AIR TRAFFIC CONTROL-TECHNOLOGY AND LAW

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From the very start of the aviation industry, there has been a certain amount of control from the ground. At first it was by means of light signals and bonfires to assist a pilot in the landing and taking off process, as well as to remain on a predetermined flight path. Later there was radio, thus allowing the pilot to stay on course over areas where no fires or beacons were established to assist him. The problem remained that under this system constant communication between the pilot and the controller was necessary in order to maintain a definite flight path and safe distance from other aircraft.[1]

Essentially there are two sets of rules under which a plane may be flown in the United States. There are the Visual Flight Rules (VFR), which are applicable up to a certain altitude in such weather as to permit the operation of a "see-and-be-seen" rule to avoid collisions. These place primary responsibility upon the pilot, nonetheless the procedures for landing and take-off remain substantially the same, and a flight plan must still be filed prior to departure. There also are Instrument Flight Rules (IFR), which operate above a certain altitude for all craft, and at lower altitudes when the weather is poor. The Air Traffic Controller is primarily concerned with those craft operating under IFR due to the fact that constant supervision is one of the characteristics of this mode of travel.

In terms of allocation of the authority and responsibility, the United States is divided into twenty-six geographical segments, with an Air Route Traffic Control Center (ARTCC) established for the 'en route traffic' in each sector.[2] Each of these centers, through the use of the equipment which will be described below, maintains constant surveillance over all of the IFR traffic which enters into its area of responsibility and directs every movement of those planes under its control.

The regulation of air traffic has been delegated by statute to the Federal Aviation Agency. This control is accomplished by means of the Federal Aviation Rules and Regulations which are issued pursuant to the Federal Aviation Act.[3] The extent of their application and effectiveness is most clearly shown by following an Instrument Flight Rules movement from departure to arrival.

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1. "Can Air Travel Be Kept Safe?" *U.S. News & World Report* Jan. 1, 1968, 54, 56.
2. P. Tyler, *Airways of America*, 22 (1958).
3. 72 Stat. 749, 49 U.S.C. 1348.

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Prior to the time set for take-off, the pilot must file a flight plan with the agency through the local control tower. This plan is, in effect, an itinerary of the proposed journey. When this has been accomplished, the pilot is permitted to go as far as starting his engines before further clearance must be obtained. The next step is the clearance issued by the Ground Control Tower at the airport of departure for the craft to taxi out to the runway and get in position for take-off. While the plane is accomplishing this task, the controller requests clearance from the appropriate Air Route Traffic Control Center. This is determined upon the basis of the flight plan previously filed with the agency. This clearance is transmitted to the pilot, who then switches his radio to the frequency of the Air Traffic Control Tower at the airport of departure. When the controller has issued clearance the pilot may take-off along a prescribed runway and then perform certain maneuvers in positioning his craft for the flight ahead.

At this point the Radar Controller will guide the flight and supervise his movements until the plane is at a point where the Air Route Traffic Control Center will assume control of the craft. This ARTCC will direct the en route portion of the flight, passing the craft on to other ARTCC personnel as the plane reaches their respective areas of control. This procedure continues until the plane reaches the vicinity of the airport of arrival. At that time the same procedure which was used upon take-off will be repeated in reverse, including the filing of a flight report which states the details of the flight and any abnormalities or difficulties encountered.

As is obvious, the system itself is basically simple in nature. The difficulty is that the methodology for achieving the desired results is extremely complicated. The basic reason for the existence of ATC is one of safety. The system was created when the industry was young, due to the conflicting methods of control being used, and the burden was placed upon the Federal Government to prevent collisions and to promote safety.[4] The Air Traffic Control System, in seeking to fulfill the task set out for it, has constantly sought to improve both the service available and the reliability of that service. The most direct method of accomplishing this result has been determined to be the acquisition of new equipment which will allow far more effective and detailed supervision of the planes, thus permitting more craft to be operated within the same amount of airspace while improving the safety level.[5]

One of the major difficulties which the industry and the ATC have lies in the fact that the growth of air travel has been grossly underestimated in

4. Smerdon v. United States, 4 Av. Ca. 17,840 (D. Mass. 1955).

5. "Can Air Travel Be Kept Safe?" *U.S. News & World Report* Jan. 1, 1968, 54, 56.

preceding years. The result of this error is seen in the problems of today's airports and at the control towers which direct the traffic to and from these facilities.[6]

A typical example of the airport problem is John F. Kennedy International at New York City. There the problem of density is more advanced and magnified, but indicative nonetheless of the situation which is, and will be, facing the ground facilities available. The delay of a craft prior to landing may run up to thirty mintues and not be uncommon, and it has been reliably predicted that this time may grow to as much as three hours in the immediate future.[7] If we take a peak travel day at Kennedy, we find that planes are directed by the control towers to "stack," form circling columns at different altitudes, for as long as three or four hours before they can land. There are sometimes so many of these "stacks" that an incoming craft will be directed to "stack" some hundreds of miles away. The plane then works its way down each stack and, ultimately, is allowed to land.[8]

The effects of the increased traffic density have also had their effect upon the ATC. The agency has realized that with increasing density, as well as higher speeds and more complex craft, the pilot must pay more attention to the cockpit and not to the airspace which surrounds him. This gives rise to the necessity of ground assistance, and the ". . . function of the tower personnel is merely to assist the pilot in the performance of the duties imposed, not relieve him of those duties."[9] The situation as it exists today is such that the pilot, as well as the Ground Controller, may well be liable for injuries resulting from negligence on their respective parts.

It is to be noted that the regulations issued by the F.A.A. prohibit the operation of a craft contrary to the instructions of the ATC and provide for a fine up to $1,000 for each violation. On the other hand, the regulations also provide that the pilot of the craft shall have final authority as to the position of the craft while he is in command.[10] The inconsistency is somewhat abated by the fact that the pilot may take any action necessary to avoid imminent danger.[11] The facts are, however, that the F.A.A. takes a very dim view of any alteration from a prescribed

6. *U.S. News & World Report* Jan. 1, 1968, at 54, see also *Project Beacon*, F.A.A. Report on ATC, at 11 (1961).

7. *Supra*, note 1 at 55.

8. *Id.*

9. United States v. Miller, 303 F.2d 703, 710 (9th Cir. 1962), *cert. denied* 371 U.S. 955, (1963).

10. 72 Stat. 783, 901 (1958), F.A.A. Regulations, Part 91, Sec. 91.75; 14 CFR, Part 91.75 (1963); F.A.A. Regulations, Part 91, Sec. 91 (3) (a).

11. F.A.A. Regulations, Part 91, Sec. 91.75.

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course of action and the danger must be clear and imminent before the action will be excused.

The problem which now comes to the front is one of time. A pilot needs at least twenty-five seconds to see, react, and navigate so as to avoid collision. This amount of time is no longer available.[12] In the near future with the Supersonic Craft, it is entirely possible that two craft could collide head on, and neither of the pilots would ever have seen the other craft. Again the results seem clear. It is no longer a question of the mandatory nature of the regulations and the instructions. The pilots now must rely upon the directions given as a matter of necessity in the safe conduct of the plane. While there seem to be no valid reasons to abandon the common sense principle that the faster you travel, the less reaction time is available and the more dangerous is the trip, the solution appears equally clear. If the situation as a whole is observed more closely and the desired information obtained at an earlier stage, the present safety factor will be retained, if not improved.

In light of the above factors, it is understandable that the courts have stated the basic function[13] and duty[14] of the ATC, the determination and maintenance of a safe distance between aircraft so as to avoid collision, will be critical factors in the placement of responsibility for resultant damages. The entire area surrounding Air Traffic Control is so closely woven as to require not only an outline of the background but also of the technique which is used in the control of aircraft throughout the country.

The systems which assist in the landing process are referred to as Instrument Landing Systems (ILS). There are presently numerous versions undergoing tests at different places throughout the country. Among the more promising methods is a miniature ILS which is hoped to have an airborne weight of some 15 pounds. This would send a "trigger" to the control station which would respond with the distance of the craft from the runway and the necessary glide path and slope. In this manner there would be further elimination of wasted time while the pilot and the controller verbally transmit information which may be able to be done automatically in a more efficient manner.[15]

The employment of computers in the field under investigation seems to be only a question of time. Already they are being used for the reservation

12. "The Grand Canyon Accident," (1956) *C.A.B.* No. 1-0090, 1957 U.S.C. Av. R. at 1; *ICAO Digest* No. 12 (1963); P. Larsen, *International Legal Regulation of ATC Liability*, 1965 (Unpublished Thesis, McGill University, Institute of Air and Space Law) at 12.

13. *Supra*, note 4.

14. Johnson v. United States, 6 Av. Cas. 18, 111 (E.D. Mich. 1960).

15. *Aviation Week and Space Technology*, 28 Nov. 1966, at 86.

process in commercial airlines, and their use has been evaluated for the purposes of speeding up the handling of air traffic. The computers will be tied together in such a manner that the flight plan which is filed at the commencement of the flight will be transferred automatically to the computers of the ARTCC in which the craft is operating. In this manner, the controller will automatically have at his disposal all of the information concerning the particular plane which has entered his control zone almost instantaneously.[16]

The advent of radar resulted in a substantial reduction in the distance necessary between planes for the sake of safety. The problem still remained, however, that the controller who was in communication with the pilot was unable to determine to which "blip" on the radar screen he was talking. More recently the technology has provided a solution to the problem in the form of a "Transponder" or "Beacon." In its initial stages this instrument allowed the pilot to push a button on the request of the controller and the results upon the radar screen would identify the craft In this manner, the controller was able to keep track of which plane was which without the necessity of such constant communication. The methodology has advanced significantly as of this date.

The present radar system in use at the major airports calls for the controller to monitor the approach according to a "glide slope" and to issue the necessary corrections to the pilot. The final decision as to whether or not to land is made by the pilot at what is called the "decision altitude." This varies according to the airport involved, but is normally 200 feet of altitude and one quarter mile from the end of the runway. As of this time, the controller has a "blip" on his screen and a set of crosshairs to evaluate the position and progress of the craft; when the "blip" is not on the line the controller calls for the necessary maneuvers.

There is a refinement of the original "Transponder" now being tested whereby the controller has either a square or a circle on his radarscope and the plane is reflected by a series of dots. When the dots go outside of the markers, then the pilot is instructed to take corrective action. The benefit to be obtained by such a system lies in the exactness of the information which is available to the controller. A number of high-powered and very narrow beams are used to obtain the dots, with a "scan" being made four times per second. This is opposed to the present method where a broad beam produces a large "blip" which is not extremely helpful during landing, and a scan is made only once per second.

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16. *Aviation Week and Space Technology*, 28 Aug. 1967, at 83.

The more precise the image, the more accurate the decision of the controller may be as to the landing process.[17]

The "Transponder" or "Beacon" may now be defined as "an airborne radar transponder which, upon interrogation by a radar pulse, transmits a synchronized reply pulse. The reply pulse can be used to determine range and direction of the aircraft and through suitable modulation indicate aircraft identity and altitude."[18] Thus the controller and the pilot both have gained more time, while the available information is transmitted automatically and is available for use at any time.

The control system presently uses a 64 code 10 channel beacon format to allow the controller to assign a particular code and channel to each aircraft which he is supervising, thus insuring the availability of instantaneous communication with the craft. Further, in the event of a radio failure, the pilot is able to activate the Transponder manually so as to indicate the difficulty to the Ground Controller who can then make provisions as to the safest method of handling the routing and landing of the craft.[19]

In addition, there is under consideration a system which provides for the installation of small radar beacons in the runway itself. These would produce an image on a screen which had been installed in the plane which would resemble runway lighting at the present time, even though the weather was too poor to allow visual contact with the ground. In this manner, the pilot is not in the situation of relying solely on verbal directions, but is able to see what he is about to attempt, which when added to the actions and supervision of the controller, will result in an increased safety factor.[20]

The results of the research efforts directed at the problems of the air industry are seen in other fields as well. As an example, we may look to the new style of antenna which was put into use at La Guardia field in New York in 1967. It is known as a "waveguide glide slope" antenna, and sends out a fan-shaped radio beam similar to an invisible electronic ramp down which a pilot may guide his aircraft to a safe landing, even in bad weather.

Although there have been antennas and systems to perform this function for some twenty years, the one at La Guardia is worthy of special attention due to the fact that the existing technique called for two beams

17. *Aviation Week and Space Technology*, 3 July 1967, at 56.

18. *Report of the Task Force on Air Traffic Control*, F.A.A., Oct. 1961, Appendix A, at 101.

19. *Aviation Week and Space Technology*, 20 Jan. 1964, at 59.

20. *Supra*, note 17, at 59.

to be sent out, one along the ground and the other into the sky at a specific angle. The system was not able to operate at the airport in question with any degree of reliability due to the presence of the East River just beyond the end of the runways. This caused the ground pattern to vary according to the tide and the pilot was required to constantly correct for the deviation.

As a result of the new method, which sends one fan-shaped beam directly into the sky, the minimum ceiling for landing has been reduced from 400 feet to 100 feet and numerous flights which in the past were diverted to other airports are able to land at their prescribed destination. The cost of the system in itself was approximately double what the normal type would have been, but the additional factor is present that in order to effectively install the older type, a platform some ten acres in size would have had to be constructed on the East River at a cost of some 1.5 million dollars.

With a view of the more distant future, we see that there are already thoughts of doing away with any ILS as it is now known. This would take time, and would also require acceptance by the international aviation community in order to be effective. The designers are looking to an Advanced Integrated Landing System which would make use of microwaves, thus providing a clearer definition of the object under surveillance than the type presently in use. This would also reduce significantly the amount of reflection which is the result of nearby buildings or ground clutter. Although there are several variations under development and testing, there is one which seems to have achieved a certain amount of acceptance by a spectrum of the aviation community. The major advantage which is obtained by the use of the system is that the pilot not only has a glide slope approach line in the cockpit, but the equipment may be used for Precision Approach Radar which others are not able to accommodate.[21]

In addition to the advances noted in the control and monitoring of aircraft, the technology has produced results in related areas which will also assist in the fulfillment of the objectives set out for the agency. More specifically, there are a number of theories being tested which would aid the pilot in maintaining a safe distance between craft at all times. These are known as Collision Avoidance Systems and are designed to be mounted on the aircraft and to warn the pilot of impending collision, as well as to provide information concerning proper evasive action.[22] While

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21. *Aviation Week and Space Technology*, 23 Oct. 1967, at 41.

22. P. LaRochelle, *Technical Feasibility of Collision Avoidance Systems*, F.A.A. Symposium, *Potential of Airborne Collision Prevention Devices*, 1962, at 9.

this will amount to an assumption of a portion of the duty which is presently attached to the ATC, it is highly unlikely that the procedure will completely relieve the controller.

Any such system will, of necessity, have to perform at least four distinct tasks in order to be successful. First, it must detect all potentially dangerous craft nearby, and second, it must evaluate the situation as to whether or not a real threat to the safety of the craft is involved. The third step is to determine what precise maneuver is needed, and fourth, specify when the action should be taken so as to maximize the factor of safety.[23] As is readily observable, the entire situation, both the problem and the necessary elements of solution, is of a dynamic nature and will require a new technology for the development of a completely satisfactory answer.

The existing radar has been found to be inadequate for two main reasons. First, the angle of approach of another craft cannot be accurately measured, and secondly, the physical fact that a "radar dish," that is, the transmitter which would have to be mounted on the plane, would have to be some ten feet in diameter in order to adequately cover the area around the plane.[24] For these reasons, the experiments have been primarily concerned with other methods of detection.[25] The implimentation of such a system is not expected until the mid 1970's and, as of this time, are nearly two years away from any substantive testing procedure.[26] There is an additional barrier to be scaled in the fact that the majority of the systems under consideration at the present time require that the other aircraft be equipped with similar equipment. There must be a uniform standard adopted, or a method developed which will allow two or more systems to work together, before the use of such devices will be sufficiently reliable for the general public or even commercial airlines to employ them on a wide scale.

Despite the vast amount of resources and energy that are being devoted to many of the stages of the problems involved with the technology, there are still some areas which seem to defy any solution. One of these is the phenomenon of "Clear Air Turbulence" which occurs mainly over 20,000 feet and consists primarily of powerful cross-currents of air. These are invisible and at the present time there is no manner of advance detection. The results are often dramatic, if not devastating, with the plane lurching

23. *Id.*

24. Russell C. Newhouse, *Project Beacon Recommendations*, (F.A.A. 1962).

25. Klass, *Aviation Week and Space Technology*, *Airborne Collision Avoidance Systems*, Part I, 10 July 1967, at 85 and Part II, 17 July 1967, at 97.

26. Klass, *Airborne Anti-Collision Systems Use Likely to Require Years of Tests*, *Aviation Week and Space Technology*, 2 May 1966, at 91.

out of control and plunging 10,000 feet or more in a sudden, violent maneuver.[27] The dangers are obvious, as is the necessity for some manner of warning the pilot in advance so that protective measures may be taken. The problem is slightly different from others mentioned in that the development of the technology may not involve the Air Traffic Control. The possibility exists, however, that the agency could either require specific equipment that would be adequate, or that the detection would be accomplished through the use of satelite observatories and the information transmitted to the pilot by means of the controller. In such a case, negligence would lead to liability in the same manner as in similar circumstances.

LAW

As we have seen, the regulation of air traffic is in the hands of the Air Traffic Controller, who is employed by the Federal Aviation Agency. The result of this, in a legal framework, is that the potential liability of the defendant agency is determined by the Federal Tort Claims Act.[28] The actual party defendant in these cases is the United States, and therefore, the FTCA provides the plaintiff with a forum in which to bring his suit. This is either the domicile of the plaintiff or the place of the tort.[29] While it is necessary to initiate the suit in a Federal District Court, the results are that the court will apply the usual tests to determine which state law shall apply to the situation at hand. This choice will be based upon the law of the place where the act or omission occurred, including the conflicts law, which will often refer the court to the place of injury via the significant contact doctrine.[30]

The theory of recovery under which damages are usually sought is that of "Proof of Fault." In general it may be stated that the fault system is based upon the showing of reliance, the reasonableness of the actions taken, the nature of the services rendered, the presence of a duty of care, and the breach of that duty as the proximate cause of the resultant damages. The concept itself has been defined as "an act or omission attributable to a defendant is a 'fault' within the meaning of this convention, a) if, without sufficient justification, it is intended to cause or to facilitate the causing of an injury; b) if, without justification, it creates

27. *Supra*, note 5.
28. F.T.C.A., 28 U.S.C. 1402.
29. Buckheit, Adm'x. v. United States Air Lines, 202 F. Supp. 811 (S.D. N.Y. 1962).
30. Richards v. United States, 369 U.S. 1 (1962).

an unreasonable risk of injury through a failure to exercise due care."[31] The most direct and effective manner of satisfying the burden of proof which rests on the plaintiff is through a showing that the negligence of the defendant proximately caused the damage to the plaintiff.

Negligence may be regarded as "conduct which falls below a standard which is set by the law for the protection of the community against unreasonable harm."[32] This standard has been set, insofar as the Air Traffic Controller is concerned, by the courts. The Court recently found that the ATC was liable for breach of its general duty to keep aircraft under the supervision of a controller separated. The controller failed to sufficiently observe the presence of one plane in the vicinity of the other and to transmit timely warning to the pilot of the commercial craft. The Government was held liable for the damages resulting from the ensuing collision and the ATC was found to have acted within the scope of their authority.[33] The most logical determination of the recent cases would seem to lead to the conclusion that the courts may be expected to continue the trend which has been indicated. The theoretical formalities or letter of the law will receive less emphasis than the factor of justice in the instant fact situation.

The Air Traffic Controller will be considered negligent in the event that he clears two planes to land at the same time on the same runway;[34] fails to maintain a safe distance between the aircraft[35] or, in general, violates either the rules and regulations of the agency itself or performs actions which are not in accord with the general duty to prevent collisions.[36]

The further factor of proximate cause does not seem to carry the weight in the aviation field which it once did. The theory acts as a limitation upon the responsibility of the defendant for the consequences of his conduct. It is based in the practicality of the situation and seeks to limit legal responsibility to those causes which are so closely connected with the results, and of such significance, as to warrant the imposition of liability by the courts. The evidence need only be sufficient for reasonable men to conclude that it was more probable than not that the conduct complained

31. *The Harvard Draft Convention on the International Responsibility of States for Injuries to the Economic Interests of Aliens,* 55 Am. J. Int'l L. 548 (1961) Art. 3.

32. W. Prosser, *Law of Torts,* 175 (1941).

33. State of Maryland v. United States; Ingham v. United States v. Eastern Airlines, 373 F.2d 227 (1967), 10 Av. Cas. 17, 122.

34. Eastern Airlines Inc. v. Union Trust Company, 4 Av. Cas. 17, 546, 1955 U.S. Av. R. 1 (D.C. Cir. 1955).

35. Johnson, Jensen, Christeson et al. v. United States of America, 6 Av. Cas. 18,111, 1960 U.S.C. Av. R. 269 (E.D. Mich. 1960).

36. Cattaro v. Northwest Airlines, 236 F. Supp. 889 (1964).

of caused the harm. The defendant is normally held liable for the forseeable results of his negligent conduct as well as for all direct consequences even though they may not be foreseeable. In a 1966 case, the court has stated that "failure to see and realize what was visible and discernible, followed by failure to give immediate warning, constituted negligence that was one of the proximate causes of the accident."[37] The case law, of which this is indicative, lies in the direction of the court finding proximate cause where negligence of the ATC is shown unless a clearly supervening force enters the picture. In the light of the background shown and the reliance factor in these cases being so absolute, this is not a harsh rule but rather an attempt to place the responsibility where the actual authority resides.

The Union Trust case,[38] along with the Cattaro decision[39] may be taken as establishing the fact that the actions of the controller are not considered to be within the discretionary actions exceptions to the FTCA. The protected decision is whether or not to operate the tower, not the manner of operation. As a result of the lack of protection afforded in this area, the government counsel then began to claim that there was no duty on the part of the controller. This claim was based upon the interpretation of two cases.

On the one hand, there is the case of Furumizo v. United States[40] where a student pilot crashed on attempting a take-off. The cause of the crash was found to be the vortex—that is, the disturbance of the air—created by a larger plane taking off, and the court concluded that the tower personnel were negligent in allowing the take-off. This was in the face of the fact that a warning had been issued by the controller. The court was of the opinion that the duty of the controller extended beyond the mere compliance with the manual and that there was a duty on his part to terminate the take-off where he observed that his warning was unheeded. The court criticized the fact that there was a lack of judgment on the part of the tower; that is, the tower failed to make a judgment, rather than that there was an erroneous one made. Again this was defended on the ground that the duty of the controller was specifically set out in the manual and he had followed those instructions. The court reasoned that the separation of aircraft on take-off is a matter of judgment with the controller, and that in the instant case, there was no exercise of that power; thus, the Government was liable.

On the other hand, there is the opinion of the Federal District Court in

37. Maryland v. United States, 257 F. Supp. 768, 773 (D. D.C., 1966).
38. Eastern Airlines Inc. v. Union Trust Co., 221 F.2d 62 (D.C. Cir. 1955).
39. *Supra*, note 36.
40. Furumizo v. United States, 245 F. Supp. 981 (D. Hawaii 1965).

Georgia concerning the Hartz case.[41] Although the fact situation in the Hartz case was almost exactly similar in nature to that of Furumizo, the results differed. The Georgia court emphasized the primary duty of the pilot and set forth a requirement that the plaintiff demonstrate the existence of a duty from the manual and then show a breach of that duty in fact. The existence of this division of authority allowed the defendant to claim no duty on every occasion. The resultant confusion was cleared when the Georgia case was reversed[42] and there seems to be little doubt at this time that there is a clear duty existent on the part of the ATC to do more than merely follow the set of instructions; the exercise of judgment to avoid potentially dangerous situations is now required.

In the light of the case law mentioned above, the theory of using the immediate cause of the accident as a means of exculpating the ATC will no longer be valid. As a prime example of this, we may look to the case of Ingham v. United States[43] where the tower failed to transmit a decrease in weather conditions. Although the pilot was negligent in the process, the Government was held liable nonetheless. The findings of the court were to the effect that the plane approached the runway from an angle some twenty percent off the proper course and then waited too long before instituting a missed approach procedure, with the result that the craft was too low and traveling too slow to stay airborne. It would seem difficult at best to formulate a situation where the immediate cause of the accident could be of a more serious intervening nature, yet liability followed. The conclusion to be drawn from these facts is that a controller bears, and will continue to bear in the forseeable future, a very heavy burden of responsibility. There is, however, a connection between this responsibility and the authority exercised, and at this time it appears to be a reasonable relationship.

CONCLUSION

We have seen the procedural technique which has developed, as well as an overview of the technology in the field of Air Traffic Control. In addition, the present state of the law and some of the effects upon the controller have been examined. The point to be considered at this time is the overall interaction of these elements.

There is a growing web of procedural restrictions and regulations governing the conduct of flight. The Air Traffic Controller is the means

41. Hartz v. United States, 249 F. Supp. 119 (D.C. N.D. Georgia 1965).
42. Hartz v. United States, 10 Av. Cas. 17,606 (5th Cir. 1968).
43. Ingham v. United States, 373 F.2d 227 (2nd Cir. 1967).

by which these are actually applied. As his tools, the Controller makes use of technological innovations and refinements whenever possible. This is one area where the development of the technology has had, and is having, a direct effect upon the development of the law.

As our considerations would indicate, it seems clear that the more highly developed and sophisticated the technology becomes, the more strict the courts will be with those employing these methods. This appears to be equitable when we consider that the sophisticated technology is providing the Controller with more information, which is more accurate than ever before, at an earlier time. Thus, the Controller is being called upon to make efficient use of this information, arrive at correct decisions, and implement correct procedures in such a manner as to fulfill the statutorily imposed duty of facilitating aviation and maximizing safety.

The technology has shown a history of developing new methods in response to particular needs and demands. As these methods have improved, the degree of responsibility upon the Controller, who is the means of exercising the authority which has developed concurrently, has also increased. This process may be expected to continue in a similar pattern for the future.