normally the recorders are forwarded to the NTSB in Washington because, in handling the flight recorder "extreme care is essential in removing the record from an extremely crushed recorder and . . . observation of the styli position and condition may serve to explain unusual traces on the recording medium."[24] Similar caution must be exercised in handling the cockpit voice recorder. Once opened, the voice recorder's tapes are run through complex readout devices, and to safeguard against possible loss, certified copies are made of each recorder track and

18. The flight recorder and cockpit voice recorder are sometimes placed within the same housing but generally are installed separately in the aircraft. To facilitate locating these recorders after a crash, the regulations provide that they be painted either bright orange or bright yellow. 14 C.F.R. § 25.1457(g) (1974) (flight recorder); 14 C.F.R. § 25.1459(d) (1974) (cockpit voice recorder).

19. 14 C.F.R. § 430.2 (1974).

20. 14 C.F.R. § 430.5 (1974). *See* Hill, *U.S. Air Carrier Accident Investigation Procedure*, 36 J. AIR L. & COMM. 414, 415 (1970). The author presents a brief summary of the various functions to be performed by the NTSB and FAA following an airline crash.

21. 14 C.F.R. § 431.13(b) (1974) provides that these parties shall be responsive to the appropriate Board representative and can be relieved from participation if they conduct themselves in a manner prejudicial to the investigation.

22. *See* Miller and Hanlon, *Procedure and Conduct During On-Site Investigations of Aviation Accidents*, 36 J. AIR. L. & COMM. 394, 400 (1970). The authors largely credit the work done by the NTSB at the site of a major air disaster, and state that the procedures followed have proven themselves to the point that other countries copy them at least in principle. *See also* Lyall, *Aircraft Accident Investigations—the 1969 Regulations*, 18 JURIDICIAL REVIEW 228 (1971). The article indicates that the procedures have been followed in England not only as to the investigation but also as to the public hearings that are subsequently held.

23. 14 C.F.R. § 37.150 (1974).

24. Speiser, *Airplane Flight Recorders and Related Devices*, in 20 AM. JUR. PROOF OF FACTS 567, 588 (1968).

then transcripts prepared of all the recorded information. At this point, background noise can be isolated, enhanced or eliminated to reconstruct specific events in the cockpit.[25]

After the initial investigation, the Chairman of the Safety Board will order a hearing whenever he deems it necessary in the public interest.[26] During the hearing, data gleaned from the flight recorder and information disclosed by the cockpit voice recorder is made available to the public.[27] It should be noted, however, that the information obtainable at the hearings is factual only. The Board's final report and conclusions are not made public until a subsequent time.

LITIGATION PROBLEMS PRESENTED BY § 1441(e)

In civil litigation, the flight recorder and cockpit voice recorder can serve as invaluable tools. They may be the only evidence available to determine the cause of the plane crash.[28] But the accumulation of data from the flight recorder or the presentation of the recorder trace itself would be meaningless to the court and jury without any explanation.[29] Even the recorded conversation of the crew on the cockpit voice recorder is not self-explanatory, and in the absence of any explanation, the tapes may not provide the jury with any indication of how the words spoken relate to the cause of the crash.

Most helpful in clearing up these difficulties would be either the final report of the NTSB containing its determinations and conclusions, or the expert testimony of a member or employee of the Board as to what connections can be made between the conversations and data before the jury and the probable cause of the crash.

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25. *See* Panel, *supra* note 2, at 480-81.

26. 14 C.F.R. § 431.21 (1974).

> In reaching his decision, the Chairman will consider the degree of public interest in the particular accident involved, the seriousness of possible deficiencies in the aircraft or related equipment, the type of operation involved, and the potential benefit in terms of accident prevention.

Puls, *Aircraft Accident Hearings*, 36 J. AIR L. & COMM. 401, 404 (1970).

27. *Id.* at 404-08. The article presents a complete description of the procedures followed at these accident hearings. *See also* Levy, *The Role of Federal Investigation in an Aircraft Case*, 18 PRAC. LAW. 65 (1972). The article entails a brief but comprehensive sketch of the entire investigative process from its initial phase to its final determination of cause.

28. *See* Note, *Evolving Methods of Scientific Proof*, 13 N.Y.L.F. 675, 769 (1967).

29. *See* Speiser, *Airline Passenger Death Cases*, in 8 AM. JUR. *Trials* 173 (1965).

Such valuable definitive reports and testimony are statutorily barred, however, by the Federal Aviation Act.[30] The restrictions on the use of the Board's findings are quite apparent from a reading of the relevant regulations.

> The government has administratively construed § 1441(e) to prohibit use in tort litigation, either at the discovery or at the trial level, of the Board's expert opinions, conclusions, evaluations and recommendations. Pursuant to that interpretation, the Board promulgated a regulation which presently authorizes its employees to testify "only as to those facts actually observed by them in the course of their accident investigations and shall respectfully decline to give opinion evidence as expert witnesses, their evaluations and conclusions, or testify with respect to recommendations resulting from accident investigations . . . ."[31]

In addition to limiting the scope of the testimony, the above regulation makes it difficult to elicit even that limited testimony from Board employees. Board employees may not testify in any action unless an "appropriate showing has been made that the facts desired to be adduced are not reasonably available to the party seeking such evidence by any other method including the use of discovery procedures against the opposing party."[32] And such preliminary or factual information will only be made available provided that furnishing it will not disrupt the course of an accident investigation or interfere with the employee's duty in investigating the accident.[33] Litigants are expected to obtain their own expert witnesses from other sources.[34] Requests for testimony of a board employee must be addressed to the general counsel who may approve or deny the request,[35] and if denied the employees will not be

30. 49 U.S.C. § 1441(e) (1970) declares:
No part of any report or reports of the Board relating to any accident or the investigation thereof, shall be admitted as evidence or used in any suit or action for damages growing out of any matter mentioned in such report or reports.

31. Good, *Use of Long Interrogatories in Aviation Cases*, 36 J. AIR. L. & COMM. 452, 453 (1970), quoting 14 C.F.R. § 435.4(a) (1970).

32. 14 C.F.R. § 435.4(a) (1974).

33. 14 C.F.R. § 435.3(a) (1974).

34. 14 C.F.R. § 435.4(a) (1974).

35. 14 C.F.R. § 435.4(d) (1974).

subject to civil subpoena for discovery or for trial.[36] Finally, employees may testify in actions for damages only by way of deposition or written interrogatories.[37] It should be noted that these prohibitions apply only in private litigation, not when the United States is a party defendant. And because this expert testimony is difficult to obtain from other than the investigative board personnel, it has been suggested wherever possible to name the federal government as a party defendant in an action involving an aircraft accident.[38]

Despite the explicit provisions of the regulations, the construction of § 1441(e) has been the subject of much litigation. The courts have narrowly construed the provision.[39] Although the statute bars the admission of board reports which express agency views as to probable cause, it does not prevent investigating officials from testifying as to personal observations about the condition of the plane after the accident.[40] The prevailing opinion is set forth in *Berquido v. Eastern Airlines, Inc.*,[41] where the court interpreted the provision as follows:

> The fundamental policy underlying 1441(e) appears to be a compromise between the interests of those who would adopt a policy of absolute privilege in order to secure full and frank disclosure as to the probable cause . . . and the countervailing policy of making available all accident information to litigants in a civil suit. Accordingly, the primary thrust of the provision is to exclude CAB reports which express agency views as to the probable cause of the accident.[42]

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36. 14 C.F.R. § 435.4(d)(2) (1974).

37. 14 C.F.R. § 435.4(c) (1974). This section formerly provided that they would be allowed to testify if unusual circumstances were shown.

38. *See* Speiser, *Airplane Flight Recorders and Related Devices*, in 20 AM. JUR. PROOF OF FACTS 567, 596 (1968); Falk v. United States, 53 F.R.D. 113, 115 (D.C. Conn. 1971): "When the government acts as a litigant, as distinguished from its regulatory functions, its status is hardly different from that of a private citizen."

39. *See, e.g.*, Israel v. United States, 247 F.2d 426 (2d Cir. 1957); Ratner v. Arrington, 111 So. 2d 82 (Fla. Ct. App. 1959).

40. Lobel v. American Airlines, Inc., 192 F.2d 217 (2d Cir. 1951).

41. 317 F.2d 628 (3rd Cir. 1963), *cert. denied*, 389 U.S. 925 (1967).

42. *Id.* at 631-32.

This interpretation was followed in *American Airlines, Inc. v. United States*[43] where the defendant airline objected to the introduction into evidence of a report by the CAB which contained a graph plotting the "indicated" altitude and a document explaining the read-out from the flight recorder of an aircraft which had crashed. In upholding the admissibility of the report and the document, the court stated that the defendant's objection to their introduction was at variance with the prevailing statutory interpretation as stated in *Berguido*, since neither the report nor the document reflected the Board's evaluation of the data in reaching a decision on probable cause.[44] When the defendant stressed the opinion nature of the testimony, the court further interpreted *Berguido* as establishing that opinion testimony going beyond merely personal observations is admissible provided such testimony does not presume to be official agency opinion.[45]

Thus, *Berguido* appears to be the controlling authority on interpreting the scope of § 1441(e).[46] But in spite of this statutory provision, these reports and the testimony of CAB employees, no matter how restricted in scope, are so important in clarifying and explaining data gleaned from the flight recorder that every effort should be made to obtain as much available information as possible. As one author commented: "[V]erdicts prove that superficial discovery is the sure road to defeat in the jury room . . . . Experience proves that all of the discovery tools frequently should be applied."[47]

Previous Aviation Litigation Involving the Use of Recorded Communications

The admissibility of the flight recorder or the cockpit voice recorder has never been considered in a reported case. As indicated above, much of the post-accident litigation concerned with the admissibility of FAA documents or records has focused on a judicial

43. 418 F.2d 180 (5th Cir. 1969).

44. *Id.* at 196.

45. *Id.*

46. *Cf.* Simpson, *Use of Aircraft Accident Investigation Information in Actions for Damages*, 17 J. Air. L. & Comm. 283 (1950). The article supports the Board's position on disclosure of accident reports and reluctance toward permitting employees to testify. *But see* Florsheim, *Administrative Law—Aircraft Accident Investigation Records—Freedom of Information Act*, 33 J. Air. L. & Comm. 490 (1967).

47. Good, *supra* note 31, at 453.

interpretation of §1441(e).[48] The courts in those cases were asked to consider the admissibility of documents prepared by government investigative agencies[49] or board employees' testimony,[50] but were never presented with the question of the admissibility of FAA recordings of any kind. In fact, the only reported decisions where a court has considered the question of admissibility of a tape recording of radio communications between aircraft and ground installations in civil aviation litigation is *LeRoy v. Sabena Belgian World Airlines*.[51]

Prior to *LeRoy* there were several decisions which involved the use of a recorded conversation between an aircraft and ground installations, but none discussed the admissibility of the recording itself. In *Schuyler v. United Air Lines*,[52] the plaintiff sought a new trial because the court had excluded a photostatic copy of an investigator's report containing radio communications made immediately before the crash. The defendant had objected to the admission of the report on several grounds: best evidence rule; hearsay; not a business record; and exclusion under §1441(e).[53] In denying the motion for a new trial, the court agreed with the defendant on the issue of best or secondary evidence, but did not discuss the other contentions.[54] The case disclosed that the original recording had been played twice to the jury although the court made no further mention as to the admissibility of the original recording.

Sprecht v. CAB[55] was an appeal from a decision of the CAB revoking a pilot's rating for failing to adhere to his traffic control clearance altitude. The pilot alleged that he left his assigned altitude because he encountered an icing condition which imperiled his

48. Federal Aviation Act § 701(e), 49 U.S.C. § 1441(e) (1970).

49. American Airlines, Inc. v. United States, 418 F.2d 180 (5th Cir. 1969).

50. Berguido v. Eastern Airlines, Inc., 317 F.2d 628 (3rd Cir. 1963), *cert. denied*, 389 U.S. 925 (1967).

51. 344 F.2d 266 (2d Cir. 1965), *cert. denied*, 382 U.S. 878 (1966). *See* Crocker, *supra* note 15, at 259-61. This article is an extremely helpful and concise sketch of the major evidentiary problems that would be raised in FAA recordings cases.

52. 94 F.Supp. 472 (M.D.Pa. 1950).

53. *Id.* at 475.

54. *Id.* The court held that since the tape recordings of the last radio message allegedly received from the airplane prior to the crash were present in court and available, the alleged report concerning the message was properly excluded as secondary evidence.

55. 254 F.2d 905 (8th Cir. 1958).

aircraft. The reviewing court relied heavily on a transcript of the recorded conversation between the pilot and the control tower to show that no emergency existed which justified a change in altitude[56] and sustained the conclusion of the Board.[57] The court did not discuss the admissibility of the recording or the transcript other than to say it was unquestioned.[58]

Eastern Air Lines v. Union Trust Co.[59] illustrates the type of problem encountered before such recordings were generally made available. The pilot of a P-38 who assumed he had been cleared to land, began his descent and struck a commercial airliner. There was a substantial conflict in the testimony concerning radio messages just prior to the accident. The air traffic controller testified that he cleared the Eastern DC-4 to land, and that the plane was in the process of making an authorized descent when it was struck by the P-38. The appellees, however, introduced the testimony of two pilots that the Eastern plane was given no such clearance.[60] The reviewing court resolved the conflict in favor of Eastern by holding that the affirmative testimony that Eastern had been cleared to land was not controverted by sufficient evidence on the part of the plaintiffs.[61]

So prior to *LeRoy*,[62] the question of the admissibility of flight recorded communication of any kind had never been decided. *LeRoy* was an action for wrongful death brought on behalf of the children of the decedent who was killed in the crash of defendant's airplane on the last leg of a flight from Brussels to Rome. The plaintiff sought to avoid the limitation of the Warsaw Convention[63]

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56. *Id.* at 908-14.

57. *Id.* at 914.

58. *Id.* at 908.

59. 221 F.2d 62 (D.C. Cir. 1955).

60. *Id.* at 65-68. The testimony tended to establish that the pilot of the P-38 had in fact made the unauthorized descent. The Air Traffic Controller told him, "You are No. 2 to land." *Id.* at 66. The controller meant that he was to land after the Eastern DC-4. The pilot of the P-38 did not see the Eastern plane at any time, and when he saw another aircraft, a Lockheed or Beechcraft taxiing from runway 3 he again radioed the tower. The tower responded ". . . prepare to land on Runway 3." *Id.* at 67. This was not an instruction to begin his descent immediately. Several seconds after the pilot began his descent he struck the Eastern plane.

61. *Id.* at 72-73.

62. Leroy v. Sabena Belgian World Airlines, 344 F.2d 266 (2d Cir. 1965).

63. Convention for the Unification of Certain Rules Relating to International Transportation By Air, Oct. 12, 1929, 49 Stat. 3000 (1936). *See* Lowenfeld and Mendelsohn, *The United*

by showing that Sabena was guilty of willful misconduct. The plane should have been flying in a ten-mile-wide corridor which would have brought it in contact with a signal beacon as it approached the Rome airport. The plaintiff alleged willful misconduct on the part of the pilot in that he deliberately mislead the Rome controller as to his position to avoid a delay which would have been caused if he had reported an uncertain position.

Over the defendant's objections that it was hearsay, the plaintiff introduced a transcript of a radio conversation between the pilot and the Rome controller. The transcript showed that five minutes before the crash a Swissair plane had passed over the beacon and reported that it was operating; three minutes before the crash, the controller radioed the Sabena pilot and asked if he had passed the beacon and the pilot confirmed that he had. The controller therefore authorized a descent which would have been safe if the plane was in the proper air corridor but proved disastrous with the plane in the area in which it was. The plane hit the side of a mountain killing all aboard. In reconstructing the hypothetical position of the plane when it confirmed that it had passed the beacon, it was shown that the plane was then thirty miles from the beacon, and that the beacon only had a range of twenty-two miles.

The court discussed the admissibility of the recording and held that the transcript would be admissible if the original recording would have been,[64] and held that the original recording would have been admissible as an ordinary business record[65] under the Federal Business Records Statute.[66] This disposed of the hearsay objection with respect to the controller's statements. With respect to the pilot's statement that he had passed the beacon, the court held that although it was hearsay, it was admissible as an admission of a party opponent. It was this statement of the pilot that was the

States and the Warsaw Convention, 80 HARV. L. REV. 490 (1967). *See generally* Tompkins, *Limitation of Liability By Treaty and Statute*, 36 J. AIR L. & COMM. 421, 430 (1970). The use of recorded data and communications provided by an aircraft's flight and cockpit voice recorders and those recordings made by ground based installations would be invaluable in counsel's effort to establish wilful misconduct and thereby go beyond the recovery limitation provisions.

64. Leroy v. Sabena Belgian World Airlines, 344 F.2d 266, 274 (2d Cir. 1965).

65. *Id.*

66. 28 U.S.C. § 1732 (1970); *see also* note 120 *infra* and accompanying text.

evidence of willful misconduct and was submitted to the jury which did find such misconduct and awarded plaintiff $205,705.00. Judgment was entered on that verdict and affirmed on appeal.[67]

Although the court in *LeRoy* considered only the admissibility of recordings made by ground-based installations, the court's analysis of the admissibility question would be applicable in civil aviation litigation where a party seeks to introduce evidence obtained from either the flight data recorder or the cockpit voice recorder.[68] The court's opinion, however, is primarily limited to a discussion of the hearsay issue which is only one of several evidentiary problems attendant the introduction of a sound recording into evidence. Other issues which must be considered are examined below.

THE EVIDENTIARY PROBLEMS

Laying the Proper Foundation for the Admission of the Recordings[69]

The litigant seeking to introduce a sound recording into evidence must first lay a proper foundation of authenticity of the sound recording.

> The cases are in general agreement as to what constitutes a proper foundation for the admission of a sound recording

67. *Id.* at 274. The court also held that the transmissions from the Swissair flight were hearsay, but their admission did not prejudice Sabena. The Court stated:

> Since one of Sabena's principal contentions to the jury was that its plane could have picked up the . . . beacon . . . , it could only have been to its advantage to establish that the beacon was operating.

Id.

68. This is especially the case with respect to the cockpit voice recorder. Since the recordings made by the ground based installations and those made by the cockpit voice recorder are sound recordings, they pose identical admissibility problems. Consequently, the focus of the remainder of the article will be primarily on the cockpit voice recorder rather than the flight data recorder. The data recorder will not, however, be omitted from discussion, and reference will be made to it in those portions of the paper where the evidentiary problems raised by the tapes are sufficiently analogous to those that would be raised by the data recorder to warrant a comparison.

69. The cockpit voice recorder is a tape recording and there are many decisions in non-aviation cases discussing the admissibility of tape recordings into evidence. Although the facts of the cases differ substantially from those which would arise in the case of an FAA recording (since most of those non-aviation cases are criminal), the problems of admissibility and the requirements necessary for admission are substantially the same. Thus, analogy is made to those cases to show how similar problems of admissibility may be met and overcome in situations involving FAA flight recordings. *See* Crocker, *supra* note 15.

> and indicate a reasonably strict adherence to the rules prescribed for testing the admissibility of the recordings which have been outlined as follows: (1) a showing that the recording device was capable of taking testimony; (2) a showing that the operator of the device was competent; (3) establishment of the authenticity and correctness of the recording; (4) a showing that changes, additions or deletions are not present; (5) a showing of the manner of the preservation of the recordings; (6) identification of the speakers; (7) a showing that the testimony elicited was voluntarily made without any kind of inducement.[70]

There are several cases which have specifically enumerated these seven elements in determining whether an adequate foundation had been laid.[71] Other cases list several of the elements.[72] Generally, a proper foundation may be laid only by substantially meeting all of these requirements. Except for the problem of identification of the speakers, these requirements should not pose any real problem in the case of flight recordings,[73] but each will be given individual consideration.

The first requirement necessary for laying a proper foundation for the admission of a tape recording is the capability of the recording device. In view of the extremely rigid regulations established as to the quality design and installation of both the cockpit voice recorder and the flight data recorder,[74] it seems unlikely that a party would be persuasive in questioning the recorders' capability.

The party seeking to introduce the recording must also be able

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70. 29 AM. JUR. 2d *Evidence* § 436 (1967); *see also* Annot., 58 A.L.R.2d 1024, 1032-36 (1958).

71. *Cf.* Steven M. Soloman Jr., Inc. v. Edgar, 92 Ga. App. 207, 211-12, 83 S.E.2d 167, 171 (1955); People v. Frison, 25 Mich. App. 146, 147-48, 181 N.W.2d 75, 76-77 (1970); People v. Taylor, 18 Mich. App. 381, 383-84, 171 N.W.2d 219, 220 (1969); State v. Miller, 6 Ore. App. 366, 369-70, 487 P.2d 1387, 1389 (1971); State v. Williams, 49 Wash. 2d 354, 360, 301 P.2d 769, 772 (1956) (following *Soloman* and stating that the court did not feel that the rule requires an excessive burden of preliminary proof to establish admissibility of the recording).

72. *See, e.g.*, Parnell v. State, 218 So. 2d 535, 541 (Fla. App. 1969) (requiring at least four of the above seven requirements); State v. Myers, 190 Neb. 146, 149, 206 N.W.2d 851, 854 (1973) (discussing five of the seven listed requirements); Williams v. State, 93 Okla. Crim. 260, 270-71, 226 P.2d 989, 995 (1951).

73. *See* Crocker, *supra* note 15, at 261.

74. *See* notes 6, 12 and 18 *supra*.

to show that the operator was competent. Again, this should present no problem since the recorders operate automatically from the time the plane commences its takeoff roll until it has completed its landing roll[75] (flight recorder), or from before the engines are started to termination of the final checklist after the flight[76] (cockpit voice recorder). And the communication tapes in the control tower are changed every twelve hours by trained personnel.[77]

In *Gomien v. State*[78] the court held that a proper foundation was laid when a witness testified that all he was required to do was turn a switch that started a recording. The actual operation of the recording was under the control of a thoroughly capable and experienced operator who testified as to how he operated the equipment.

The party seeking to introduce the tape recording is also required to show that no changes, additions, or deletions have been made. If the party contesting the admissibility of a tape recording can show that it has been erased, deleted, or changed in any manner, the court would sustain an objection to its admission.[79] But again, it is unlikely that a party would be persuasive in asserting that the tapes were deleted or erased in part. In fact, the only erasure done by the FAA is to eliminate or isolate background noise in the cockpit.[80] Similarly, a representative of the FAA to whom the tapes were entrusted could be deposed to show that no deletions or alterations were made. In *United States v. Fuller*,[81] the court held that a foundation for establishing such accuracy was sufficiently laid when agents through whose hands the tape passed testified that it had not been altered and its condition at the time of trial was identical to that at the time of seizure.[82]

The party seeking to introduce the tape recording must be prepared to show the manner of preservation of the recording. In *Jones v. State*[83] the court held that where it conclusively appeared that a

75. *See* note 8 *supra*.
76. 14 C.F.R. § 121.359(a) (1974).
77. *See* Crocker, *supra* note 15, at 262.
78. 172 So. 2d 511, 515 (Fla. App. 1965).
79. Williams v. State, 226 P.2d 989, 995 (1951). *Accord*, Cummings v. Jess Edwards, Inc., 445 S.W.2d 767, 773 (Tex. App. 1969).
80. *See* note 25 *supra* and accompanying text.
81. 441 F.2d 755 (4th Cir. 1971), *cert. denied*, 404 U.S. 830 (1971).
82. *Id.* at 762.
83. 253 So. 2d 154 (Fla. App. 1971).

recorded disc of the defendant's statement had remained in possession of the local detective bureau from the time it was made until the time it was offered into evidence and that it was in the same condition when it was offered in evidence as when originally taken to the bureau, there was sufficient compliance with the rule governing the continuity of possession.[84] It is not difficult to show the manner of preservation for FAA flight recordings, since the recorder is usually sent from the scene of the crash directly to Washington and remains there while transcripts and rerecordings are made.[85]

The requirement that the testimony be voluntarily given is applicable primarily in criminal cases[86] to protect against entrapment. It could not seriously be contested that what was recorded on FAA tapes was involuntarily given.

Establishing the authenticity of an FAA recording by identification of the speakers presents the only difficulty in laying a proper foundation for admission of the recording.[87] But on the other hand it is not an insurmountable task.

> Modern technology makes commonplace the receipt of oral communications from persons who are heard but not seen. The problems of authentication raised by these communications are substantially analogous to the problems of authenticating writings.[88]

Three methods may be used in authenticating writings:[89] (1) have

84. *Id.* at 157; *see also* State v. Alleman, 218 La. 822, 829, 51 So. 2d 83, 85 (1950). The defendant contended that the state did not disclose the method it used to preserve a wire recording. The court disagreed, stating that where the state had shown that after the recording was made it was in the care and custody of one of the officers and locked in the sheriff's office and that prior to trial the state had established that it was an exact reproduction, proper preservation was sufficiently shown.

85. *See* note 24 *supra* and accompanying text.

86. *See, e.g.*, State v. Hendricks, 456 S.W.2d 11 (Mo. 1970); Commonwealth v. Jackson, 450 Pa. 575, 301 A.2d 632 (1973).

87. These two requirements are combined because they are necessarily analogous. Identification of the speakers in a recorded conversation establishes authenticity.

> If direct testimony of the authorship of a writing or of an oral statement is given, this is sufficient authentication and the judge has no problem on that score.

C. McCORMICK, EVIDENCE, § 227, at 555 (2d ed. 1972) [hereinafter cited as McCORMICK]. *See also* 32 C.J.S. *Evidence* § 738 (1964).

88. McCORMICK, *supra* note 87 at § 226.

89. Tracey, *The Introduction of Documentary Evidence*, 24 IOWA L. REV. 436, 441-45 (1969).

the witness testify that he was present and saw the party sign;[90] (2) if the witness did not see the party sign but is familiar with his signature, have the witness identify the signature as the genuine signature of the person purporting to sign;[91] (3) if the witness is neither present nor sufficiently familiar with the party's signature to testify to the genuineness of the specimen but does have in his possession another document signed by such party, have the witness produce that document for comparison with the specimen.[92]

Where the witness actually hears the original conversation which is being recorded and identifies the voice on the tape as that of the participant in the conversation, the tape is authenticated. This authentication by direct proof is analogous to the situation where a witness personally observes a party sign the writing.[93] In *Todisco v. United States*,[94] a prosecution for attempting to bribe an I.R.S. agent, the court held that a tape recording of a conversation with the defendant was properly authenticated where the agent, who had participated in the conversation with the defendant, testified as to the accuracy of the tapes and identified the voices that could be heard. One court also held that voices on a tape were properly identified where a witness testified that he had seen the conversation taking place with two police officers and the defendant, and the witness had placed the recorder on one of the police officers.[95] Since the court had already heard the officers testify, the court deduced that the third voice had to be that of the defendant.

It was suggested by one court that the most logical way to lay a foundation for the playing of the recordings was for the participant

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90. *See, e.g.*, Durham v. State, 422 P.2d 691 (Wyo. 1967).

91. *See* McCORMICK, *supra* note 87, at § 221. Tracey, *supra* note 89 at 443:

> The witness . . . must, of course, be qualified . . . not . . . [as] a handwriting expert, but only that he be shown to be a person acquainted with the handwriting of the person whose signature he identifies and that from such acquaintance he is satisfied that the signature is genuine.

92. *See, e.g.*, United States v. Cashio, 420 F.2d 1132 (5th Cir. 1970). *See also* McCORMICK, *supra* note 87, at § 221.

93. *See* note 90 *supra* and accompanying text.

94. 298 F.2d 208 (9th Cir. 1961), *cert. denied*, 368 U.S. 989 (1962). *Accord*, Chavira Gonzales v. United States, 314 F.2d 750 (9th Cir. 1963); Brandow v. United States, 268 F.2d 559 (9th Cir. 1959); Webb v. State, 486 S.W.2d 684 (Ark. 1972); People v. Dupree, 156 Cal. App. 2d 60, 319 P.2d 39 (1st Div. 1957).

95. Lindsay v. State, 41 Ala. 85, 125 So. 2d 716 (Ala. App. 1960), *cert. stricken*, 125 So. 2d 725 (Ala. 1960).

in the conversations to listen to the recordings and to state whether, according to his recollections, the conversations were truthfully recorded.[96] And, finally, one court has held that where a participant in the taping of a conversation testifies, his testimony meets the first five of the seven requirements.[97]

Under the above analysis, an air traffic controller or a surviving crew member could authenticate FAA recordings by direct proof. A controller who was a participant in the original communication between the aircraft and a ground based installation could authenticate the tape by identifying the voices that are heard on the tape.[98] A surviving crew member who was in the presence of the pilot and hears the original communication can similarly authenticate the tape by identifying the voice on the recording as that of the pilot.[99] But the testimony of a witness who was a participant in the original conversation or a witness who was in the immediate presence of the speaker is not essential to authenticating a tape.[100] In the absence of such direct proof there are still three methods of identifying the speaker's voice on the recording by means of circumstantial proof.[101]

The first method is to have a witness familiar with the voice of the speaker identify that the voice heard on the tape is that of the speaker. This authentication by a person not in the presence of the speaker is analogous to the situation in which a witness familiar with the handwriting of a particular party identifies the signature of that party although he did not see the party sign.[102] In trying to establish the identity of the speaker, a relative or friend who is familiar with the voice could be called to identify it.[103]

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96. People v. Finch, 216 Cal. App. 2d 444, 453, 30 Cal. Rptr. 901, 907 (1963).

97. State v. Miller, 6 Ore. App. 366, 370-71, 487 P.2d 1387, 1390 (1971).

98. *See* note 94 *supra* and accompanying text.

99. *See* note 95 *supra* and accompanying text.

100. Anderson, *Tape Recordings as Evidence*, in 17 AM. JUR. 2d PROOF OF FACTS 1, 44 (1966):

> It is advisable but not absolutely necessary for witnesses to have seen the speaker at the time the recording was made in order to identify the speaker.

101. Winburn v. Minnesota Mutual Life Insurance Co., 261 S.C. 568, 576-77, 201 S.E. 2d 372, 376 (1973):

> The proof of authenticity required preliminary to the introduction of an instrument in evidence need not be direct proof. Authenticity of documentary evidence may be shown, so as to render it admissible in evidence, by direct or circumstantial evidence.

102. *See* note 95 *supra* and accompanying text.

103. McGuire v. State, 200 Md. 601, 92 A.2d 582 (1952), *cert. denied*, 344 U.S. 928 (1953).

In *People v. Nahas*,[104] two police officers testified that they knew the defendant and heard his voice before the date in question and testified that the voice on the recording was that of the defendant. The court held that was sufficient identification of the defendant's voice to be authenticated. Similarly, in *LeRoy*, there was a tentative identification by another captain who testified that he was "practically sure that he recognized the voice of the particular crew member."[105] The court stated that this identification taken in the context of the transmission "makes it highly unlikely to say the least, that a transmission purportedly coming from the Sabena plane did not in fact do so. We think that the source of the transmission was sufficiently identified."[106]

It should be noted that the identity of the party need not be known at the time of the conversation—it is sufficient if the knowledge which enabled the witness to identify the other party was obtained later.[107]

A second method of circumstantial proof, analogous to that used to identify participants in telephone calls, also may be used to authenticate a recording. Thus, where the pilot directly identifies himself or his flight and the circumstances would tend to confirm his identity (*i.e.*, flight, path, position, etc.) the source would be sufficiently identified and the recording identified.[108]

Direct proof is not required,[109] but a mere statement of identity by the party calling or called is not in itself sufficient proof of such identity; unless, in addition to his statement of identity, he relates facts and circumstances which would tend to reveal that identity.[110]

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104. 9 Ill. App. 3d 570, 578, 292 N.E.2d 466, 472 (1973).

105. LeRoy v. Sabena Belgian World Airlines, 344 F.2d 266, 274 (2d Cir. 1965).

106. *Id.*

107. State v. Porter, 251 S.C. 393, 398, 168 S.E.2d 843, 846 (1968). State v. Massey, 266 S.W.2d 880, 883 (Tex. App. 1954) (even one year later). The court stated:

> We know of no reason why the time of the personal meeting should enter into the question of admissibility, though it might well effect its weight.

108. Crocker, *supra* note 15, at 262.

109. United States v. Young, 470 F.2d 962, 964 (9th Cir. 1972), *cert. denied*, 410 U.S. 967 (1973). The circumstantial evidence connecting the defendant with telephone calls was adequate foundation for admission of the telephone records against him. Direct proof is not required. *Accord*, United States v. Estrada, 441 F.2d 873, 878 (9th Cir. 1971), Carbo v. United States, 314 F.2d 718, 743 (9th Cir. 1963).

110. 29 AM. JUR. 2d *Evidence* § 383 (1967).

Thus, with the emphasis placed upon circumstances,

> [t]he FAA tape recordings provide an even more reliable check on identification since it can be shown by independent evidence that the aircraft was in the transmitting area, that when the place was called by its identification number the person answering identified himself as speaking from the plane and the nature of the call and surrounding facts and circumstances usually will tend to confirm that identity.[111]

One final method of identifying the speaker's voice is to compare it with other voice tapes of the pilot which might exist or by a scientific comparison of the "voice prints" or sound spectrograms of the existing tapes with the voice on the accident recording.[112] This last method of authentication is analogous to authenticating a writing by comparing the handwriting of a questioned document with that of an exemplar.[113]

Admissibility as a Business Record Under 28 U.S.C. § 1732

The tapes from the cockpit voice recorder and those recordings made by FAA ground based installations may or may not contain hearsay depending on the nature of the transmissions and the purpose for which they are offered.[114] Even if the recording does contain hearsay it would be admissible as a record made in the regular course of business under 28 U.S.C. §1732.[115] In *LeRoy* the court held

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111. Crocker, *supra* note 15, at 262.

112. *Id.* For a discussion of the admissibility of spectrography evidence, *see* Annot., 49 A.L.R.3d 915 (1973); Comment, *Evidence: Admissibility of Spectrographic Voice Identification*, 56 MINN. L. REV. 1235 (1972).

113. *See* note 96 *supra* and accompanying text.

114. Crocker, *supra* note 15, at 262. The author gives two examples to point out the difference. If the recording is offered to show that the control tower warned the deceased pilot of another aircraft in the traffic pattern or instructed the pilot that he was cleared to land on a particular runway the hearsay rule does not apply since the recording was not offered to prove that there was in fact another plane in the traffic pattern or in fact that the runway was clear. On the other hand, if the recording contains a message from the deceased pilot that one of the engines was on fire and offered as evidence of the fact that the engine was on fire then it is clearly hearsay.

115. In any court of the United States and in any court established by act of Congress, any writing or record, whether in the form of an entry in a book or otherwise, made as a memorandum or record of any act, transaction, occurrence, or event shall be admissible as evidence of such act, transaction, occurrence, or event, if made in the regular course of any business and if it was the regular course of business to

that although the statements by the Rome controller were hearsay they were nevertheless admissible under the Federal Business Records Statute holding:

> The archetype of the records to which § 1732 was intended to apply is the typical business accounting records, a routine factual entry made without reference to anticipated litigation . . . . The statute's rationale is equally applicable to the recording here involved, which was a simultaneous recording made as part of a regular air control procedure . . . . [T]he recording, thus, was at least the equivalent of a regular written journal kept by the Rome controller and was a contemporaneous business record. That is all §1732 purports to require.[116]

To establish a recording as a business record, certain conditions must be shown to exist. McCormick lists four conditions in the common law which had to be shown if the business entry was to be admissible to prove the facts recited in it:

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make such memorandum or record at the time of such act, transaction occurrence or event or within reasonable time thereafter.

All other circumstances of the making of such writing or record, including lack of personal knowledge by the entrant or maker, may be shown to effect its weight but not its admissibility.

The term "business" as used in this section, includes business, profession, occupation and calling of every kind.

McCORMICK, *supra* note 87 at § 306. This statute is codification of the Commonwealth Fund Act, and in addition to the federal jurisdiction it has widespread adoption in most jurisdictions and even in those states in which there is no statute comparable to any of these model formulations. However, it is likely that the development of the common law exception will follow closely interpretations of the model formulations. *See also* Laughlin, *Business Entries and the Like*, 46 IOWA L. REV. 276, 277 (1961) (listing those states which have adopted some form of business entry statute and those which have not).

The Federal Rules of Evidence also contain a provision similar to § 1732:

> The following are not excluded by the hearsay rule even though the declarant is available as a witness:
>
> (6) Records of Regularly Conducted Activity—A memorandum, report, record or data compilation, in any form, of acts, events, conditions, opinions, or diagnoses, made at or near the time by, or from information transmitted by, a person with knowledge, all in the course of a regularly conducted activity, as shown by the testimony of the custodian or any other qualified witness, unless the sources of information or other circumstances indicate a lack of trustworthiness.

FED. R. EVID. § 803(6).

116. LeRoy v. Sabena Belgian World Airlines, 344 F.2d 266, 272-73 (2d Cir. 1965).

(a) entries must be original entries made in the routine course of business;
(b) entries must have been made upon the personal knowledge of the recorder or someone reporting to him;
(c) the entries must have been shown to have been made at or near the time of the transaction recorded;
(d) the recorder and his informant must be shown to be unavailable.[117]

Today the unavailability of the informant is no longer required. The federal statute does not even mention it as a requirement[118] and the Federal Rules provide that such unavailability is immaterial.[119] In any event, the common law requirements incorporated by the statutes present no serious obstacle to establishing that the recordings made by the cockpit voice recorder and the flight data recorder are admissible as regularly kept records.

The first requirement is that the recordings be made in the routine of a business.[120] The term business is to be construed liberally and not "mechanistically applied,"[121] but it should be noted that even though the formal requirements for admissibility of such records may be shown, they are not to be admitted automatically; the indispensable fundamental trustworthiness of the proferred record must be evident.[122] In *LeRoy*, the court moved away from the strict interpretation of "business" stating that the archetype of these records was the factual accounting type record and that the rationale of the statute would be equally applicable to this type of recording.[123] The advisory committee's notes to the Federal Rules would lend support to this departure from both the limited view of business entries,[124] and the strict construction of the term "busi-

117. McCORMICK, *supra* note 87, at § 306.
118. *See* note 115 *supra*.
119. FED. R. EVID. § 803(6) (1975).
120. *See, e.g.*, Brown v. Commonwealth, 208 Va. 512, 518, 158 S.E.2d 663, 668 (1968); State v. Addington, 205 Kan. 640, 652, 472 P.2d 225, 234 (1972). *See also* McCORMICK, *supra* note 87, at § 308; 30 AM. JUR. 2d *Evidence* § 937 (1967); 32 C.J.S. *Evidence* § 685 (1964).
121. Coulter v. State, 494 S.W.2d 876, 883 (Tex. App. 1973).
122. *See* Bowman v. Kaufman, 387 F.2d 582, 587 (2d Cir. 1967); Woolner Theaters Inc. v. Paramount Pictures Corp., 333 F. Supp. 658, 659 (E.D. La. 1970) (both cases citing *LeRoy*).
123. LeRoy v. Sabena Belgian World Airlines, 344 F.2d 266, 272-73 (2d Cir. 1965).
124. 56 F.R.D. 183, 311 (1972). The rule acknowledges advanced technology:
The form which the "record" may assume under this rule is described broadly as a

ness" itself.[125]

The second requirement is that the entries be made at or near the time of the transaction.[126]

> Whether an entry made subsequent to the transaction has been made within a sufficient time to render it within the exception depends upon whether the time span between the transaction and the entry was so great as to suggest a danger of inaccuracy by lapse of memory.[127]

This requirement should present no problem in regard to the flight recorders since the recording takes place simultaneously with the occurrence. In *LeRoy*, the court described the recordings as being "simultaneous" and "contemporaneous" business records.[128]

The final requirement is that the entries be made upon the personal knowledge of the reporter or someone reporting to him.[129] Again, this requirement presents no difficulty. Since the person reporting or making the entries would be the pilot or the flight controller, personal knowledge of the matter entered is obvious.

Considering for a moment the recordings made by an FAA ground based installation, it should be noted that the party attempting to introduce a recording of a conversation between the

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"memorandum, report, record or data compilation, in any form." The expression "data compilation" is used as broadly descriptive of any means of storing information other than the conventional words and figures in written or documentary form.

Id.

125. *Id.* at 308:

To get away from the stringent idea of records being squeezed into the fact patterns which give rise to the traditional business records. The rule therefore adopts the phrase "the course of a regularly conducted activity" as capturing the essential basis of the hearsay exception as it has evolved and the essential element which can be abstracted from the various specifications of what is a "business."

126. *See, e.g.*, Thompson v. AAA Lumber Company, 245 Ark. 518, 522, 432 S.W.2d 873, 875 (1968). *See also* McCORMICK, *supra* note 87, at § 309; 30 AM. JUR. 2d *Evidence* § 938 (1967); 32 C.J.S. *Evidence* § 690 (1964).

127. *See* Martin v. Glenn's Furniture Co., Inc., 126 Ga. App. 692, 191 S.E.2d 567, 570. The fact that information was not placed on a business ledger until 28 days later did not render it inadmissible; Standard Oil Co. of Cal. v. Moore, 251 F.2d 188, 223 (9th Cir. 1957) (even a lapse of several months did not render a business ledger inadmissible).

128. LeRoy v. Sabena Belgian World Airlines, 344 F.2d 266, 274 (2d Cir. 1965).

129. *See* McCORMICK, *supra* note 87, at § 310; 30 AM. JUR. 2d *Evidence* § 938 (1967); 32 C.J.S. *Evidence* § 690 (1964).

pilot of an aircraft and an air traffic controller will often be faced with a problem of hearsay. Although the *LeRoy* court held that the statements of the controller on the recording were admissible under an exception to the hearsay rule for business records,[130] there still remained the hearsay objection with respect to the pilot's statements. Based on *LeRoy*, the controller's statements will conform with an exception to the hearsay rule, since the recording is "at least as satisfactory as a written record kept by the controller."[131] But the pilot's statements remain inadmissible as hearsay unless they conform with some exception to the rule. A statement by the pilot amounting to an admission would be one such exception.

Admissions are defined as "the words or acts of a party-opponent, or of his predecessor or representative, offered as evidence against him."[132] In *LeRoy*, the pilot of the Sabena airplane radioed the tower that he had passed the beacon when, in fact, the plane was more than eight miles beyond its range. The court held that although the pilot's statement was hearsay, it fell within the exception to the hearsay rule for admissions of a party-opponent. The opinion, however, pointed out that the courts have been reluctant to admit business records where the information was obtained only through hearsay, but allowed the recordings stating:

> But the statements involved in this case are not the gratuitous reports of persons not involved in the business. If the plane crews were not required to make such reports, it certainly was at least the regular business practice for them to do so.[133]

An excited utterance is another exception to the hearsay rule with which the pilot's statement would conform. The theory of this exception is simply that "circumstances may produce a condition of excitement which temporarily stills the capacity of reflection and produces utterances free of conscious fabrication,"[134] thus, insuring

130. LeRoy v. Sabena Belgian World Airlines, 344 F.2d 266 (2d Cir. 1965), *cert. denied*, 382 U.S. 878 (1966).

131. *Id.* at 274.

132. McCormick, *supra* note 87, at § 262. *See also* Pekelis v. Transcontinental & Western Air, Inc., 187 F.2d 122, 130-31 (2d Cir. 1951), *cert. denied*, 341 U.S. 951 (1951); Paulsen v. Scott, 260 Wis. 141, 50 N.W.2d 376 (1951).

133. LeRoy v. Sabena Belgian World Airlines, 344 F.2d at 273.

134. 56 F.R.D. 183, 304 (1973).

trustworthiness. The question of how long the excited condition can prevail is by no means settled,[135] but it would seem that in this context

> . . . even an extended series of radio conversations [or statements made by the pilot or crew] would be covered by the res gestae rationale where it appears from surrounding circumstances that . . . [they were] under some emotional stress throughout.[136]

In addition to affecting the admissibility of tape recorded communications between aircraft and ground based installations, the hearsay problem could also affect the admissibility of tape recordings of crew conversations made by the cockpit voice recorder. For example, if crew members are conversing or commenting upon something, the remarks of each crew member may or may not contain hearsay. Again, this would depend upon the nature of the remarks and the purpose for which they are sought to be introduced. If the statements of more than one crew member contain hearsay, then again, in order to introduce those tapes into evidence each of the statements contained therein must conform with some exception to the hearsay rule.

Overcoming the hearsay objection is only one problem facing the party seeking to introduce these tapes into evidence. When the original cannot be obtained, and a rerecording or transcript of the original must be used, "best evidence" objections are likely to arise.

Transcripts and Rerecordings of The Tapes and Problems of the Best Evidence

It was pointed out above that when a major airline crash occurs the flight recorder and the cockpit voice recorder are sent to Washington. There they are subjected to highly sophisticated readout

135. *Id.*

136. Crocker, *supra* note 15, at 263. Crocker, however, uses the example of spontaneous utterances to show that the airline might escape liability by showing that some malfunction in the aircraft is evidenced by the pilot's statement. But it seems likely that an opposing party could also use the pilot's statement to his advantage. For example, suppose the last transmission the pilot makes or the last statement recorded on the cockpit voice recorder is "I've come in too low, I've got to correct," and then could not correct in time to avert the crash. An opposing party could use this statement as proof of pilot error in an action against the airline. Therefore the spontaneous utterance can be a two-edged sword.

techniques which ultimately result in transcripts containing the information gleaned from the flight data recorder, and both transcripts and rerecordings of the cockpit voice recorder's tapes. The offer of such a transcript or rerecording will most likely be met by an objection that it is not the best evidence and should not be admitted.

Although the best evidence rule has come to be associated primarily with contesting a writing, the problems which arise when introducing transcripts and rerecordings are analogous to those encountered in introducing a writing.[137] The basic rationale of the rule is that if it is shown that there is a higher grade of evidence existing which, if produced, would more satisfactorily explain and establish a fact that the evidence offered, then the evidence actually produced will be excluded on the grounds that it is secondary evidence.[138]

> Whatever rationale is viewed to support the rule, it will be observed that the advent of modern discovery and related procedures under which original documents may be examined before trial rather that at it, have substantially reduced the need for the rule.[139]

Nevertheless, it has been pointed out that "areas remain in which the best evidence rule continues to operate usefully . . . and that a sensibly administered best evidence rule still has a place in a modern system of evidence."[140]

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137. Note, 64 HARV. L. REV. 1369 (1951).

> Although a recording is not colloquially considered to be a writing, it . . . should be similarly treated in relation to the best evidence rule since the policy of the rule—to obtain the most truly probative evidence of a preserved communication—is equally applicable to recordings.

The article also contends that rerecordings should be admitted as duplicate originals which under the best evidence rule would be admissible to prove the contents of a writing without requiring an excuse for not producing the original.

138. *See, e.g.*, General Builders Supply Co. v. MacArthur, 228 Md. 320, 327, 179 A.2d 868, 872 (1962); In Re Riggs' Estate, 68 Misc. 2d 760, 761, 328 N.Y.S.2d 138, 140 (1972). *See also* 29 AM. JUR. 2d *Evidence* § 448 (1967); 32A C.J.S. *Evidence* § 780 (1964).

139. MCCORMICK, *supra* note 87, at § 231. *E.g.*, in State v. Melerine, 236 La. 881, 109 So. 2d 454 (1959) where the parties, prior to trial, indicated that they would be satisfied with the use of transcriptions, of tape recordings, the court held that in furtherance of the stipulation the transcriptions were admissible.

140. Cleary and Strong, *The Best Evidence Rule: An Evaluation in Context*, 51 IOWA L. REV. 825, 847-48 (1966).

There are numerous cases where objection has been made to the introduction into evidence of typewritten transcripts as a violation of the best evidence rule.[141]

> [B]ut generally typewritten [transcripts] of sound recordings have been held admissible in evidence if their accuracy and reliability is clearly established and especially if the original is produced for comparison.[142]

But with respect to the flight recorder and cockpit voice recorder, production of the original may be impossible because it could not be located after the crash. Additionally, the recording may have been so badly damaged in the crash that the transcripts and rerecordings made after subjecting the original to sophisticated readout devices is the only way in which the information would be intelligible. In such cases the original should be excused and other evidence of its contents become admissible.[143]

Even in cases where the original recording is available it still may be desirable to use transcripts contemporaneously with the playing of the recording to assist the jury in understanding the original.[144] In fact, several courts have stated that it is desirable for the jury to have a transcript before them so that they may follow the original as it is being played.[145]

In any event, a transcript which is sought to be admitted must

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141. *See* Annot., 49 A.L.R.3d 598 (1974).

142. Anderson, *Tape Recordings as Evidence*, in 17 AM. JUR. PROOF OF FACTS 1, 43 (1966).

143. United States v. Maxwell, 383 F.2d 437, 442 (2d Cir. 1967). *See also* MCCORMICK, *supra* note 87, at § 237.

144. Crocker, *supra* note 15, at 263.

> Due to factors of excessive background noise which cannot be eliminated [or static on the tapes] an FAA tape recording may be difficult for a jury to grasp fully even if played over several times. Thus, it will usually be helpful to provide a typewritten transcript of the recording to assist the jury in understanding the original.

See also Annot., 58 A.L.R.2d 1024, 1042 (1958).

145. *See* People v. Finch, 216 Cal. App. 2d 444, 452, 30 Cal. Rptr. 901, 907 (1963):

> The important thing is that the jurors to hold a transcript as they listened to the play back of the records was no different than allowing them to have, in an appropriate case, a photograph, a drawing, a map or model . . . as an assistance to understanding.

Accord United States v. Hall, 342 F.2d 849 (4th Cir. 1965).

be shown to be accurate. In *Kilpatrick v. Kilpatrick*,[146] the court held:

> When the safeguards as to accuracy are fully met, and the discs themselves are laid in evidence to afford the adverse party the opportunity to determine the correctness of the transcript no good reason appears for excluding such evidence.[147]

In *LeRoy*, the court stated that if the appendix to the accident report (based on the recording) was admissible, then the transcript would be admissible since the transcript did not contain any information which was not contained in the report itself.[148]

One way of proving the authenticity of the transcript to the satisfaction of the court is to have the person who prepared the transcription appear and testify to its accuracy.[149] The presence of the transcriber is an important factor in establishing the transcript's authenticity. Some courts have held that where the person who identified the transcripts was neither the transcriber not present when they were transcribed, the transcripts were inadmissible.[150] In view of the emphasis which many courts place upon the testimony of the actual transcriber, the surest method of guaranteeing admission of a transcript is to depose the FAA employee who made the transcript and have him attest to its accuracy.

It may also be necessary to resort to rerecordings of the original tape in court. As with the use of transcripts:

> [Rerecordings] are generally held admissible over the objection that they are not the best evidence, provided their authenticity is established and the original is made available for purpose of comparison.[151]

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146. 123 Conn. 218, 193 A.2d 765 (1937).

147. *Id.* at 225. *Accord*, People v. Wojahn, 169 Cal. App. 2d 135, 337 P.2d 192 (1959). *See also* Grimes v. Wainwright, 346 F.Supp. 713 (D.C. Fla. 1972). The court denied petitioner's writ of habeas corpus when the petitioner alleged inaccuracies in a transcript of his tape recorded statements, which he did not raise in the trial court.

148. LeRoy v. Sabena Belgian World Airlines, 344 F.2d 266, 272 (2d Cir. 1965).

149. Commonwealth v. Hart, 403 Pa. 652, 170 A.2d 850 (1961).

150. *See, e.g.*, Bonicelli v. State, 339 P.2d 1063 (Okla. 1959); Duggan v. State, 189 So. 2d 890 (Fla. App. 1966).

151. 29 AM. JUR. 2d *Evidence* § 436 (1967). Annot., 58 A.L.R. 2d 1024, 1044 (1958).

Just as a transcript may be used in situations where the original recording has either been lost or so badly damaged as to render it unintelligible, similarly a rerecording may be used in such situations.[152] The courts have also commented on the value of the rerecording in assisting the jury to follow and understand more clearly what is said on the original.[153]

The basic rationale of the rule relating to rerecordings was discussed in *State v. Lyskoski*[154] where the rerecording was likened to a photograph. In holding the rerecording admissible the court stated:

> The audible tape recording [rerecording] bears the same relationship to the inaudible wire recording [original] that a photograph bears to the negative. No good purpose would be served by not following the rule applicable to both.[155]

The person who made the rerecordings plays an equally important role in establishing the authenticity of the rerecording as the person who transcribed the original onto the challenged transcript. In *United States v. Madda*,[156] the engineer who made the rerecordings testified that the conversations were completely rerecorded, that the material was the same, and that he did not dub any sound. And when the voices on the rerecording were properly identified, the court held that the rerecordings were properly authenticated and that they were admissible. Thus, the party seeking to admit the rerecording would be well advised to depose[157] the board employee who made the rerecording. There should not be a great deal of difficulty admitting the rerecording since:

> Where counsel are afforded an opportunity to check the original on the equipment available at any FAA communications center, there would seem to be no reason for refus-

152. *See* note 143 *supra* and accompanying text. *See also* United States v. Knohl, 379 F.2d 427 (2d Cir. 1967) (rerecording admitted where witness testified that she had lost the original).

153. Fountain v. United States, 384 F.2d 625, 631 (5th Cir. 1967).

154. 42 Wash. 2d 102, 287 P.2d 119 (1964).

155. *Id.* at 105. *Accord*, Hurt v. State, 303 P.2d 476, 485 (Okla. 1956).

156. 345 F.2d 400 (7th Cir. 1965). *Accord*, People v. Albert, 182 Cal. App. 2d 729, 6 Cal. Rptr. 473 (1960).

157. *See* note 37 *supra* and accompanying text.

> ing to accept the recording simply because it was not the best evidence.[158]

Two additional points should be noted in regard to the best evidence problem raised by transcript and rerecordings. If a witness has overheard a conversation or communication, his testimony as to that communication is primary evidence even though it may be later documented or incorporated in a sound recording. Under such circumstances, secondary evidence is not sought to prove the contents of a writing or recording, but rather all the evidence is primary evidence stemming from a common cause.[159] This situation is particularly applicable where an FAA controller, who heard a communication at one of the ground based centers, may be called upon to testify to help clear up an uncertain part of a recording.

Secondly, it is permissible for a witness to give a summary based on a number of documents when the documents are so numerous and intricate as to make an examination of them in court impracticable. The admission of proof of this character is not a violation of the best evidence rule, but a realization thereof demanded by the exigencies of the case.[160] This situation is more applicable when considering the flight data recorder where it may be helpful to have a summary prepared explaining the various data contained in it.

In any event, in light of the high degree of skill with which rerecordings and transcripts are made, it is almost certain that they will attain a high degree of accuracy and the best evidence rule should not be made to unduly hinder their admission by relegating them to the status of secondary evidence. For as one court has stated:

> An over-technical and strained application of the best evidence rule serves only to hamper the inquiry without advancing the cause of truth.[161]

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158. Crocker, *supra* note 15, at 264.

159. People v. Kulwin, 102 Cal. App. 2d 104, 226 P.2d 672 (1951). *See also* 29 AM. JUR. 2d *Evidence* § 449 (1967).

160. 29 AM. JUR. 2d *Evidence* § 458 (1967). Such a summary must confine itself to the fact or date and must exclude opinion. But if it were possible to get a Board member to testify in a given situation, the Board member's testimony would already be bound by this limitation under § 1441(e).

161. United States v. Manton, 107 F.2d 834, 845 (2d Cir. 1939).

Transcripts and rerecordings constitute a valuable source of evidence and, when properly authenticated, can be introduced into evidence. But suppose a party wants to introduce the original recording into evidence. If for some reason the original was held inadmissible, an attempt to introduce the transcripts or rerecordings would be to no avail.[162]

Partial Inaudibility and Its Effect on Admissibility

Although the flight recorder and cockpit data recorder are designed to withstand the most catastrophic conditions, sometimes the tremendous impact of a crash may damage or destroy some of the recording. Sometimes, because of background noise in the cockpit or the failure of the pilot to speak distinctly, the tape from the cockpit recorder may be inaudible or garbled in part. These facts do not always mean the tape will automatically be excluded, provided the inaudibility is not substantial:

> The fact that a recording may not reproduce an entire conversation or may be indistinct or inaudible in part, has usually been held not to require its exclusion; however, the recording may be rejected if it is so inaudible and indistinct that the jury must speculate as to what was said. . . . Unless the unintelligible portions of the tape recording are so substantial as to render the recording as a whole untrustworthy, the recording is admissible, and the decision whether or not to admit it should be left to the sound discretion of the trial judge.[163]

Each of the aspects in the above general principle will be briefly examined.

It is not a prerequisite of trustworthiness that 100% of a conversation be recorded.[164] Similarly, if statements or conversations contained on the tape are indistinct or inaudible in part this will not

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162. 32A C.J.S. § 783 (1964):
Secondary evidence of the contents of a writing cannot be introduced where it appears that, for any reason, the writing if produced would not be admissible.

163. 29 AM. JUR. 2d *Evidence* § 436 (1967).

164. Christiensen v. State Farm Mutual Auto Ins. Co., 52 Haw. 80, 470 P.2d 521 (1973). A tape recording was held admissible when only ten minutes of a one and one-half hour conversation was recorded.

require exclusion of the recordings. The frequently cited rationale for the admission of inaudible tapes was laid down in *United States v. Schanerman*:[165]

> [T]he mere fact that certain portions of the mechanically recorded conversations were less audible than others did not call for exclusion of what the jurors personally heard from the playing of the records. There would be no more valid reason for exclusion of the mechanically recorded conversations than there would be for excluding competent conversations, overheard in fact, by human witness.[166]

The courts have exercised great liberality as to admission of recordings which are partially inaudible. Tapes have been admitted where intelligible only in part,[167] or when only half the tape is intelligible,[168] or where in the opinion of the court, although largely unintelligible, the tapes have any probative value at all.[169]

Additionally, for a recording to be admissible it must not be so inaudible or unintelligible that jurors must speculate as to what is being said. In *State v. Carter*,[170] where a tape recording was rendered unintelligible by background noise which could not be filtered out, the court held the recording to be inadmissible, stating:

> Individual jurors might have speculated upon the various isolated portions of the recording which could be understood. Such speculation cannot be a basis for conviction.[171]

Jury speculation could present a problem for a party trying to admit FAA tapes where background cockpit noise cannot be eliminated even with the use of sophisticated machinery the FAA possesses.

Although tapes which are partly unintelligible or inaudible are not usually excluded, if the unintelligible portion of the tape is of

165. 150 F.2d 941 (3d Cir. 1945).

166. *Id.* at 944. *Accord*, People v. Porter, 105 Cal. App. 2d 324, 233 P.2d 102 (1951).

167. United States v. Weiser, 428 F.2d 932, 937 (2d Cir. 1969), *cert. denied*, 402 U.S. 949 (1969).

168. Addison v. United States, 317 F.2d 808, 816 (5th Cir. 1963), *cert. denied*, 376 U.S. 905 (1964).

169. Byrne v. United States, 327 F.2d 825, 826 (9th Cir. 1964).

170. 254 So. 2d 230 (Fla. 1971).

171. *Id.* at 231. *Accord*, People v. Sacchetella, 31 App. Div. 2d 180, 183, 295 N.Y.S.2d 880, 882 (1968).

prime importance to the tape as a whole it will be held inadmissible. The principal case in this area is *Monroe v. United States*,[172] where the defendant, in a prosecution for attempting to bribe a police officer, objected to the admission of a tape which was inaudible in part. The court held:

> No all-embracing rule on admissibility should flow from partial inaudibility or incompleteness . . . . Unless the unintelligible portions are so substantial as to render the whole untrustworthy the recording is admissible . . . .[173]

Finally, however unintelligible the tape is, or for whatever duration the unintelligible portion lasts, the decision whether or not to admit is within the sole discretion of the judge.[174] In *State v. Driver*,[175] the court laid down guidelines by which a judge should exercise his discretion:

> Before allowing a sound recording to be used, the trial judge should listen to it out of the presence of the jury so that he can decide whether it is sufficiently audible, intelligible, not obviously fragmented, and also whether it contains any improper or prejudicial matter which ought to be deleted.[176]

In view of the overall liberality which the courts display in admitting sound recordings generally, it would appear that, unless the flight recording was substantially damaged in the crash, or an essential part so impaired as to render the whole untrustworthy, the recording would be admitted into evidence.

CONCLUSION

In light of the highly technical procedures involved in the design and installation of the flight recorder and cockpit voice recorder

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172. 234 F.2d 49 (D.C. Cir. 1956), *cert. denied*, 352 U.S. 873 (1956). *Accord*, United States v. Kabot, 295 F.2d 848, 853 (2d Cir. 1961); Cape v. United States, 283 F.2d 430 (9th Cir. 1960). In Gorin v. United States, 313 F.2d 641 (1st Cir. 1962), *cert. denied*, 374 U.S. 829 (1963), the court held:

> While it appears that parts of [the tapes] are inaudible we cannot say that . . . the inaudible parts are substantial so as to make the rest more leading than helpful.

173. *Id.* at 54-55.

174. People v. Spencer, 60 Cal. 2d 64, 313 P.2d 134, 31 Cal. Rptr. 782 (1963), *cert. denied*, 377 U.S. 1007 (1964).

175. 38 N.J. 255, 183 A.2d 655 (1962).

176. *Id.* at 288, 183 A.2d at 672.

which render the possibilities of inaccuracies slight, their trustworthiness as valuable pieces of evidence should be obvious. With the ever increasing amount of air travel, the possibility of accidents is not remote. The flight recordings may offer the only clues to a determination of what caused the accident. And the role which they can play in litigation should be no less than that which they play in investigations. If the fundamental basis for the rules of evidence is a successful development of the truth, then to remove such a valuable piece of evidence from the litigative process would be to hamper that development substantially.

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