A.T.C. Radio Tapes

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Often an aircraft is or has been in contact with a governmental or ground controlling station. An investigator may want to get copies of these tapes to listen to them. Often the governmental agency will transcribe these tapes and make them an inclusion in the actual report. Of course, the actual recording is the best evidence and it should be obtained.

An attorney must act quickly for if the government has not asked for the preservation of a tape it may be reused after thirty days and valuable information may be lost.

A telephonic call backed by a FAX request should be made to the facility that made the tape as well as regional counsel for the F.A.A. where the facility is located. I always follow up with a certified letter of request.

An aircraft on I.F.R. flight plan may be handled by any of the following entities :(they are listed in normal sequence)

a. Ground control at departure airport.
b. Clearance delivery at departure airport.
c. Tower at departure airport.
d. Departure control at or near departure airport.
e. Air Route Traffic Control Center-along flight
f. Approach control at or near destination airport
g. Tower at destination airport
h. and ground control at destination airport.

If the airplane is on a V.F.R. flight plan, he may only talk to:

a. Ground control
b. Tower
c. F.A.A. flight service stations
d. Tower and
e. Ground control

An investigator is advised that he may obtain tapes of simply the controller radio link to the aircraft or you may chose to ask for other recordings that are routinely kept.

A for instance in tower there is usually a recording of all internal voice communications and there are landline recordings as well (telephone intercommunications that co-ordinate hand offs between sectors and centers.

The most important are communications between controller and the accident airplane and airplanes in the same sector of control at the same time. When Air controller malfeasance is suspected all aspects are important.

Tower tapes are marked with time hacks for universal time so these can be coordinated with the radar tapes exactly. These can be coordinated with the F.D.R. tapes as well. There are several reasons to obtain tape recordings rather than transcripts not the least of which is sound analysis that will be covered separately.

In one case I have investigated, I received a tape transcript that quoted the Captain with a question aimed at the co-pilot.

"You have it?"

When you listen to the tape the interpretation that anyone would have was that the Captain said aimed at the co-pilot.

"You have it!"

The co-pilot responded,

"I have it."

The interpretation is critical. If it were a question, it would be the captain reminding the co -pilot that he should pay attention and fly the machine. If it were an exclamation, then the captain is urgently transferring manipulation of the controls in a classic manner to the co-pilot

In this case, the Captain who had previously announced a difficult situation was giving up trying to fly out of the emergency. In my thirty years as an aviator, I have never seen a Captain willingly give up control in an emergency if he could save the situation.

You can see that the tapes themselves present the best evidence and the interpretation of the wording is best left to the jury and testifying experts.

Flight data recorders metal tape, digital, and other (military)

Some aircraft carry flight data recorders. When this is the case, the government will retrieve the "black box". They will then take it to their laboratory and analyze the data within. The standard old recorder is a metal tape device that records several parameters of performance. They are instantaneous:

a. Airspeed
b. Mean Sea level Barometric altitude
c. Aircraft heading
d. Time
e. Vertical speed (sink rate)
f. Normal "G" forces

These tapes play for about thirty days worth of flights. The investigator is interested in the last portion of the flight, but he should analyze the entire flight to see that the system was calibrated and working, and that the airplane was being

flown appropriately.

An investigator should correlate the time hacks with the radar tape time that is universal (old bureau of standard) time. Then the investigator can superimpose this data on the other reconstruction to verify and solidify results. (“G" forces are very important in midair separations and stall accidents)

When one has this data ,and it is noted that the aircraft heading changes and the airplane turns its track while still maintaining altitude the actual angle of bank can be derived from the airplanes recorded "G" forces by applying the formula:

"G” = 1/ cos theta,
Where "G" is the gravity force and theta is the angle of bank.

From the aircraft, flight manual, with knowledge of "G" force (Bank angle), weight, altitude and airspeed you can determine stall speed of the airplane. You must also know airplane configuration (flaps up or down). As you can see if you have the F.D.R. and A.T.C. radar tapes, you have a great ability to reconstruct what was going on in the aircraft.

Newer aircraft have much more sophisticated digital computer Flight Data Recorders that record many, many more channels of information in addition to the six in the old metal recorder. Some record almost 150 different items. Things like engine performance and flight control condition are included. The data is most useful to a serious investigator these recorders record upwards of forty channels of information. The newest ones almost one hundred and fifty channels.

The very new aircraft have so many other non-volatile data storage chips that retrieval from a flight Data recorder and CVR are far from the only source of retrievable stored data. As examples, analog or digital data may be stored in non-volatile memory chips located throughout many systems. Other systems may have volatile chips whose data decays quickly or instantly after power sources are lost. The following is places to look for data.

1. Cell phones and I pods of flight crew and even passengers
2. Flight Management System chips
3. EICAS computer chips
4. EIFIS Chips
5. GPWS system chips
6. TCAS chips
7. GPS Nav system chips
8. Engine FADEC system chips
9. FOQUA Air and Ground station data storage chips.
10. The Stores Management system on military aircraft
11. CAWS and TOWS computer chips.
12. Ground Foqua downloads.
13. Auto flight computer memory chips

The list is ever extensive. In 1987 in the first model F-16, we gained testimony

that in that tiny fighter aircraft there were over thirty separate Memory storage chips. Including a small Digital Flight Data recorder that ejected with the pilot as part of the egress system.

Military recorders are even more efficient (see dissertation on magic recording boxes).Some fighters even have metal tape video cameras instead of gun cameras. These can be invaluable. As in A.T.C. radar tape reconstruction, do not always accept the work of the N.T.S.B. as final. In one DC-8 case I worked the N.T.S.B. ran a computer to show the angle of bank a DC-8 would have had to gone to fly a certain track. The investigator did not look at the "g" forces data that he had obtained from the flight recorder. They showed that the airplane could not have achieved that angle of bank, and so the question became “How can a DC-8 make such a violent turn without increasing the g forces while maintaining altitude?"

The true answer was that the aircraft had skidded around the turn rather than turned. We believe it was an uncommanded rudder input. A lot can be learned from these data and a lawyer is advised he needs an expert to help decipher and interpret the information.