Hints of an Uneven Playing Field in Aviation Torts: Is There Proof

R. Daniel Truitt

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HINTS OF AN UNEVEN PLAYING FIELD IN AVIATION TORTS: IS THERE PROOF?

R. DANIEL TRUITT*

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* R. Daniel Truitt, J.D., M.A., is an attorney who works as a pilot for a major airline, which is based in New York. He is also a patent-holder in the field of aviation safety. Mr. Truitt's prior experiences include tours of duty as an Air Force fighter pilot and as an international politico-military affairs officer. The author thanks Marc R. Poirier of the Seton Hall School of Law for helping to impose order on some random musings.
LEGAL CASES INFUSED with arcane scientific or technical facts are among the most difficult for fact finders to resolve. Untrained judges and juries must sometimes decide between two equally plausible versions of technical truth. To place this onus on fact finders who lack the requisite background in the art or science is burden enough; to additionally expose them to contradictory expert interpretations of these technical facts merely provides the illusion of fairness in many cases.

Substantial fairness is more likely to be achieved when the judicial setting assures that fact finders understand the facts upon which they must make a decision. Presently our judicial system allows the parties to utilize expert witnesses to explain technical facts. But the system does little to help the fact finders resolve the ambiguities inherent in the adversarial presentation. This system is tolerable when fact finders are called upon to decide the nature and quantum of conduct necessary to meet a standard of due care in ordinary activities. But as familiarity with the subject matter or protocols of a specialized field decreases, there is a heightened danger that lay fact finders will be unable to correctly resolve the ambiguity.1 For present purposes, this Article will refer to the foregoing hypothesis as the “ambiguity of technical facts problem” or simply as the “technical problem.” Where the ill-effects of the technical problem can be empirically demonstrated, the judicial system should take due note. The system should also be hospitable to reform where these effects can be remedied with simple structural changes.

This Article develops data tending to show that on an aggregate basis there exists a significant variance between aviation tort action outcomes and the results predicted by an independent standard of “expertise.”2 It attributes this difference in out-

1 The notion that this ambiguity is resolvable rests on the premise that some scientific knowledge or technical propositions are not seriously arguable, and that there is only one correct resolution. In this connection, Steven Goldberg observed: “There is in modern America a scientific community capable of forming a consensus on technical scientific issues. There is therefore something that can usefully be thought of as scientific expertise.” Steven Goldberg, The Central Dogmas of Law and Science, 36 J. LEGAL EDUC. 371, 372 (1986). To illustrate the implications of this, Goldberg adds, “It is barely possible to be a member in good standing of the American scientific community today if you disbelieve in evolution or believe in laetrile. It is impossible to be a member if you hold both views.” Id. at 373.

2 “Variance” as used here refers only to a difference between the two outcomes, not to variance as the term is understood and used in parametric statistics.
comes mainly to the operation of the technical problem (i.e.,
the difficulty inherent in resolving the ambiguity imposed by the
adversarial presentation of technical facts). This Article also
links the technical problem to another problematic factor—the
propensity of fact finders to resolve ambiguities in favor of the
injured claimant at greater than expected rates.

According to the selection effect theory, propounded by
George Priest and Benjamin Klein, the overall expected plaintiff
win rate should be approximately fifty percent. Yet recent work
has shown that in several categories of personal injury actions,
including “airplane personal injury,” plaintiff recovery rates ex-
ceed the predictions of the selection effect theory. This Article
argues that the operation of the technical problem essentially
liberates fact finders to impose outcomes that the neutral expert
would not predict. Furthermore, decisional accuracy and reli-
bility in the technical cases can be improved by certain changes.
A judicial system unable to deal competently with the technical
problem should adopt some of the methods of the inquisitory
style of judicial fact finding. This might mean, inter alia, provid-
ing fact finders with all the relevant information concerning the
case, not just the versions of the parties.

One important thematic obstacle preventing neutrality in our
current fact-finding regime is the “adversary ideology” that is im-
bedded in our legal culture. The central premise of this ideol-
ogy is that in a free and fair contest of adversaries, the truth will
prevail. But this ideology actually places process values ahead of
truth values. By maintaining the “champion of facts” myth, our
adversary ideology sacrifices “truth” for an uncontaminated pro-

5 George L. Priest & Benjamin Klein, The Selection of Disputes for Litigation, 13 J.
LEGAL STUD. 1, 5 (1984). The authors’ thesis was that litigants account for any
anticipated pro-plaintiff bias in their selection of cases for trial. With this in
mind, many defendants will settle. Cases that are tried should then distribute
outcomes evenly.

4 See Kevin M. Clermont & Theodore Eisenberg, Trial by Jury or Judge: Tran-
scending Empiricism, 77 CORNELL L. REV. 1124, 1137 (1992). The authors found
that in five of six types of personal injury cases—airplane personal injury, marine
personal injury, motor vehicle, products, and medical—plaintiff recovery rates
exceeded fifty percent. With a judge as the fact finder, for example, plaintiff win
rates ranged up to a high of sixty-nine percent in motor vehicle torts. Id.

The authors did not test their discrete “judge” and “jury” rates for statistical
significance since their principal focus was on variance between the judge and
jury. Their study also excluded cases in which the government was the defend-
ant. Therefore, the scholarship has yet to describe the behavior of judges in
respect to the government-as-defendant variable, as in a Federal Tort Claims Act
(FTCA) case. See discussion, infra note 13.
When dealing with facts of everyday experience, this ideology does not unduly interfere with an approximation of truth; if its central premise is accurate, it advances that goal. But our ideology is not necessarily equal to the task when the facts or canons of the case are unfamiliar.

One thesis of this Article is that the more esoteric the facts, the stronger the influence of the technical problem and the less likely that an informed verdict will be reached, even when experts are used. Consequently, it is arguable that such a verdict is less likely to be just. Even where the main issue is not a matter of scientific knowledge but one of understanding rules of conduct in a specialized field, the technical problem can exist. In such a case, the problem arises not just from the necessity to decide esoteric facts but from an application of a rule determining liability. Where the rule is embodied in a law, or regulation with force of law, our legal system often permits attribution of negligence as a matter of law. Indeed, this "per se" approach to imposing liability can result in a particularly egregious form of the technical problem—an application of the rule that works at cross purposes with the rule's rationale or policy.

Aviation is a technical field bound by a tight web of rules. As such, aviation provides a host of opportunities for both forms of the technical problem. Extensive literature highlights on the tendency for aviation tort actions to produce outcomes counter to what would be predicted by a neutral and informed view of the facts. Until now, however, there has been no attempt to empirically test any hypothesis relating to the incidence of the technical problem in aviation tort actions. This Article uses the reports of the National Transportation Safety Board (NTSB) on aviation accident causation to assess aviation tort action outcomes.

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5 Ellen Sward argues that our adversary ideology is so ingrained in the American legal culture that it is difficult to discuss its failings with lawyers and jurists. See Ellen E. Sward, Values, Ideology, and the Evolution of the Adversary System, 64 Ind. L.J. 301, 301 (1988-1989). She argues that the myth of its effectiveness is only maintained by the system's engraftment of some nonadversary features. Id. at 354. She includes modern liberalized discovery, which in principle violates the ideological rationale of litigant autonomy and control; the use of masters and court-appointed experts, which violates the "passive arbiter" ideological rationale; and the creation of special courts for dealing with specialized fact situations and types of claims (e.g., bankruptcy, tax, international trade, probate, patent appeals, etc.). Id.

6 For an abbreviated review of relevant commentary, see infra Section IV.
comes. The non-trivial variance between this independent standard and some sample case outcomes tends to substantiate the charges of the commentators. The following section recounts a case that is of independent historical interest to aviation litigators and provides an illustration of how the technical problem can distort the path of the law.

II. A PARADIGM CASE

On the morning of November 1, 1949, an Eastern Air Lines DC-4 and a P-38 fighter plane, piloted by a Bolivian Air Force pilot on a test flight, were simultaneously approaching the Washington National Airport to land. The P-38 pilot overtook the DC-4 from above and behind and rammed it, cutting the DC-4 in two, killing all aboard. Miraculously, the Bolivian pilot survived. After his plane plunged into the Potomac River, he was rescued. Although the Bolivian pilot was under the ostensible control of the Washington Airport tower operators, testimony showed that he was probably either too distracted with alleged engine problems or was insufficiently proficient in English to respond properly to, or obey, the local controller’s instructions. The tower controller had issued several urgent warnings to the P-38 pilot that he was approaching dangerously close to the DC-4 from behind. All warnings were ignored. The Bolivian testified that he was on his “final” approach and that he believed he had been cleared to land. The undisputed facts showed that he had interpreted a standard sequencing phrase (“You are number two to land”) as landing clearance. He testified that he could not see ahead because an airplane design deficiency limited forward visibility, accounting for his not seeing the DC-4. This excuse strains credulity in the extreme.

7 See infra Section V.
8 The statistics of this small-sample data aggregation are adduced as suggestive only. The sample size was too small for testing with confidence intervals.
9 Even if he had been correct in his assumption that he had a landing clearance, he still violated at least two fundamental precepts of aviation embodied in regulations: (i) the always applicable “see and avoid” rule and (ii) the obligation of the overtaking aircraft to give way to an aircraft ahead and below in the landing pattern. 14 C.F.R. § 91.113(b), (f) (1995). Both rules are codified as federal regulations known as the federal aviation regulations, or FARs. For a discussion of the FARs, see infra note 52. Thus, the Bolivian had no defense, especially in consideration of the facts elucidated in the succeeding note.
10 According to military historians, the Lockheed P-38 Lightning was one of the most highly successful aerial combatants of World War II, a fact indicative of excellent cockpit visibility. See RENÉ J. FRANCILLON, AMERICAN FIGHTERS OF
A. SIGNIFICANCE OF EASTERN AIR LINES

The case of Eastern Air Lines v. Union Trust Co. is best known to aviation lawyers, not for this bizarre set of facts, but for the rule that courts may entertain claims under the Federal Tort Claims Act (FTCA) against government air traffic controllers for negligence in the performance of their duties. The government argued that these kinds of government duties were subject to the discretionary function exception (DFE) of the FTCA. After Eastern Air Lines, however, there was no doubt that air traffic controllers had no discretion to be negligent in the performance of their duties. So notorious is this case, in the FTCA context at least, that most, if not all, commentary on the subject of air traffic controller liability begins and ends with citation to it.

The facts in the case are interesting, but of even greater curiosity are the interpretations that the judge and jury gave these facts. Their interpretations supply some ready illustrations of the inherent problems in interpreting highly technical or specialized facts and in treating them fairly. The case also illus-

World War II 3, 47 (C.W. Cain ed., 1971). Additionally, the most aerial victories achieved by an American fighter pilot during the War were notched by top ace, Captain Richard I. Bong, flying P-38s in the Pacific. U.S. Air Force Historical Division, A History of the United States Air Force 80 (Alfred Goldberg ed., 1974). There is no better testimony to the plane's excellent cockpit visibility.

The FTCA, 60 Stat. 842 (1946) (codified at 28 U.S.C. §§ 1346(b) & 2671-2680 (1988)), overturns the common law rule of sovereign immunity in order to provide redress to persons harmed by the negligence of government employees. Codified at 28 U.S.C. § 2680(a) (1988), the DFE provides that the United States will not be liable under the FTCA on "any claim based upon an act or omission of an employee of the Government . . . based upon the exercise or performance or the failure to exercise or perform a discretionary function or duty on the part of a federal agency or an employee of the Government, whether or not the discretion involved be abused."

At the time of this case, courts were struggling with the question of when duties of government functionaries stop being discretionary and became subject to a rule of due care. See, e.g., Dalehite v. United States, 346 U.S. 15 (1953) (setting forth the original analysis).


In actions against the United States under the FTCA, the court is the fact finder. See 28 U.S.C. § 2402 (1988). (In this consolidated case, the jury decided the case against the airline.)
trates some of the problems with the application of specialized rules to specialized fact patterns. In view of its results, *Eastern Air Lines* should be recognized not just for the rule of government responsibility for negligent harm caused by employees performing routine duties, but for illuminating problems inherent in technical cases, particularly aviation cases.

The impact of the "technical problem" can be recognized in the general problem of factual abstractionism in the cases. "Factual abstractionism" connotes the inevitable process by which both the parties and the deciders of facts sift through facts pertaining to the case to discover those facts that are of some legal significance.\(^\text{16}\) The abstractionism problem, if it exists, amounts to leaving factual gaps that can steer case outcomes away from results obtainable if all facts had received proper consideration.\(^\text{17}\) Abstractionism is all the more problematic where the case involves complex facts and unfamiliar rules whose significance may not be properly understood. Thus, while the courtroom situation inevitably entails some abstracting of facts, the greater the factual intricacy, by hypothesis, the greater the danger of William James' "vicious abstractionism" interfering with a correct verdict. Important facts may be ignored or possibly misinterpreted in light of a misunderstanding of the applicable law. This might be the case in *Eastern Air Lines*. In the decisions of the judge and jury, the errors of factual interpretation and legal application are so conspicuous that it is almost inconceivable that they could have occurred unless the experts employed by the defendants, Eastern, and the government were either not in attendance or were inadequately used.

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\(^{16}\) This is a problem separate from distinguishing between adjudicative facts (those facts relevant only to this case) and legislative facts (those relevant facts about the world in general). Facts of either type can be improperly abstracted in the presentation and deciding of cases.

\(^{17}\) William James termed the problem "vicious abstractionism," saying:

> We conceive a concrete situation by singling out some salient or important feature in it, and classing it under that; then, instead of adding to its previous characters all the positive consequences which the new way of conceiving it may bring, we proceed to use our concept privatively; reducing the originally rich phenomenon to the naked suggestions of that name abstractly taken, treating it as a case of 'nothing but' that concept, and acting as if all the other characters from out of which the concept is abstracted were expunged. Abstraction, functioning in this way, becomes a means of arrest far more than a means of advance in thought.

B. FINDINGS AND DECISIONS

The attentive reader might be surprised to learn that on the facts outlined above, the Bolivian pilot was completely exonerated by the jury, which found against the Eastern crew for proceeding to land without having received clearance. There was testimony that the Eastern pilot had received clearance, which the judge credited in his own ruling against the government. The jury, nevertheless, found that the Eastern crew had caused the accident despite the facts that (i) Eastern, as the aircraft ahead and lower in the landing pattern, had by regulation and custom the right of way; and (ii) the Eastern DC-4 was rammed from behind and was thus helpless to avoid the peril. Yet, the jury findings cannot be characterized as wholly irrational; the appellate court found that the verdict against Eastern had been tainted by some substantially prejudicial testimony at trial. The court reversed and remanded on this point.

The trial judge also found against the government controller for lack of adequate warnings to either plane, even though there was uncontradicted testimony, which the judge did not reject, indicating that there were many urgent warnings. The judge also found against the government for the controller’s having cleared the two aircraft to land on the same runway at the same time, despite the fact that the only testimony to that effect was provided by the perjurious and mistaken P-38 pilot. The P-38 pilot’s “proof” on this point was his testimony that the controller had advised him that he was “number two to land.” This was a standard traffic sequencing advisory which says nothing about a clearance to land; nonetheless, this testimony persuaded the judge. The only possible explanation for the judge’s belief is that either he was insufficiently instructed on this element or he was not impressed with a very critical distinction.

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18 Eastern Air Lines, 221 F.2d at 65-66.
19 Id. at 68-72. On appeal, the Supreme Court reversed again and remanded. Union Trust Co. v. Eastern Air Lines, 350 U.S. 907 (1955), modified per curiam, 350 U.S. 962 (1956) (remanding for the appeals court to consider items left undecided by the Supreme Court’s reversal).
21 Eastern Air Lines, 221 F.2d at 65-66.
22 Id. at 78. But the jury had a contrary finding that the Eastern pilot was not cleared to land. See supra note 19 and accompanying text.
23 Eastern Air Lines, 221 F.2d at 66.
24 The distinction between an air traffic “advisory” and an air traffic “clearance” can be a critical one, as it was in this case. FAA is at pains in its official
Following the remand by the Supreme Court, the appellate panel refused to disturb the trial court's ruling or the jury verdict. On the issue of whether the Eastern aircraft had been cleared to land, the jury found against Eastern (for negligently attempting to land without a clearance), whereas the court found against the government (for clearing both aircraft to land simultaneously—upheld). As to these mutually contradictory findings, the writer at the appellate court level (who, interestingly, was also a dissenter) opined,

This court's affirmance of the judgments against the appellant produces this anomalous situation: Eastern Air Lines and the United States have both been mulcted in damages because of contrary findings on a single fundamental factual issue. The judgments against both defendants cannot possibly be correct; justice has miscarried either as to Eastern or as to the Government. Since the Supreme Court has affirmed the judgments against the latter and so has stamped approval on the finding that the Eastern plane was cleared to land, I see no escape from the conclusion that Eastern Air Lines is the victim of injustice.

The judge rightfully decried the patent injustice in the case. One fact finder (the jury—finding against the totally fault-free airline company) exonerated the sole negligent party, the Bolivian pilot; the other fact finder (the judge) found against the completely fault-free government FAA controller.

C. IMPLICATIONS FOR THE FUTURE

Some new aviation rules arguably produced by this judicial resolution include the following: (1) controller duty to maintain separation of aircraft is a strict liability duty for the government regardless of any intervening pilot misconduct; (2) pilots

definitions of terms to make the distinction clear. See FAA ORDER 7110.65J (1995), also known as the Air Traffic Controller's Manual, or ATCM, Pilot/Controller Glossary. These definitions merely reflect a common sense distinction that is apparent to anyone holding a pilot's license, i.e., that information concerning sequence in the traffic pattern is advisory only and is not to be confused with a clearance to proceed for landing.

27 Id. at 33 (footnote omitted) (Miller, J., dissenting).
28 Controller procedural duties are outlined in FAA ORDER 7110.65J (1995), supra note 25. Among the primary duties of controllers is to maintain separation of aircraft. Id. para. 2-1-2. Furthermore, controllers are under a legal duty to follow procedures in their manuals. 14 C.F.R. § 65.45(a) (1995). See Rodríguez v. United States, 823 F.2d 735, 740 (3d Cir. 1987); Armstrong v. United States, 756 F.2d 1407, 1409 (9th Cir. 1985); see also James L. Rigelhaupt, Jr., Annotation,
operating in terminal areas under FAA tower control are effectively relieved of their regulatory duty to maintain vigilance to see and avoid other aircraft; pilots are free to ignore controller sequencing, traffic advisories, and even warnings in terminal areas—in apparent disregard for either obvious or inobvious collision dangers; pilots are free to ignore the regulatory right-of-way of aircraft both ahead and lower on the final approach segment, and controllers have the presumptive duty to compensate for any pilot misconduct by way of negligence, lack of skill, or rule violations.

Fortunately for air travelers, none of these ascriptive rules are given practical or legal effect today, nor will they ever be. The skies would be far too dangerous. Thus, aside from its prominence as the primary authority for non-applicability of the DFE to government employees in the performance of routine duties, Eastern Air Lines stands as an example of the worst effects of the technical problem. The decisions in the case illustrate how the ambiguity of technical facts in a case can distort the normal judicial abstracting process into a charade. A question thus suggests itself: How could Eastern Air Lines have been allowed to happen? More to the point, why were the experts who were working for the defendants, Eastern and the Government, unable to convey to the fact finders how these facts had only one proper interpretation and how the relevant aviation rules should have been applied to these facts? The answers must lie in lack of persuasiveness on the part of the defendants' experts; at the very least, they must have been less believable than the plaintiffs' experts. But, if the law were plain and the facts unequivocal, as they seemed to be here, then only a modicum of persuasiveness should have been necessary on the part of defendants' experts.

Liability of United States For Negligence of Air Traffic Controller, 46 A.L.R. Fed. 24 (1980). However, imposition of strict liability on controllers is a novel approach. 14 C.F.R. § 91.113(b) (1995) requires pilots to maintain vigilance to see and avoid other aircraft. They must do this "when weather conditions permit, regardless of whether an operation is conducted under instrument flight rules [IFR] or visual flight rules [VFR]." Id. This particular language is important for its imposition of the duty whenever there is adequate in-flight visibility. Conversely, when visibility conditions do not permit, pilots must obtain an instrument clearance and submit to ATC radar control. Radar control is fairly ubiquitous, but it is generally not mandatory unless operating in instrument meteorological conditions (IMC) or in certain types of special airspace. See, e.g., FAA Order 7110.65J (ATCM), supra note 25.

The possibility of a deep pockets theory or just plain jury sympathy for plaintiffs is not excluded by this analysis. In the case of the judge, where these explanations are less likely, any number of speculative reasons could be advanced.
Perhaps *Eastern Air Lines* reflects a simple failure of lawyering. After all, it is the job of counsel to successfully elicit the proper expert testimony in order to win the case. This problem has been the subject of trenchant comment.\(^3\) If not a lawyering failure, the problem for these defendants might have been the inability of lawyers and experts to speak each other's language. Perhaps *Eastern Air Lines* should stand for the proposition that it is essential for attorneys and experts to make the necessary intellectual and tactical connections before making their united presentation. From this supposition, one can hypothesize that the more an attorney is familiar with the exigencies, norms, and rules of a specialized field, the more effective her performance will be, including her use of experts.\(^3\) Judge Harold Levanthal observed that “[i]t is the kind of issue where a month of experience will be worth a year of hearings.”\(^3\)

### III. ADVERSARINESS: COSTS AND BENEFITS

At a rudimentary level, *Eastern Air Lines* can serve to illustrate some of the general problems inherent in our adversarial pres-

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\(^3\) Samuel Gross stated:

> At the low end of the spectrum, there are many cases in which the lawyers are not competent enough, or do not care enough, or cannot afford to do anything more than cursorily prepare their experts. In these cases there is a fresh set of problems. Because expert testimony is more difficult and complex than lay testimony, minimal preparation is likely to produce incomprehensible evidence, not to mention poor use of the available expertise.


\(^3\) This is the view taken by Daniel C. Cathcart, who is a strong proponent of the “expert” advocate in the aviation case. Cathcart's comments on the qualities on the ideal aviation litigator may be well taken:

1. He should be a seasoned trial lawyer.
2. He should be an experienced pilot whose certificates and ratings have at least qualified him for flight under instrument flight rules and procedures. Piloting experience will provide the lawyer with the necessary vocabulary, jargon and buzz words involved in aviation. He will also be familiar with current procedures and techniques and will have a practical knowledge of the Federal Aviation Regulations and their application.
3. He should have had formal scientific training in physics, chemistry, higher mathematics, aerodynamics, [etc.]...


\(^3\) American Airlines v. CAB, 359 F.2d 624, 632-33 (D.C. Cir. 1966).
entation of complex facts and in particular, our use of experts. As an initial matter, it is useful to consider why our system calls for the use of experts. Under Federal Rule of Evidence 702, the system provides for experts when they possess specialized knowledge, training, or experience that will assist the trier of fact. This standard merely begins the inquiry, however. We use experts, in general, not for their dispassionate, neutral examination of facts or their scientific conclusions, but to prevail.

A. Adversariness and its Alternatives

Accordingly, it has been said that the adversary system for truthfinding is not necessarily the best system for all seasons. Examples abound in all places adhering to the Anglo-American legal tradition where, in the interest of either efficiency, accuracy, or fairness, the general model of an inquisitorial system is adjudged the model of choice. Two obvious examples are most forms of administrative decisionmaking and official governmental investigations and inquiries. The latter category includes impartial congressional investigations into matters of a technical nature as well as executive and administrative inquiries into catastrophes and accidents. Other areas subject to official governmental inquiry include the conditions present in industries, the environment, foreign trade, and the monetary system.

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54 FED. R. EVID. 702.
55 See Sward, supra note 5, at 301.
56 “Adversary” is understood as the traditional Anglo-American methodology of deciding legal relations, i.e., the “combat” model. A central desideratum of this system was expressed by Justice Brennan in Baker v. Carr: “Have the appellants alleged such a personal stake in the outcome of the controversy as to assure that concrete adverseness which sharpens the presentation of issues upon which the court so largely depends for illumination of difficult constitutional questions?” 369 U.S. 186, 204 (1962).
57 “Inquisitorial” is understood as the system in use in most places in continental Europe where a neutral magistrate is empowered to inquire into and decide facts in a non-adversarial fashion. The chief focus of the inquisitorial system, according to Sward, is truth-finding in ways that stress social and communitarian values over individual and autonomy values. See Sward, supra note 5, at 313-15.
58 Based on the principles of efficiency and expertise, many matters that in this country would at one time have been decided in an Article III court are now being decided in administrative fora. The Supreme Court considers administrative agencies experts in their own bailiwicks and has ruled that the judicial system should not interfere absent irrationality, illegality, or clear abuse of discretion. This stance has been denoted in the literature as “Chevron deference.” See, e.g., WILLIAM F. FOX, JR., UNDERSTANDING ADMINISTRATIVE LAW 304-06 (2d ed. 1992), citing Chevron U.S.A., Inc. v. Natural Resources Defense Council, Inc., 467 U.S. 837 (1984) and its progeny.
All such governmental fact-finding endeavors employ neutral experts to find the data and to make it accessible to decisionmakers.

Why, as a general rule in these situations, would fact finders prefer a nonadversary method of fact gathering? One reason is efficiency considerations. Where there is no legal dispute, and thus no cause for implicating the judicial system and its methods, a nonadversarial method of data gathering is cost-effective. Second, and more importantly, are considerations of accuracy and reliability. In removing the ambiguities inherent in the adversarial exposition of facts, a neutral, technical inquiry presents the decision maker with a consistent interpretation rather than a conundrum. Most scientific propositions, such as evolution and laetrile, are capable of only one construction, and arguments for any other construction would be wasted efforts in the scientific community. Therefore, where the conclusions of experts, or groups of experts working in concert, are consistent with good science, the fact finder is arguably better circumstanced to make a correct choice than when faced with intrinsic ambiguity. For example, technical conclusions of groups of experts concerning either the monetary system or the causation of accidents, though theoretically arguable, resemble scientific conclusions. Such technical considerations are reached and tested collegially by experts skilled in the art or science; thus, they generally have a rightful claim to accuracy. Additionally, these results are likely to be reliable because they tend to replicate results in similar cases.

The neutral exposition of technical facts should be equally competent in the legal setting. Evidence of this proposition can be found in the strong push for neutral-found facts in helping to resolve technical legal disputes. This instinctive trust, both on the part of courts and parties, of neutral, expert-found facts is not difficult to understand: the facts are perceived as

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58 See Goldberg, supra note 1, at 371.
59 This view is reflected in the Manual for Complex Litigation (3d ed. 1995) when discussing appointment of experts, masters, and magistrates. See § 21.5 Special Referrals.
40 One element of this evidence is the accelerating pace of court opinions allowing greater portions of the reports of the National Transportation Safety Board (NTSB) into evidence in transportation tort cases—despite the statutory inadmissibility of the Board’s conclusions. See 49 U.S.C. § 1154(b) (1994). For a complete statement of the law on inadmissibility of the Board’s conclusions, see Lee S. Kreindler, 2 Aviation Accident Law §§ 18.01-03 (1995).
generally accurate, reliable, and free of the taint of partisanship.41

The same rationale should apply with equal force to experts’ conclusions regarding factual relationships and matters of causation. In this connection, authorities have explained the statutory inadmissibility of the conclusions of the NTSB investigations as resulting from a desire to encourage full disclosure in the interests of accident prevention42 and to prevent invasion into the province of the jury.43 Yet, the Supreme Court is not necessarily persuaded by this logic. In Beech Aircraft Corp. v. Rainey, the Court took the opportunity to address the admissibility of the expert conclusions of a government report not having any statutory protection (a report of a Navy aircraft accident).44 In finding that the entire Navy report was admissible, the Court went to great lengths to stress the liberalizing trend in the current Federal Rules of Evidence. The Court acknowledged and was impressed by “the Federal Rules’ general approach of relaxing the traditional barriers to ‘opinion’ testimony.”45 Therefore, the statutory inadmissibility of the NTSB conclusions could be characterized as merely a creature of Congress that is arguably at odds with its other indulgent pronouncements on admissibility of evidence in general. It is also at odds with the reasoning of the Supreme Court in Beech Aircraft Corp.

B. A MINI-THEORY ON BEHALF OF TECHNICAL NEUTRALITY

Other arguments support the use of neutral expert conclusions in complex cases. Aside from the partisanship difficulty, or rather springing from it, would be the manner in which fact

41 This is why, according to one commentator, the relevant statute proscribing admission and the Board’s supporting regulations have been all but eviscerated. See Roy T. Atwood, Admissibility of National Transportation Safety Board Reports in Civil Air Crash Litigation, 53 J. AIR L. & COM. 469 (1987) (if the original justification for exclusion was ever valid, it is no longer so); see also Phillip J. Kolczynski, The Criminal Liability of Aviators and Related Issues of Mixed Criminal-Civil Litigation: ‘A Venture in the Twilight Zone,’ 51 J. AIR L. & COM. 1 (1985).


44 488 U.S. 153, 169 (1988). The Court’s touchstone for admission was the “trustworthiness” criterion embodied in Federal Rule of Evidence 803(8)(C) (the public records and reports exception to the rule against hearsay).

finders may perceive the battle of the experts. It would be logical for lay fact finders to conclude that, if the experts cannot agree on these matters, then objective reasonable scientific certainty in any complex case does not exist. From this perception, the fact finder, as the final factual arbiter, may (and arguably is forced to) turn to his own understandings of the physical world.

The ambiguity inherent in the presentation of diametrically opposed opinions about technical facts, or in the application of rules, can essentially be viewed as "liberating" the fact finder to refer to his own frame of reference for deciding them. The more esoteric the facts or the more unfamiliar the rules, by hypothesis, the greater the tendency to fall back on one's own understandings. To the extent the fact finder's comprehension is flawed or incomplete, then the potential of courtroom errors is a consideration. Just as microphone feedback produces an unintelligible squeal, the reliance by the fact finder on uninformed ideas or prejudices concerning facts to be found can produce similar incoherence.

As a brief illustration of how this "feedback" error can operate, consider that many people hold eminently logical and pragmatic, yet erroneous, notions of the physical world. Termed "lay mental models" these non-scientific and non-technical constructs enable people to infer (though sometimes incorrectly) facts and relationships about nature and technology in an ad hoc fashion—without doing much harm. For example, educated people functioned perfectly well in the mistaken belief that the earth was flat—they did so for centuries, even after scientific evidence was available to refute the erroneous theory.

There are modern analogs for this relatively harmless, yet erroneous, form of pragmatic problem-solving. A simple illustration is provided by the notion held by many that a thermostatically-controlled automatic heating or cooling device will reach a target temperature more quickly by setting the ther-

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46 There is extensive literature on this phenomenon. See Brian Wynne, Public Understanding of Science, in HANDBOOK OF SCIENCE AND TECHNOLOGY STUDIES 361, 370-73 (Sheila Jasanoff et al. eds., 1995).

47 The work of Jon D. Miller and others has shown that most Americans—93% to be exact—continue to be scientifically illiterate, under fairly relaxed standards. THE INTERNATIONAL CENTER FOR THE ADVANCEMENT OF SCIENTIFIC LITERACY, INTERNET WEBSITE, http://www.icasl.org/www/icaslab.html, 11/10/95. The findings of the American researchers have been duplicated in Britain. See John R. Durant et al., The Public Understanding of Science, NATURE, Jul. 6, 1989, at 11.
mostat beyond the target temperature. It is plausible that mechanisms could be designed to work this way, even though they are not.

In the hypothetical courtroom situation where adverse experts contend for different understandings of how thermostats work, feedback error could easily favor an incorrect "expert" interpretation. The expert who can plausibly confirm the factfinder's pragmatic predisposition with respect to the facts will be the expert finding credence. Of course, it may be argued that the inquisitorial style of truth finding is not any more immune from this type of error than is adversary fact finding. Working strongly against this argument, however, is the fact that the independent neutral expert will be much less likely to render an opinion when payment is dependent on the opinion being the "right one." In fact, serious doubts have been expressed whether adversariness of expert information is a necessary concomitant of our system.

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48 This illustration comes from a widely reported public survey conducted in this country in the last decade. Wynne, supra note 46, at 371-72. Of course, many physical properties of the world are correctly understood by people, but these would not likely be the areas of inquiry necessitating expert assistance. (The standard for Federal Rule of Evidence 702 is that the expert be able to "assist" the trier of fact.)

49 If not clearly erroneous, these facts are not likely to be corrected on appeal. Similarly, in an apocryphal New Jersey case in the early 1990s, two lawyers were heard to argue in court whether 12:00 p.m. meant noon or midnight, an apparently material distinction to the case. It was reported that the judge could not decide that day which was right. (The courtroom exchange was a news item and not to my knowledge reported in any case reporter.)

50 To say the that theoretical range of opinion on an esoteric subject is wide is not necessarily to impute dishonesty. For example, a court once said, "In the great majority of the cases the experts are entirely honest, and their disagreement is simply a typical illustration of reasonable minds differing in their opinions." McIntosh v. Milano, 405 A.2d 500, 511 n.19 (N.J. Super. 1979) (citing Harold F. McNiece, Psychic Injury and Tort Liability in New York, 24 St. John's L. Rev. 1, 75-76 (1949)). Yet the burgeoning industry of expert courtroom practice has, in the view of some, engendered the need for curbing inexpert experts by removing courtroom immunity and allowing suits for expert malpractice. See Carol H. Garcia, Expert Witness Malpractice: A Solution to the Problem of the Negligent Expert Witness, 12 Miss. C. L. Rev. 39 (1991); see also Don J. DeBenedictis, Off-target Opinions, A.B.A. J., Nov. 1994, at 76.

51 The literature is replete with such expressed doubts, starting as far back as 1848 (and perhaps much farther), with publication of Judge John P. Taylor's Treatise of the Law of Evidence (3d ed. 1858) (as cited in Gross, supra note 31, at 1114). Taylor sought to isolate several types of evidence givers whose testimony should be treated with caution, saying that "[p]erhaps the testimony which least deserves credit with a jury is that of skilled witnesses.... [I]t is often quite surprising to see with what facility, and to what extent, their views can be made to corre-
The “battle of the experts” also contributes to a related problematic factor which confounds reliable truthfinding in complex cases. This problem springs from the persuasiveness of counsel and her expert. This refers not to the inherent truth or rightness of their presentations but to the quality of their argumentation. This factor can be termed “non-germane persuasiveness.” I suggest only that a good lawyer and her expert can win on bad facts. The strength of this factor no doubt also varies in direct proportion to the general inaccessibility of the facts to laypersons.

This hypothesis is probably all the more apt where the fact finder is generally uninformed or may be predisposed to a “flat-earth” view of some facts. It is presumably also all the more pertinent where the fact finder must apply technical rules without adequate exposition of their policies. For these reasons, any controversy with adversary exposition of technical facts or rule applications is probably well-founded.

The next section details some of the special problems in aviation, perhaps making the field more susceptible than others to the vagaries of the technical problem. It reviews some of the commentary reflecting dissatisfaction with the current system and discusses possible solutions.

IV. REAL PROBLEMS, PROBLEMATIC SOLUTIONS

Deciding complex facts in a tort action can be an unremarkable task. Even the intrinsic problem of factual ambiguity is not entirely insoluble where the facts are susceptible to some common sense confirmations. There are probably many fields, though complex and technical, where the issue of due care in a given instance is capable of lay resolution. One of the reasons for this is because in these fields, such as surgery or fire fighting, deciding the matter of due care might be founded more on reason rather than on understanding and applying esoteric rules. The technical problem begins to assume larger proportions and probably produces more error where the field is subject to regulation by rules with policies that are unknown or not fully understood. For example, where the common sense purport of a rule is belied by a subtle policy objective or by the requirement to

spond with the wishes and interests of the parties who call them.” Id. (quoting Taylor, supra, §§ 45-50, at 65-69). Gross argues that adversariness of experts is counterproductive to effective truthfinding and not necessary to our system.
balance values implicated by the particular factual situation, the rule is even more subject to inexpert application.

A. DISTINGUISHING FEATURES OF AVIATION TORTS

The foregoing may distinguish aviation torts. The existence and pervasive influence of federal regulations governing every aspect of the enterprise operates to suffuse many legal disputes with a technical rule application problem. The rules are not necessarily those of everyday experience, and as a result they are not necessarily subject to easy resolution by reference to lay understandings. But parties to a case do not always completely address policies or explain how certain values are affected by a particular application. For example, a pilot of an aircraft that is in extremis may be called upon to balance the values of observance of regulatory right-of-way and self preservation. A party injured as a result may call upon the fact finder to find that a certain rule is applicable irrespective of the circumstances. The real question may be how the rule is best applied to serve the most important value at the moment. The problem is that the present system incorporates few features that help the fact finder properly discriminate between the two versions of technical truth being offered.

Many, if not most, aviation rules may appear to the uninitiated as categorical imperatives. This would encourage a lay fact finder to ignore policies and eschew balancing. As official government pronouncements, the rules give strong impetus for resolution of legal disputes by per se attributions of either due care or negligence. Indeed, the common law of many states will impose that type of analysis. Thus, even though the authorities will state that liability for aviation accidents is decided upon ordinary due care concepts, the decision-maker is still burdened by deciding the substantive nature of the rule of due care applied to the specific set of facts. Is it ordinary care, or is it the man-

52 The Federal Aviation Regulations (FARs) make up probably the most comprehensive set of rules of conduct with the force of law to govern any human endeavor. All of Title 14 of the Code of Federal Regulations is “Aeronautics.” The FARs, comprising Chapters 1 & 2 of Title 14, govern: every aspect of aviation including flight rules and the operation of aircraft; airplane certification and maintenance; air traffic control; and operation of airlines, flying schools, charters, airports and navigation aids. See 14 C.F.R., chs. 1 & 2 (1995). The FARs also have the force of law. See In re N-500L Cases, 691 F.2d 15, 28 (1st Cir. 1982); United States v. Schultetus, 277 F.2d 322, 327 (5th Cir. 1960).

date of a federal regulation? If it is the latter, have the regulation’s policies been completely explained and interpreted to the fact finder?

Consider the pilot’s regulatory duty to “maintain vigilance to see and avoid” other traffic.\textsuperscript{54} A main issue in a midair collision case concerns applicability of this regulation. One side may argue for a finding that it was breached as a matter of law, and that this breach amounts to negligence per se. A counterargument will center around whether the pilot had a true opportunity to see and avoid. Additionally, a counterargument will raise circumstantial matters such as the following: (1) sun angle, speed, size, and relative approach angles of the aircraft, atmospheric conditions; (2) whether one or both aircraft were under air traffic control; (3) and whether the control met a due care standard. Arguably, imposition of liability based solely on the facial implication of the regulation could set a standard exceeding due care under certain circumstances. Would such a standard be correct?\textsuperscript{55} By the same token, mere regulatory compliance should not supply a conclusion of due care under the specific circumstances. A simple illustration is provided by a crash caused by the neglect of a pragmatic (i.e., aircraft control or navigation) duty as opposed to neglect of a regulatory duty. Here, compliance with all regulations should not defeat a claim of compensable negligence.

These illustrations point out that the main legal issue in an accident case should be causation rather than breach. Yet, an alleged breach commonly becomes the main issue. This is not to say that the breach of a rule cannot sometimes amount to causation, but this would be subject to proofs based on the conclusions of experts. Thus, ideally, the experts’ function will be to provide conclusions that will help the fact finder to decide whether at the time of breach the risk of an accident was reasonably foreseeable.\textsuperscript{56} If harm was not reasonably foreseeable at the time of a party’s breach, then an analysis informed by neutral

\textsuperscript{54} See 14 C.F.R. § 91-113(b) (1995).

\textsuperscript{55} This question was presumably answered in the negative by the court in Steering Committee v. United States, 6 F.3d 572, 576-79 (9th Cir. 1993). The court declined to find that the pilot’s duty of vigilance, while important, exceeded ordinary due care. Id. at 579; see also Donald R. Andersen, Recent Cases and Developments in Aviation Law, 60 J. AIR L. & COM. 3, 110-11 (1994).

\textsuperscript{56} This is the law’s formula for deciding proximate cause. When combined with factual, or “substantial factor” cause, foreseeable results will produce legal liability. See infra note 94 for authorities.
expertise would not connect this breach with the harm. This is as true of the breach of regulations as it is of breach of the rules of due care. Causation is always a separate analysis, and it should be the dispositive analysis in an accident case.

Therefore, the prime function of experts in an accident case is to help the fact finder determine when and if harm of the type occasioned was reasonably foreseeable. For this reason, aviation accident cases absolutely require expert assistance since laypersons have little, if any, basis for making such decisions unaided. Yet, in the adversary modus of their employment, experts are forced by the system to "throw off" some of their authority in elucidating the causative facts. This authority is devolved upon the fact finders by the default of ambiguity. In acknowledging this problem, the commentators have offered some solutions.

B. Solutions of the Commentators

In 1993, a team of commentators recounted the long history of individual efforts to implement a judicial system of neutral expertise that preceded the adoption of Federal Rule of Evidence 706 (permitting court-appointed experts). The authors adverted to the groundbreaking attempts to set up a system for use of impartial experts in medical malpractice cases by the Bar of New York City in 1956 and to several court opinions either using or extolling neutral experts or panels of experts. The authors quoted a judge who found the advice of an independently appointed expert invaluable on a summary judgment motion invaluable:

A busy trial court faced with complex technology may require independent education or analysis if it is to understand the technology before the trial. The parties nominated [the expert] and agreed that he is an independent expert. If a motion for summary judgment appears to have merit a court will need some education about the technology at an earlier stage of the proceedings but it will not need independent findings. That is this case. What was sought here was an independent explanation of the technology and assistance in understanding the positions of the parties' experts.

58 Id. at 105-06.
In addition to being an obvious aid in expeditiously disposing of cases by summary judgment, the authors point out that the mere presence of a court expert discourages frivolous lawsuits and avoids discovery harassment of the partisan experts.\textsuperscript{60} They are not sanguine, however, about the prospects for near-term structural change. Citing a recent poll of judges conducted by the Federal Judicial Center, the authors highlight substantial institutional resistance to active use of the court's authority to appoint experts \textit{sua sponte} (conferred in Federal Rule of Evidence 706).\textsuperscript{61} One discovery was that judges generally prefer the parties to control the evidence, if for no other reason than its contribution to the preservation of true adversariness in the case.\textsuperscript{62} The authors decried this mind-set as exaltation of form over function.\textsuperscript{63} Some commentary has addressed the problems of mass torts, specifically in the aviation context. For example, Kyle Brackin wrote approvingly of draft legislation that was submitted to the American Bar Association for consideration in 1989.\textsuperscript{64} The legislation sought to build upon the concept of the Judicial Panel on Multidistrict Litigation by creating a federal judicial panel on mass torts. The draft bill, which the ABA rejected in 1990, also included provisions for court appointed neutral experts in more complex cases.\textsuperscript{65} The provisions, according to Brackin, conferred several benefits:

\textsuperscript{60} Id. at 108.
\textsuperscript{62} Burd & Lozano, supra note 57, at 111.
\textsuperscript{63} Id.
\textsuperscript{64} Kyle Brackin, \textit{Salvaging the Wreckage: Multidistrict Litigation and Aviation}, 57 J. AIR L. & COM. 655, 698-99 (1992). These ideas are not to be confused with the urgings of Professors Arthur Kantrowitz, Allan Mazur, and others in the 1960s and 1970s for the creation of a "science court." The science court idea sought definitive resolution of major public policy scientific issues, such as nuclear power, pollution, and substance toxicity by science-trained judges. For a comparison, see Twenty-Five Year Retrospective on the Science Court: A Symposium, 4 \textit{Risk: Issues in Health \\& Safety} 2 (1993).
\textsuperscript{65} Brackin, supra note 64, at 98-99.
The overburdened court will have expert assistance in making sense of very technical issues. A disinterested party can objectively evaluate the facts and testimony of the many concerned parties much as a special master could. Since the plaintiff and defendant each retain experts to help attorneys sift through their cases, it seems only fair that a judge faced with hundreds of cases should have the ability to retain experts of his own.\textsuperscript{66}

In recognition of the specialized nature of aviation torts, Brackin also suggested that aviation cases could be regularized nationwide by conferring exclusive federal jurisdiction over them, much the same as in admiralty.\textsuperscript{67} He even suggested creating an arm of the FAA or the NTSB that would be empowered to decide fault in aviation cases.\textsuperscript{68}

Andrew J. Dilk made remarkably similar suggestions in 1987. An FAA supervising attorney, Dilk took note of what he perceived to be a systematic tendency of federal judges to find against the government in cases involving the interaction of a pilot and an FAA air traffic controller.\textsuperscript{69} (These may conveniently be referred to as the "pilot-controller nexus" cases.) In these cases, pilots, injured parties, or their representatives allege government employee negligence in causing an accident. Dilk referred to what he perceived as the federal judiciary's undeclared bias against the government in the pilot-controller nexus cases.\textsuperscript{70} As a corrective, he urged the creation of an "Aviation Tort Liability Board," managed under the auspices of the FAA, which would decide aviation tort claims against the government.\textsuperscript{71} The gist of his suggestion was that, regardless of the reasons for the perceived systematic unfairness in the aviation cases (particularly against the government), it would cease being a problem under a regime of informed decisionmaking through

\textsuperscript{66} Id. at 700 (footnote omitted).

\textsuperscript{67} Brackin noted that he was not the first to suggest this idea. Id. at 702. Several bills had been submitted to Congress in the 1960s by Senator Tydings of Maryland with this goal in mind. Id.

\textsuperscript{68} Id. at 711. Brackin likened this professional fault assessment board to workmen's compensation panels or the National Labor Relations Board. Id. at 711 n.280. Both find fault, and/or make damage awards, and make decisions that fully bind the parties. Id.

\textsuperscript{69} Andrew J. Dilk, Aviation Tort Litigation Against The United States—Judicial Inroads on the Pilot-in-Command Concept, 52 J. AIR L. & COM. 797 (1987). Dilk was at the time Manager of the Accident Counsel Branch, Litigation Division, Office of the Chief Counsel, Federal Aviation Administration. Id. at 867.

\textsuperscript{70} Id. at 799-800.

\textsuperscript{71} Id. at 865.
neutral expertise. He argued that such a Board could be adequately screened off from agency influence. Dilk also argued that such a Board would eliminate the problem of relying on of "federal district court judge[s], [who], burdened with constitutional issues and prioritized criminal cases, cannot be expected to absorb the technical complexities of pilot and air traffic control procedures in a relatively short period of time and dispassionately render a truly objective judgment."

Nor was Dilk sanguine about the possibility of any lesser measures being able to effectively address the problem. He also noted the limited effectiveness of magistrates arbitrating aviation claims due to their "inability to comprehend the complexities of the aviation system and tort law in the time restrictions imposed upon them." While there is really no political constituency, and thus little, if any, chance for any meaningful structural modification, Dilk nonetheless made an impassioned case for his thesis that there is something wrong in the aviation cases—at least where the government is concerned.

Other commentary has pointed to the ready availability of expertise that could help guide case outcomes. For example, in the pilot-controller nexus cases, Kevin Courtois opined that because the FAA is composed of experts, its conception of safety procedures is probably more informed than any judicial pronouncements on the cases. In regard to the pilot-controller nexus cases in particular, Courtois noted that "[a]ir traffic control is a technical and complicated undertaking. The FAA has the specialized resources and experience necessary to evaluate alternative safety measures. . . . The judiciary lacks comparable technical resources and does not have consistent contact with

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72 Id. at 864-66.
74 Dilk, supra note 69, at 865.
75 Id. (citing 9 U.S.C. §§ 1-14 (1982)).
76 Courtois, supra note 14, at 1148. In an important insight, Courtois noted that as long as courts continue to apply a per se standard of negligence to controllers, the FAA has little incentive to rationalize its rules and make them more responsive to the total needs of the air traffic system. Id. at 1154.
Courtois' thesis was that a fact-specific approach to aviation liability, as opposed to a per se approach, leads to more accurate results as well as serves the goal of encouraging the FAA to promulgate more specific instructions and standards.

Although the focus of commentators varies somewhat according to the particular twist of the argument or problem area identified, the commentators have been nearly uniform in the views that (1) aviation is a particularly complex and vexing subset of the technical problem; (2) the current adversarial factfinding system is not doing an adequate job of assuring accuracy or reliability in the deciding of cases; and (3) the current system is producing injustice. The next section discusses an attempt to empirically test aviation tort actions in order to assess the claims of the commentators. It also provides an argument and rationale for the appropriateness of NTSB conclusions as a research standard. It then reports the results of the inquiry, using an aggregate analysis.

V. AN EMPIRICAL TEST OF AVIATION TORT ACTIONS

If the commentators are wrong in their assertions, we would expect aviation tort case outcomes to conform closely to the conclusions of an independent neutral standard, assuming the standard meets the criterion of trustworthiness. Reports of the NTSB have many hallmarks of trustworthiness. They are the products of experts operating in a collegial investigative environment. These experts are employed full-time as professional technical investigators. And finally, their reports are free of the.

77 Id. at 1150.

78 This is not the first attempt to evaluate case outcomes by an independent standard. The first true empirical study comparing judicial outcomes with an independent standard was the early 1960s University of Chicago Law School study performed by Professor Harry Kalven and others. Using a detailed questionnaire of 600 judges (Kalven's expert or standard) supervising some 8000 jury trials, researchers made major findings in both criminal and civil cases. For example, they were able to cast doubt on much of the common lore of jury incompetence and bias. See Harry Kalven, Jr., The Dignity of the Civil Jury, 50 VA. L. REV. 1055 (1964); Harry Kalven, Jr., The Jury, the Law, and the Personal Injury Damage Award, 19 OHIO ST. L.J. 158 (1958). For more recent empirical work of this type, see R. Perry Sentell, Jr., The Georgia Jury and Negligence: The View from the Bench, 26 GA. L. REV. 85 (1991); see also Clermont & Eisenberg, supra note 4.
error-inducing ambiguity inherent in partisanship. \textsuperscript{79} Factual and theoretical bases for these themes are developed in Part A.

Part B explains the assumptions and methodology of the instant study. Briefly, the method chosen for the comparison study was to inquire if the main issue in a tort action, whether the defendant’s conduct or its product—or alternatively, the plaintiff’s contribution to the harm—was confirmed by the NTSB in its report on accident causation. \textsuperscript{80} An instance of variance is registered when there is a lack of substantial concordance on this issue. \textsuperscript{81} In Part C, each “variance” case is reviewed independently. Part D aggregates the data, develops statistics, and discusses possible implications.

A. THE STANDARD: NTSB REPORTS

The National Transportation Safety Board (NTSB) exists as an independent, federal fact-finding agency for all major mishaps in the transportation industry. The Board’s responsibilities include the investigation of mishaps involving aviation, highway, railroad, maritime, pipeline, and hazardous materials, fixing the causes thereof, and making safety recommendations. \textsuperscript{82}

\textsuperscript{79} Aviation litigators can point to cases where the NTSB investigation arguably fell short of the mark. However, this criticism does not blunt the statistical probability of a generally accurate institutional product. Furthermore, accident investigations always remain open and are subject to revision based on the receipt of new information. John S. Hoff & Thomas A. Smith, \textit{NTSB Probable Cause in Error? Change It!}, 1992 \textsc{Int’l Soc’y of Air Safety Investigators (ISASI)} F. Pro. 281.

\textsuperscript{80} The NTSB computer brief reports, called “Briefs of Accidents,” consist of a one or two page computer printout of the essential accident facts. Included is a 200 word narrative description plus separate findings of causes or “factors.” These findings are usually undifferentiated as to primacy; thus, they are readily analogized to concurring causes in the law, i.e., causes involving no supersession, one by the other. The Brief reports are available to the public. (For major accidents the NTSB publishes its extensive “Blue Cover” report, which includes a detailed and far reaching analysis of all aspects of the accident. \textit{See} 49 C.F.R. § 845.40 (1995)).

\textsuperscript{81} “Variance” as used here refers to mere difference, not to variance as the term is understood and used in parametric statistics.

Composed of a staff of transportation safety and accident investigation professionals, and headed by a five-member independent Board, the NTSB is a paradigm of the independent, expert investigative agency. Indeed, for many years the Board’s reports of accidents have been instrumental in influencing the outcomes of aviation tort cases (and settlement negotiations). Of course, the courtroom inadmissibility of the Board’s “conclusions,” or judgments on the specific issue of accident causation, has operated to limit the Board’s effectiveness in enhancing overall transportation safety.

Although the Board’s products have been subject to various criticisms by lawyers over the years, no report has been made regarding systematic bias or general lack of accuracy in the Board’s conclusions. One factor that may account for this is the professional qualifications of the investigative and analytical


83 In view of the fact that “[m]ost reports are accurate, well documented, and incisive,” Stuart M. Speiser saw the reports as a “lever” in settlement negotiations. 13 Am. Jur. Trials § 62, at 670 (reprinted in Stuart M. Speiser, *Aviation Accident Litigation* (1968)). Windle Turley, referring to the existence of the NTSB reports, commented that it is “economical to build on the work that has already been done...” Windle Turley, *Aviation Litigation* § 8.12, at 303 (1986). Lee Kreindler complimented the Board’s (then the Civil Aeronautics Board’s) employees as “the most devoted public servants I have ever met. [The Board] has access to and freely draws upon the best brains in the aviation industry...” Kreindler, supra note 40, § 23.01, at 23.


85 One complaint has concerned the Board’s rule (codified at 49 C.F.R. § 831.11 (1995)) allowing “party” status to those whose conduct or product may have contributed to the accident. (“Parties” may include manufacturers, airline companies, and union representatives). According to some, withholding party status from potential civil claimants unfairly prejudices them. See Miller II, supra note 82, at 290. See also Turley, supra note 83, at 284. As pointed out by one court, however, the inherent adversariness injected into the proceedings by the presence of a potential claimant even as a “silent note taker[ ]” would chill the “neutral, calm and scientific atmosphere” essential for an investigation. Thomas Brooks Chartered v. Burnett, 920 F.2d 634, 646 (10th Cir. 1990.) This sounds like endorsement of the notion, argued herein, of the general superiority of the inquisitorial style for technical fact finding.
Although the five appointed Board members are not necessarily chosen for technical qualifications, a common background thread is professional stature in the aviation, business, science, or legal fields. Besides institutional expertise, an investigative team is preferable since, as a general proposition, the larger the group, the greater the likelihood of superior fact recall and the correction of errors. When the fact finders are all experts operating in a collegial, scientific atmosphere, there is good reason, ceteris paribus, to suspect a fairly accurate report.

Yet an argument against the accuracy and consistency of NTSB reports could conceivably rest on the fact that the Board devotes a relatively small quantum amount of resources to minor crashes. The degree of institutional effort devoted to a particular investigation, including the amount of expertise brought to bear, depends on the magnitude of the crash and the number of fatalities. The Board husbands its resources by marshalling investigative talent according to these criteria so that a general aviation accident with one fatality may have only one NTSB field investigator assigned. Even though there might be reason to suspect the quality of such a report, such skepticism is misplaced. First, in a field investigation, the investigator is usually assisted by experts from local FAA offices who help the investigator analyze items such as weather services, air traffic control, and flight planning. Second, the investigator's report consists strictly of facts found, not conclusions; this "factual report" is the only product courts have declared admissible. The investigator then recommends that the Board adopt the conclu-

86 The position descriptions for the 11 sub-types of air crash accident investigator (e.g., Air Carrier, Structures, Powerplant, Human Performance, etc.) require applicants with strong aviation or accident investigation credentials, or both. See NTSB, Position Vacancy Announcement, No. 90-096 Senior Air Safety Investigator Sept. 14, 1990 (on file with the Journal of Air Law and Commerce). Furthermore, successful applicants receive additional training by the Board at its Washington headquarters.

87 For example, in 1994, two or three of the members had legal training. Telephone inquiry with the NTSB’s Public Inquiries Office (Aug. 1994).

88 This is a finding of John Guinther in his generally favorable report on juries. See JOHN GUINThER, THE JURY IN AMERICA (1988). Guinther relies on the rule of numerosity to bolster the jury's standing (echoing the conclusions of Kalven, supra note 78).

89 Papadakis, supra note 84, at 30. "General aviation" refers to most private or pleasure flying, but includes charters and the like. General aviation accidents without fatalities are delegated to the FAA. See 49 C.F.R. pt. 800, app. (1995).

90 Papadakis, supra note 84, at 31.

91 See Atwood, supra note 41, at 489-90.
sions of causation resulting from the investigation. These recommenda-
tions are sent to the Board under separate cover and are analyzed by the Washington staff. The staff may approve or modify the investigator's conclusions. To support overall quality control, some reports are also forwarded to the Board for review. Therefore, even though the resources devoted to a general aviation accident with one fatality are fewer than those assigned to a major air crash disaster, the Board has procedures in place to insure consistency.

B. STUDY DESIGN

A necessary consideration for the present undertaking was whether systematic conceptual differences could be shown to exist between the ways accident investigators figure the notion of causation and the way lawyers view it. If there were any such conceptual discontinuities, there would be problems with this research. Fortunately, even though there are some semantic dissimilarities, analysis discloses no fundamental discord between the approach of science or law to the discovery or description of "causation." Thus, the safety professionals' usage of "probable cause" signifies that probabilistic estimates can substitute for certainty. This locution does not disagree with any notions of causation used in legal application. Similarly, the lawyer's use of "proximate," or legal, cause means that the proximity, or alternatively, the "directness," of the link between an ostensible cause and a result is so close that, in logic, they must be connected.

92 For details of the investigative and reporting process. See NTSB Order 70, Major Accident/Incident Investigation and Report Preparation, Mar. 16, 1988 (formerly NTSB ORDER 6200.4 and 6200.1) (on file with the Journal of Air Law & Commerce).

93 At least one commentator has argued vigorously against the idea of comparing "technical" findings of investigators and "legal" causation findings, saying that they have different conceptual foundations. See Miller I and Miller II, supra note 82. But Miller's arguments against comparability appear to rest largely on semantic grounds.

94 "Legal cause" is the concurrence of (i) "substantial factor" cause and (ii) lack of a liability-limiting rule for how the particular breach contributed to the happenstance. RESTATEMENT (SECOND) OF THE LAW OF TORTS § 431 (1964) [hereinafter RESTATEMENT]. "Substantial factor" cause is the Restatement's variation on what is more commonly referred to in the legal community as the factual, or sine qua non, cause.

Absence of a liability-limiting rule is the Restatement's method of assigning legal responsibility and is capable of being analogized to the more common usage, "proximate cause." The concept of "proximate cause" limits the scope of legal
The safety community's emphasis on acknowledging uncertainty and the legal community's emphasis in satisfying logic can be seen as compatible goals. These related aspirations are united by the quest for objective truth in the discovery of how facts are connected. They also are supported by certain shared approaches in problem-solving; these would have to include common sense, systematic analysis, and a due regard for evidence. In short, thoughtful people proceeding from sound premises and an insightful view of the facts should reach similar conclusions regarding their true provenance. If this is an accurate reflection on the processes of law and science, then different usages should not mask the fundamental congruence of expectable results.

The design of this study also required consideration of whether the differing goals of the two enterprises—safety improvements in the one and victim compensation in the other—might act to skew or invalidate the results of a comparison effort. To rebut this suggestion, it would seem that if the expected results of inquiry will be similar, the uses to which they are put should not matter. Second, if, as indicated above, the immediate goal of the two enterprises is objective truthfinding, the existence of differing ultimate goals should also be immaterial. Finally, in answering the suggestion that differing ultimate aspirations may invalidate comparisons, there is evidence of one shared ultimate goal, and that is the enhancement of prospective societal safety by molding future conduct. Thus, if differ-

liability to harms eventuating from “foreseeable risks” or from “directly traceable” forces. W. PAGE KEETON ET AL., PROSSER AND KEETON ON THE LAW OF TORTS §§ 41, 42 (5th ed. 1984 & Supp. 1988) [hereinafter PROSSER AND KEETON].

95 Commentators who have thought about the issue of comparability of scientific and legal analyses are in general agreement. One commentator explained, “[t]o the extent that there is ‘a method’ of reasoning in the law, it is the same as that in science—it is the rational method.” Michael Scriven, Methods of Reasoning and Justification in Social Science and Law, 23 J. LEGAL EDUC. 189, 198 (1970) (emphasis in original). His interlocutor wrote that even if the methods of the two fields varied as to the gathering of data, “[a]fter the findings are in, the interpretation process involves both professions in similar endeavors—inferring, reasoning, analyzing, etc. In a word, thinking.” Maurice Rosenberg, “Comments” on Michael Scriven’s Methods of Reasoning and Justification in Social Science and Law,” 23 J. LEGAL EDUC. 199, 204 (1970).

96 That improvement in safety is the ultimate goal of NTSB investigation and reporting is beyond cavil. The commentators also agree that this is an important goal of the tort system. Courtois, in his survey of authorities including Prosser, Keeton, Calabresi, Posner, and England, concluded that with the possible exception of England, there is agreement that regulation of safety is at the core of tort law. Courtois, supra note 14, at 1195 n.194.
ing goals were to make a difference, the fundamental congeniality of these ultimate aims provides adequate support for the notion of the basic comparability of the methods, and particularly for the expected results of inquiry.

As a final experimental check on the comparability of the results of NTSB investigation and tort case decisions, an examination of each of the thirty-four NTSB investigations appearing in the sample was conducted for conformance to a result producible by a legal causation analysis, which is informed by neutral expertise.\(^{97}\) The result of this effort was a finding of broad agreement throughout the thirty-four case sample between independent analysis and the NTSB result. This outcome should signify that whatever concepts, methodologies, or nomenclature are used by professional safety investigators, their final product can be said, in many cases, to resemble a result wrought by standard legal causation analysis. Thus, by both theory and experiment, arguments for the basic validity of the study design are supportable.

Yet, a possible confounding factor in the analysis could be the intermittent practice of accident investigators to apply the event-condition school of accident causation. The event-condition school reflects a commonly held view in the safety community that an accident sequence is best described as a chain of causal events leading to a final disaster.\(^{98}\) Thus, investigators will often point to a precipitating event or condition, such as "engine failure" or "airframe icing" as a triggering cause. The law, however, requires that some relevant human conduct be identified.\(^{99}\) A meaningful comparison with a court result is still possible in such a case. To transform the investigator's finding into a con-

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\(^{97}\) Authorities and methodology are set forth supra note 95.


\(^{99}\) One argument of safety professionals on behalf of their stance is that "fault-finding" is the job of the judicial system and that the NTSB report should not necessarily reflect on human conduct. See Miller I and Miller II, supra note 82. However, as the succeeding note shows, the Board institutionally has no problem with a conduct-based analysis of accident facts.

Furthermore, if the processes of tort law are ultimately to act to improve general safety, then safety professionals logically would favor any improvements in the tort system's methods for reaching more accurate results. This would include making available the safety professionals' conclusions to legal fact finders.
duct-based causal conclusion, it is only necessary to analyze the reported chain of causation to deduce the conduct most responsible for the condition or event. This would be the investigator’s conduct-related conclusion, if it had been included.

Normally, the relevant conduct is obvious, as the following illustration reveals. If the investigator reported that the accident pilot failed to obtain a weather briefing and then flew into icing conditions in a plane not equipped for it, a conclusion of pilot fault in the ensuing accident is deducible from the report. This would be the case in spite of the fact that the investigator listed “airframe icing” as the precipitating cause.

Another theoretical objection to the strict comparability of results might spring from the propensity of legal claimants to reach further up the accountability chain to locate financially responsible tort defendants. However, on close inspection, this problem reveals itself to be an illusion. First, in the usual case, a corporate defendant would not be in court but for the alleged fault of its employee or failure of its product. Thus, an NTSB report with a finding of employee fault is not incompatible with a court result implicating the corporate defendant. Second, the NTSB reporting method limits possible compari-

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100 A 1990 NTSB Office of Field Operations memorandum to the staff appears to have attempted to settle the matter in favor of conduct-based assessments. Although the memorandum initially related probable cause to events in the accident sequence, it then proceeded to announce a preference for illuminating the human contributions by adding that “[a]ct(s) or omission(s) which resulted in the accident and for which there is at least more evidence for than against.” Miller I, supra note 82, at 124 (quoting NTSB, Memorandum “Procedures” from Chief, AS-20 to Regional Directors (Aug. 29, 1990)) (emphasis added). This specific reference to “acts or omissions” can be read to affirm the Board’s acceptance of a conduct-based analysis of accident causation.

Additional evidence in support of these conclusions is found in the Board’s provision for the Human Performance Investigator discipline. This investigator’s job is to analyze relevant human conduct, described as “operator behavior and operator/workplace interface in relation to accident causation.” NTSB, Position Vacancy Announcement No. 90-026, Human Performance Investigator, Jan. 16, 1990 (on file with the Journal of Air Law and Commerce).

101 M.P. Papadakis supplies the following poignant illustration of potential disagreement. A safety investigation may cite a mechanical or material failure as a cause. However, a more in-depth investigation, as might be performed by a plaintiff’s lawyer, might disclose a path to recoverable damages from the corporate seller or maker of a defective product. Papadakis, supra note 84, at 31-32. Nevertheless, where the NTSB report of accident and the court findings concur on the immediate issue of product failure, this signifies agreement more than it does disagreement.

102 The safety community is not insensitive to what it calls systemic or latent causes, which may include an employer’s conduct. See James Reason, Identifying
sons to matters of causation. Thus, the comparison methodology of this study was limited to the question of whether the act, omission, or product of the defendant (or its employee or the plaintiff where the issue is contributory negligence) was present or absent in the NTSB listing of probable causes.  

Finally, it might be argued that since the cases that come to trial are the hardest cases, it would be unfair to hold the judicial system to an "expert" standard. Under this analysis, variation between tort case outcomes and the determinations of an independent neutral expert might simply be the result of the irreducible random scattering of judicial results. Such a distribution can be expected when lay fact finders resolve technical ambiguity. In other words, it is difficult for fact finders to wade through the murky and sometimes highly esoteric facts and circumstances of the aviation accidents that come to trial, especially where opposing experts put entirely different spins on the facts. The random variance between court results and those of independent experts might be a natural product of the relative indeterminacy of baffling technical facts. However, it would be difficult to resist making the crucial argument that where the judicial system manages to add artificial obstacles, such as a factfinding regime that succeeds in partially "hiding the ball" from the fact finders, this regime of expectable indeterminacy could rightfully be characterized as indefensible.

C. Research Results

The sample cases for the study were drawn from cases treated in the continuing journal series on recent developments in aviation law. This insured that cases included in the sample would be of more than passing interest to lawyers interested in aviation. Cases coming into the study included those in which


103 At first blush, this methodology would seem to load variance into the analysis. But this is not the case. For example, in the airframe icing example given above, the main issue in the corresponding tort case might be the pilot's legal responsibility for the harm. If the NTSB report lists the pilot as a cause, and if the pilot-plaintiff lost in court on the issue of contributory negligence, this judicial treatment would substantially accord with the NTSB result, notwithstanding the reporting of other concurring causes.

104 Thus, the sampling method was not random and not particularly scientific. (A truly random sample would have included some uninteresting cases.) The articles included: Winstol D. Carter, Jr., Recent Developments in Aviation Case Law, 51 J. Air L. & Com. 51 (1985); Randal R. Craft, Jr., Aviation Liability Law Develop-
pilot or FAA employee negligence,\textsuperscript{105} or a product defect, was asserted as a claim or defense. The sample was further narrowed to cases for which NTSB accident reports were available. This eliminated accidents occurring on foreign soil or waters and general aviation accidents in which there were no fatalities.\textsuperscript{106} The study criteria yielded a sample of thirty-four federal and state cases decided between 1974 and 1992. Of the thirty-four trial opportunities, there was substantial agreement between courtroom and Board causation findings in twenty-three of the cases.\textsuperscript{107} The eleven instances of variance at trial were

\textsuperscript{105} "FAA employee" normally refers to an air traffic controller but not always. For example, many accidents are weather-related. A frequent complaint is that inadequate weather briefing has been given to the pilot by the FAA Flight Service Station (FSS) specialist. For a brief description of this service, see Madole & Silverman, \textit{supra} note 14. One commentator has pointed out that the demise of the bar of contributory negligence in most jurisdictions has opened the door for greater implication of the FAA and the National Weather Service (NWS) in factoring causation. Frederick P. Alimonti, \textit{Death by Misinformation? Governmental Liability for Faulty FAA Weather Information}, 60 \textit{J. Air L. & Com.} 961 (1995).

\textsuperscript{106} The FAA is delegated responsibility for investigating minor accidents. \textit{See supra} note 89.

specifically created by (i) a primary judicial result implicating an act or omission that was excluded by the Board report, or (ii) a primary judicial result that failed to implicate an act or omission that was included in the Board findings. The provenance of most observed variance was the result of either fact finder misapprehension of aviation facts or the misapplication of aviation rules.

To assess the reliability of the NTSB findings, each NTSB result was appraised for conformance to a standard legal causation analysis for foreseeability of harm based on neutral expertise. Where the NTSB result comported with this standard, and the result went against the principal finding in the associated tort case, the case was registered as an instance of variance. The NTSB result substantially met this standard in all of the eleven trials reflecting significant differences. Therefore, it seems justified to conclude that the NTSB reports for this sample of cases formed a passably reliable standard.

The following example illustrates how an instance of countable variance would be registered under this methodology. Generally speaking, the neutral expert examining a clear day collision of two aircraft in a traffic pattern will use regulatory "see and avoid" to infer some pilot fault.\textsuperscript{108} The expert would also consider circumstantial facts that might rebut the inference.\textsuperscript{109} Additionally, the expert would reject a conclusive presumption of pilot fault as causal. Either extreme, failing to draw the rebuttable inference or indulging a conclusive presumption, would exemplify an "inexpert" interpretation. One course reflects ignorance of the federal rule's design to place primary responsibility on the pilot; the other reflects ignorance of the

\textsuperscript{108} See 14 C.F.R. § 91.113(b), \textit{supra} note 29 "see and avoid"; \textit{see also infra} note 139 (discussing the invariant implications of the Federal Aviation Regulation concerning the pilot-in-command (P.I.C.) concept). If a clear day, mid-air collision were not prima facie evidence of some pilot fault, the consequences of these rules would be nugatory.

\textsuperscript{109} The expert would take the following types of facts into consideration in deciding whether the inference of some pilot fault is rebuttable: the approaching angles of the aircraft (for deciding both "right of way" and "opportunity to see"); relative speed and size of the aircraft; sun position; visibility conditions; the existence of air traffic control; whether the control services met a due care standard; and whether it was a single-piloted or dual-piloted aircraft (greater burden on the dual-piloted aircraft). Unfortunately, some state substantive rules concerning breach as negligence per se would not permit this analysis.
need to examine circumstances and to balance. A court resolution involving either of these errors, coupled with a result that varies from the "expert" standard, would be registered as a variance case.

In this sample of thirty-four trials, eleven instances of significant variance in result produced a trial "variance rate" of about one-third. A more meaningful statistic would probably consist in the ratio of final judicial results to the prediction standard (i.e., the NTSB report). To do this, the appellate stages had to be considered. The eleven "variance" cases included nine appellate stages. Four of these reviews corrected the trial result to achieve agreement with the prediction standard. To offset this marginal corrective effect, two appeals courts re-evaluated case facts and reversed cases that were correctly decided at trial. Thus, the final research result consisted of a finding of significant variance in final case outcomes in nine of thirty-four cases—for an agreement rate of about three-fourths. This statistic cannot be considered in a vacuum, however. This marginal improvement, from two-thirds to three-fourths agreement, was purchased at the considerable cost, both to the system and to the parties, of a total of eleven appellate reviews. The cases, classified by principal issue, are discussed below.

I. Controller-Pilot Nexus

Controller-pilot nexus cases arise in several contexts but most often in "midair collision" and "lost pilot" scenarios. The midair collision cases invariably involve allegations that controller negligence contributed to the collision. Of the three cases in the study involving midair collisions, one court invoked the regulation to impute negligence per se; this was corrected on appeal by the use of a facts and circumstances test.

In *Nakajima v. United States*, a foreign student helicopter pilot was practicing approaches at the Opa Locka Airport in Florida when his helicopter was rammed from behind by a Cessna operated by a student and an instructor. The decedent helicopter pilot's estate sued the government for failing to deliver adequate warnings and air traffic control services. The trial court

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110 The idea of balancing was given expression in a pilot-controller nexus case. "[A]s a result, a balancing process is involved, i.e., the vantage point of the pilot will be weighed against the tower's superior knowledge or awareness of the pilot's danger." Richardson v. United States, 372 F. Supp. 921, 926 (N.D. Cal. 1974).

found the tower controllers negligent in the issuance of warnings but also found the deceased helicopter pilot, Nakajima, contributorily negligent per se based on "see and avoid." The court believed the decedent could not escape the command of the regulation even though he was rammed from behind. In contrast, the appellate court found from these facts that the rule was clearly inapplicable, citing to some previous cases approving a facts and circumstances test. Interestingly, the trial court, as allowed by regulation and precedent, had relied heavily for factfinding purposes on the NTSB factual report, which excluded causal conclusions. Had the trial court had access to the Board's causal findings, the corrective appellate stage might have been obviated.

The NTSB investigators identified the accident causes as air traffic control error as well as the inattention of the pilots in control of the ramming aircraft. It is possible, using the legal test for proximate cause, to confirm this result through the following reasoning: a clear-day traffic pattern collision of two aircraft, where the pilots of one plane had a forward aspect view of the other, is not reasonably foreseeable in the absence of pilot inattention or lack of skill. There were no circumstances in this case that would rebut the inference of negligence on the part of the ramming pilots or of the tower operators, for that matter. Where both the tower controllers and the pilots were inattentive, their negligence, therefore, must have concurred. The possibility of a breach of any legal duty by Nakajima would, on the other hand, be excluded by such an analysis.

Rodriguez v. United States was factually similar, but the trial result was appreciably different. A plane flown by a biennial flight check student and an instructor rammed a plane piloted by a solo student in the Caldwell, New Jersey, traffic pattern. The trial court took a very narrow view of "see and avoid," to say

112 759 F. Supp. at 1580-81.
113 Id. at 1581.
114 Nakajima, 965 F.2d at 989. Application of the "see and avoid" rule has been particularly problematic for the courts, and thus results are highly variable between jurisdictions and courts. For example, in the "sample" case of Colorado Flying Academy, Inc. v. United States (not analyzed because of general concordance in results), the appeals court found that Colorado law would have applied the per se rule against the pilots of both colliding planes, the trial court, on the other hand, would have applied a facts and circumstances test. 506 F. Supp. 1221, 1228 (D. Colo. 1981), affd, 724 F.2d 871 (10th Cir. 1984).
116 823 F.2d 735 (3d Cir. 1987).
in essence that, even in the circumstances of a clear day and an unobstructed view of approaching traffic, it could not infer any pilot negligence. Instead, the court found the tower operators negligent for inadequate warnings, and their negligence was found as causal. Reconstruction of accident geometry by experts confirmed that the occupants of the dual-piloted airplane had an unobstructed view of the single-piloted aircraft as they approached it from the side and above. The Third Circuit appellate panel, taking time to contrast New Jersey and Pennsylvania law on the point, noted that, in New Jersey, violation of a regulation supplies an inference of negligence but not proof of it. The court further opined that on the facts presented, it could infer pilot negligence as a concurring cause and, thus, reversed the verdict in favor of Rodriguez's estate. This, too, had been the conclusion of the NTSB, which had found that inattention on the part of the pilots figured as causes in the accident. Rodriguez, like Nakajima, was one of the four variance cases corrected on appeal.

Transco Leasing Corp. v. United States was another midair collision case. In Transco, the trial court found the controllers negligent and found no contributory negligence on the part of the pilots involved. In this case, two light aircraft collided while approaching each other in a forward aspect (i.e., a forward view) in apparently clear skies. There was evidence of controller negligence in the vectoring of one of the aircraft outside protected airspace. This finding of negligence was sufficient in the view of the court to attribute accident causation solely to the government controller. Thus, the pilots' estates were granted

117 Id. at 742.
118 Id. at 740.
119 Id. at 739-40.
120 Id. at 742, 744.
121 NTSB, BRIEF OF ACCIDENT No. 3048 Aug. 29, 1982. The report cited only the pilots and not the controllers except to name congested traffic pattern as a factor. Controllers are responsible for spacing and sequencing and thus, by implication, for congestion. Nevertheless, on the main issue of pilot contributory negligence, the federal investigators and appellate panel agreed. Rodriguez, 823 F.2d at 744.
122 896 F.2d 1435 (5th Cir. 1990).
123 Id. at 1440.
124 A controller's "vector" constitutes a verbal instruction indicating the direction the pilot is to fly.
125 Transco Leasing Corp., 896 F.2d at 1439.
126 Id. at 1444-45.
summary judgment on the issue of their contributory negligence.\textsuperscript{127}

The appellate panel, in its affirmance, noted that the Government had failed to produce any evidence in opposition to the plaintiff's motion for summary judgment. In other words, the Government was deprived of even an inference of pilot negligence in the case—this, regardless of the implications of the federal regulation or of the circumstances of a clear day and forward-aspect approach.\textsuperscript{128} The court cited \textit{Celotex Corp. v. Catrett}\textsuperscript{129} for the proposition that avoidance of a summary judgment motion required the non-movant to produce sufficient evidence.\textsuperscript{130} In a doubtful application of \textit{Celotex} and Federal Rule of Civil Procedure 56, the court said, in disregard of the implications of the "see and avoid" rule and of the Government's showings on all the factual circumstances of the accident, that the Government did not meet the \textit{Celotex} standard.\textsuperscript{131}

Furthermore, in agreeing with the plaintiffs' amended summary judgment motions, the court said that the deposition of the Government's own expert witness supplied the plaintiffs' proof of the absence of any evidence in opposition to the motions.\textsuperscript{132} The Government's expert, when asked whether he knew of any evidence to support the contention that the pilots

\textsuperscript{127} \textit{Id.} at 1456.

\textsuperscript{128} \textit{Id.} at 1447.

\textsuperscript{129} 477 U.S. 317 (1986).

\textsuperscript{130} \textit{Transco Leasing Corp.}, 896 F.2d at 1444. The concern of the \textit{Celotex} court was the nonmoving party's "complete failure of proof concerning an essential element of...[that party's] case..." (evidence of exposure to asbestos), in order to form an issue for trial. \textit{Celotex}, 477 U.S. at 323 (citing Anderson v. Liberty Lobby, Inc., 477 U.S. at 242, 250 (1986)).

\textsuperscript{131} The nonmoving party's burden in Federal Rule of Civil Procedure 56(e) is to come forward with "specific facts showing a genuine issue for trial." There is authority for the proposition that permissible inferences from the nonmoving party's factual averments should be "indulgently regarded." \textit{JAMES W. MOORE, MOORE'S FEDERAL PRACTICE, FEDERAL CIVIL RULES 1995} \textit{PART I} \textit{¶ 56.3} [14], at 577 (1995) (citing Bishop v. Wood, 426 U.S. 341 (1976) and United States v. Diebold, Inc., 369 U.S. 654 (1962)). Further, where there are facts from which different inferences might be drawn, all these inferences are to be taken "against the nonmoving party and in favor of the opposing party." \textit{MOORE}, \textit{¶ 56.3} [15], at 579 (citing Sankovich v. Life Ins. Co., of N. Am., 638 F.2d 136 (9th Cir. 1981)). \textit{Celotex} does not change these results. Thus, in \textit{Transco}, the government arguably met the rule of \textit{Celotex}. A mid-air collision of two aircraft in clear skies must supply an inference of some pilot negligence (\emph {see supra} note 108 and accompanying text). This inference should have been indulgently treated \emph{i.e.}, as creating a genuine issue of triable fact.

\textsuperscript{132} \textit{Transco Leasing Corp.}, 896 F.2d at 1445.
could have seen one another, answered “no.” In contrast, the NTSB opined that not only was air traffic control a cause, so was at least one of the pilots. Although the case was essentially decided as a matter of federal civil procedure, a basic misapprehension of aviation facts and law put it in that posture.

Other contexts for pilot-controller nexus cases are the “lost pilot” and “controlled flight into terrain” (CFIT) cases. One case in the study comes in under both headings. In *Jatkoe v. United States*, a doctor and his family had embarked on a cross-country vacation in their light twin-engine aircraft. Prior to the flight, Dr. Jatkoe received a standard weather briefing that forecast a weather front containing “low ceilings, minimal visibility, heavy precipitation and freezing rain” in his route. While traversing the front, the plane iced up and an engine that had earlier given signs of trouble lost power. Unable to climb after missing an approach due to inclement weather at a diversion airport, the plane flew into high terrain. Controllers from two different sites were attempting to supply directions to keep the plane safe, but radio difficulties apparently prevented timely receipt and compliance. The jury concluded, as did the judge, that whatever the quantum of negligence attributable to Jatkoe, it was superadded by that of the ATC controllers trying to help him.

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133 *Id.* This illustrates the absolute importance of properly preparing witnesses. The answer to this question should have been “yes.” After all, the planes approached each other in a forward aspect. This constitutes “evidence” of the ability to see one another.

134 NTSB, BRIEF OF ACCIDENT NO. 3361 Oct. 27, 1982. Under the circumstances, NTSB investigators had to cite at least one of the pilots for either failing to “see and avoid” or, alternatively, for violating VFR cloud clearance criteria (i.e., maintenance of a specified distance from clouds when operating visually). See *supra* note 29. The latter violation was chosen on the strength of a weather report that showed clouds in the vicinity of the impact. What is important is that pilot fault concurred as a cause in this accident.

135 A CFIT accident can result if a pilot in fog misjudges altitude, misconstrues the height of terrain, or just loses situational awareness. For the latest on CFIT and its causes and cures, see Mark L. Majikas, *Helping Pilots Avoid Terrain*, *Air Line Pilot*, Aug. 1995, at 28.


137 This was the Jatkoes’ return leg from Savannah, Georgia, back to their home in Pontiac, Michigan. A well-understood factor in return trip accidents goes under the moniker of “get-home-itis.” It has been described in accident reports.

138 19 Av. Cas. (CCH) at 17,840.

139 The court in FTCA cases may use an advisory jury. See *Fed. R. Civ. P. 39(c).*
Evidence of Jatkoe's negligence, according to the Government case, included: (1) overloading the aircraft, (2) planning a flight and flying into forecast and reported icing conditions for which the airplane was not equipped, (3) continuing a flight, at night, in adverse weather conditions in a plane with a known or suspected engine problem, (4) continuing the flight in deteriorating weather despite minimal experience in the type of aircraft, and (5) planning flight in severe weather despite unfamiliarity with the operation of the plane's onboard weather radar.140 These averments were not contradicted; nevertheless, in the court's view they did not "cause" the accident because of the controllers' failure to exercise their "last clear chance to avoid the accident." Adverting to the court's understanding of last clear chance under Virginia law and to the Restatement (Second) of Torts section 479, the court was satisfied that the doctrine was intended to cut off Jatkoe's negligent contribution to the events.141 This was surely a case of egregious facts won on a dubious legal interpretation. In contrast, the NTSB identified conduct-based factors in the accident attributable to both the pilot and air traffic control.142

Another CFIT case coming into the study was Barber v. United States.143 In this case, a pilot flying at night and in clouds, de-
scended below the regulatory minimum altitude and flew into high terrain. The court found certain controller and FAA management omissions so egregious that any pilot negligence in this accident was overborne and thus, recovery against the government was not barred. Plaintiff's averment was that the non-directional radio beacon that Barber was told to use that night for commencing his Instrument Landing System (ILS)\textsuperscript{144} approach to the airport apparently malfunctioned. There was testimony to the effect that the controllers in the tower knew of this failure, and yet they failed to warn Barber. Apparently, relying on erroneous indications from the radio beacon, Barber strayed from protected airspace and into a mountain.

The court pointed out that a pilot should never descend below the depicted initial approach altitude until receiving a glide slope "fly-down" indication on the ILS instrument display. A simple low frequency beacon is never satisfactory for this critical maneuver. Barber's violation of this rule confirmed its importance. Furthermore, the Government adverted to regulations, which, under the prevailing weather conditions, required Barber either to carry a copilot or an operating autopilot. Barber had done neither. Under the circumstances, it would be reasonably foreseeable to any person holding a pilot's license that disaster could strike in exactly the fashion it did. This was the conclusion of the NTSB investigation, which, in contrast to the court, found the accident cause to be "pilot . . . improper IFR operation."\textsuperscript{145}

The controller-pilot nexus also arises in pilot loss-of-control accidents. Although the pilot-in-command, or P.I.C., rule\textsuperscript{146} would seem to govern in the cases where a pilot loses control of and crashes his aircraft, suits are occasionally brought seeking to

\textsuperscript{144} ILA is a ground-based electronic radiating system that provides final approach guidance to the pilot via the plane's instruments.

\textsuperscript{145} NTSB, Brief of Accident No. 3-1043 Jan. 15, 1978.

\textsuperscript{146} This rule, codified at 14 C.F.R. § 91.3 (1995), essentially makes the pilot ultimately responsible for the fate of the flight. The circuits are uniform as to its import: where the pilot is able to affect the outcome, he has a legal duty to take whatever action is necessary to assure safety. See, e.g., In re N-500L Cases, 691 F.2d 15, 28 (1st Cir. 1982); Redhead v. United States, 686 F.2d 178, 183 (3d Cir. 1982); Coatney v. Berkshire, 500 F.2d 290, 292 (8th Cir. 1974); Bibler v. Young, 492 F.2d 1351, 1358 (6th Cir. 1974); Spaulding v. United States, 455 F.2d 222, 226-27 (9th Cir. 1972); United States v. Schultetus, 277 F.2d 322, 327 (5th Cir. 1960).
implicate ATC.\textsuperscript{147} The next case in the study, \textit{Schuler v. United States},\textsuperscript{148} is an example of this type of suit. The pilot had taken off in his light twin-engine aircraft from the Muskegon County Airport in Michigan. Shortly thereafter the plane developed engine problems. The pilot requested an immediate return for landing, and the request was granted. The controllers, however, delayed final landing clearance until they were satisfied that the runway intended for landing was clear of aircraft. A military C-130 was taxiing clear of the active runway at the time.

The trial court found the controllers twenty percent at fault for the pilot's loss of control and crash on final approach.\textsuperscript{149} The evidence showed that in lining up for landing, the pilot had turned into the dead engine at a low altitude. This is a maneuver which pilots must avoid in light twin-engine aircraft because there is a high potential for losing control and crashing. The dead engine is both a weight and a drag—particularly if the propeller cannot be made to feather.\textsuperscript{150} Furthermore, high power on the good engine adds to rolling forces toward the dead engine. Therefore, an attempt to turn into the dead engine can very easily cause an uncontrollable spiral or spin. The accident sequence of events in this case apparently followed this pattern. The appellate panel reversal of the trial court finding of controller fault stressed the import of the pilot-in-command rule.\textsuperscript{151} The panel suggested that for all their responsibilities and duties, controllers simply cannot fly the pilot's aircraft for him.\textsuperscript{152} The pilot in command must do it. This was also the judgment of the NTSB investigators in their report.\textsuperscript{153}

2. \textit{FSS and NWS-Pilot Nexus}

Since many general aviation accidents are weather-related, it is not surprising that claims frequently allege inadequate weather briefings by FSS specialists. The customary charge is

\textsuperscript{147} Even if some kinds of "see and avoid" and "CFIT" cases may, on proper facts, properly implicate the ATC controller, it is difficult to imagine how a controller's act could cause a pilot to mishandle flight controls so as to lose control of his aircraft.

\textsuperscript{148} 868 F.2d 195 (6th Cir. 1989).

\textsuperscript{149} \textit{Id.} at 196.

\textsuperscript{150} A technique that turns the propeller blades into the wind via mechanical or hydraulic means from the cockpit.

\textsuperscript{151} 868 F.2d at 197.

\textsuperscript{152} \textit{Id.} at 198.

\textsuperscript{153} NTSB, \textit{BRIEF OF ACCIDENT} No. 3-2777 June 30, 1981. The NTSB also listed as a concurring cause "powerplant failure."
that inadequate briefing misled or negligently failed to inform the pilot—leading to ultimate disaster. Some suits also seek to implicate National Weather Service (NWS) personnel for inadequate forecasting or faulty dissemination of reports.\textsuperscript{154}

\textit{Springer v. United States}\textsuperscript{155} was such a case. Springer's estate brought suit, alleging controller negligence in failing to convey current windshear conditions up the chain of command for dissemination to all pilots. The estate also charged negligence on the part of NWS forecasters for failing to amend an area forecast to warn of windshear conditions.\textsuperscript{156}

Springer had planned a cross-country flight in his light twin-engine aircraft into cloudy, rainy weather associated with a passing warm front. Although Springer had received a weather briefing earlier in the day, it could not be definitively determined whether he had called the FSS for an update briefing just before flight.\textsuperscript{157} If he had done so, as would have a prudent pilot under the circumstances, he would have obtained an advisory of moderate, low level turbulence.\textsuperscript{158} Such an advisory would have put a pilot on notice of the probable existence of windshear.\textsuperscript{159} Within sixty seconds after takeoff, Springer's plane plunged out of the low cloud bases and into the ground, killing Springer and his passenger.

Unluckily for defendants in this case, the judge chose to believe almost every instance of invented testimony offered by plaintiffs' experts.\textsuperscript{160} For example, plaintiffs' weather expert testified to a windshear gradient (i.e., change in wind velocity) of 45 knots over a 100 foot height between 500 and 600 feet of altitude (the estimated height of the Springer plane's "up-
This hypothetical wind velocity gradient was shown by defendant's expert to be a next-to-impossible occurrence in nature. The latter, who was the director of windshear research at the National Center for Atmospheric Research, said such a gradient had "never . . . been observed." The judge also believed that this next-to-impossible wind shear at 500 feet could have been contained in an overcast sky with reported ceilings of about 200 feet above the ground. In fact, a shear of such strength would have literally blown the clouds away from the shear zone, and there would have been no cloud ceilings in evidence. So the case actually devolved down to a question of having one or the other, low ceilings or a strong windshear, but not both. (This judge chose both.)

Additionally, plaintiff's pilot expert was able to convince the credulous judge that a frontal wind shear of this type could operate to roll Springer's aircraft to an inverted position and cause it to plunge to the ground from 500 feet of altitude. In fact, only two types of windshear possess this kind of strength: (i) the transitory "wake vortex" type of turbulence that swirls out from beneath the wings of large transport aircraft in landing patterns and (ii) convective microburst windshear—which is a very strong gust front emanating from the bottom of some thunderstorms. Neither of these conditions were in evidence that day; therefore, the windshear Springer was left to contend with consisted of simple turbulence—which admittedly can shake aircraft. It would be very unlikely to turn one upside down though, let alone blow it down from 500 feet to the ground.

Even if the facts were exactly as the judge had found them, none could explain how a light plane "upset" at an altitude of

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161 Id. at 931 n.5.
162 819 F.2d at 1139.
163 Id. at 932.
164 Sometimes imprecisely referred to as wingtip vortices, this kind of turbulence has been blamed for many loss of control incidents. FAA, for this reason, specifies lengthened intervals for planes following large aircraft in landing patterns. For recent learning, see NTSB Special Investigation Report, Safety Issues Related to Wake Vortex Encounters During Visual Approach to Landing, NTSB/SIR 94/01 (1994); Tom Duke, Training to Beat Wake Turbulence, AIR LINE PILOT, Sept. 1995, at 20. Obviously, this was not a factor in Springer's loss of control.
165 See FAA, supra note 159, at 114-15. The phenomenon gets its name from both the vertical ascent of warmer air (convection) followed by its sudden reversal of direction after having cooled, in a highly localized rainshaft (micro). A number of crashes have been attributed to microburst encounters near airports. For recent learning on the microburst phenomenon, see William W. Melvin, Windshear Revisited, AIR LINE PILOT, Nov. 1994, at 34.
500 feet by windshear could not have been recovered before crashing to the ground. One explanation would be that Springer was not proficient in weather flying. Combined with a turbulence encounter, which was forecast, an unproficient pilot could become spatially disoriented and be unable to interpret his instruments properly. Although Springer was a relatively experienced pilot with in excess of 2000 hours, he only had a little over 100 hours of instrument time. If his instrument experiences were sporadic over those 2000 hours of flying, his instrument skills could have been at a minimal level for coping with turbulence in the clouds. This was the conclusion of the NTSB investigation, which listed as the probable cause of the accident “pilot . . . spatial disorientation.”

Norwest Capital Management & Trust Co. v. United States was another FSS weather briefing case. A pilot’s estate claimed that the FSS specialists had inadequately briefed him on the possibility of icing during his flight. The pilot, Largent, and three passengers had departed the Hot Springs, South Dakota, Airport in Largent’s light twin and crashed in apparent icing conditions shortly thereafter. Evidence was that the FSS briefers had indicated to Largent in their briefings that all the conditions recognizable as conducive for icing were present, i.e., low ceilings, near freezing temperatures and precipitation. But, the briefers failed to mention the specific word “icing” in the forecast. The trial court found this omission to be negligent, but not the proximate cause of the accident. The trial court found that the crash was not caused by icing but by pilot spatial disorientation in the clouds (Largent was not instrument-qualified). Therefore, the court found it unnecessary to assess whether Largent’s negligence was more than slight in comparison to that of the FSS weather briefers. As an alternative finding, the court, relying on the testimony of several experts, said Largent was at fault for failing to draw the necessary conclusions regarding the icing potential, or in consciously ignoring the briefings given

166 NTSB, BRIEF OF ACCIDENT No. 3-8576 Dec. 1, 1981.
167 828 F.2d 1330 (8th Cir. 1987).
168 Id. at 1331.
169 Id. at 1336-37.
170 South Dakota is one of two states adopting the “more than slight” comparative negligence standard as a bar to plaintiff’s recovery. Christopher Curran, The Spread of the Comparative Negligence Rule in the United States, 12 INT’L REV. L. & ECON. 317, 319 n.9 (1992).
him. Furthermore, Largent's plane was not equipped with any wing deicing equipment.

The appellate panel revised the factual findings, concluding that airframe icing did figure prominently in the crash, and that the FSS briefers were negligent. It therefore remanded the case to the trial court to make the negligence comparison of Largent and the FSS briefers. The error of the appellate opinion was not its conclusion that icing was a cause. Rather, its error was in failing to reach the understanding that Largent's negligence in planning and flying in icing conditions without proper equipment or instrument qualification was so unforeseeable that any FSS omissions in the case were superseded. Largent knew, or constructively knew, that conditions for icing were present and/or forecast. He also knew that he was not instrument-qualified. Telling was the testimony of Largent's instructor, who said that after observing conditions that morning, he "would not have flown into that weather."

The NTSB conduct-based causal finding was that "[P]ilot... initiated flight in adverse weather conditions." The report also listed the "condition" of airframe ice. The NTSB found the weather forecast to be "substantially correct." Therefore, any accumulation of airframe ice was also due to pilot conduct—planning a flight into known or knowable icing conditions. The report also concluded that the plane was improperly loaded for overall weight and center of gravity limitations. In other words, this was a case of pilot negligence, and the appellate court revision implicating the NWS briefers was erroneous. This was one of the two cases in the study involving, by the NTSB standard, an erroneous appellate reversal on the main factual issue.

3. Products Liability

The exposure of plane manufacturers to tort liability in the United States is a point requiring little elaboration at this junc-

171 828 F.2d at 1333, 1342.
172 On a subsequent appeal, the court found that the judge's assessment of Largent's negligence as "more than slight" was not clearly erroneous. Largent v. United States, 910 F.2d 497, 499 (8th Cir. 1990).
173 828 F.2d at 1334. Furthermore, if the trial court was correct, and the cause was spatial disorientation, then Largent was also negligent for flying unlicensed and untrained in instrument conditions.
When an airplane crashes, counsel must investigate all potential causes, including the possibility of faulty design or manufacture of the airplane or one of its parts. *Moorhead v. Mitsubishi Aircraft Int'l, Inc.* combines an icing case with an alleged products liability. Using the NTSB analysis of black box data along with expert testimony, the court found that the pilot had flown into icing conditions and had then allowed airspeed to decrease to the point that a stall developed. The stalled aircraft apparently went into a spin, from which the pilot was unable to recover, and it fell from 20,000 feet to the ground.

In a detailed weather briefing on the part of FSS personnel. The pilot had been adequately advised of the potential for icing along the route of his flight. The facts and expert testimony also established that the pilot was both unproficient and imprudent. He was found sixty percent negligent for flying into icing conditions unprepared, and for mismanaging the ensuing stall. The remaining forty percent was allocated to the manufacturer for supplying a pitot-static (airspeed measuring) system that was unreasonably susceptible to icing. This particular problem had been previously identified by the Mitsubishi Company and NTSB. Both had issued advisories to operators of the plane and to Mitsubishi pilots. The existence of these advisories could have been the linchpin of the company’s defense, and yet they were not offered to prove that either the pilot or the owner, or both, were negligent in flying, or allowing the plane to be flown,

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177 Id. at 400. An aerodynamic stall is a sudden loss of lift associated with excessive wing angle. An air disturbance occurs on the upper surface that substitutes localized turbulence for lift. Another factor accounting for low speed stall is the decrease in the dynamic wind pressure on the underside of the wing to a value below that required, along with thrust, for supporting the plane's weight.

178 Id. at 395-96

179 Id. at 402.

180 *Moorhead*, 828 F.2d at 284.
in icing conditions.\textsuperscript{181} Flying into icing conditions in a plane with a known dangerous icing susceptibility the antithesis of prudence.\textsuperscript{182}

Nonetheless, the court found that Mitsubishi's defective product contributed to the accident.\textsuperscript{185} Under standard products liability doctrine, Mitsubishi's advisory to users and operators should conceivably have supported an assumption of the risk defense.\textsuperscript{184} Furthermore, the pilot's planning and conducting a flight into icing conditions should probably have been viewed as an unforeseeable act superseding the manufacturer's connection to the harm. Even if the pilot had not been on actual notice of this important product information—which is unlikely given the particularly notorious nature of a defective airspeed measuring system on a "type" of aircraft—the owner and operator surely were on notice. The appellate panel, in its remand for a reallocation of liability between the pilot and Mitsubishi, embraced the trial court's basic causal analysis as essentially correct. In contrast, the NTSB found the pilot's conduct was the sole cause of the icing buildup and the ensuing crash by dint of (1) "improper in-flight decisions or planning" and (2) "fail[ing] to obtain/maintain flying speed."\textsuperscript{185}

Mergen v. Piper Aircraft Corp.\textsuperscript{186} was the second of the two study cases involving an erroneous appellate reversal of correct trial

\begin{itemize}
\item \textsuperscript{181} The appellate court noted that the proffer was not made since the warning information was only "advisory" in nature. \textit{Id.} at 284 n.27. If the issue is reasonable conduct, however, the proffer should have been made on the strength of the argument that even advisories should be heeded to avert potentially life-threatening situations. It would simply not be reasonable to do otherwise.
\item \textsuperscript{182} Commentators have adverted to recently developed information relating to susceptibility of the Mitsubishi design to tailplane icing. They call into question previous reports implicating pilots involved in icing accidents. Hoff & Smith, \textit{supra} note 79, at 282. But where pilots are aware of a plane's susceptibility to icing, regardless of the particular failure mode, prudence would dictate a policy of avoidance.
\item \textsuperscript{183} 639 F. Supp. at 401.
\item \textsuperscript{184} See \textit{Restatement (Second) of Torts} § 402A cmt. n (1965), which reads in pertinent part, "On the other hand the form of contributory negligence which consists in voluntarily and unreasonably proceeding to encounter a known danger, and commonly passes under the name of assumption of risk, is a defense under this Section as in other cases of strict liability." See also Jimmie E. Tinsley, \textit{Assumption of Risk as Defense to Strict Products Liability Action}, 31 Am. Jur. Proof of Facts 2d § 527, at 536-37 (1982).
\item \textsuperscript{185} NTSB, Brief of Accident No. 3-3593 Sept. 2, 1981. Also named in this report as a cause was "airframe ice." Pilot conduct was, however, responsible for exposure to icing. See \textit{supra} note 174 and accompanying text.
\item \textsuperscript{186} 524 So. 2d 1348 (La. Ct. App. 1988).
\end{itemize}
findings. Mergen, pilot of a light twin aircraft, crashed after experiencing engine failure shortly after takeoff. Post-crash investigation showed one engine inoperative, with the propeller feathered, and the other engine developing moderate power at impact. The trial court was satisfied with defendants' experts' theory of the accident—failure of the right engine, possibly even pilot induced, followed by loss of aircraft control in weather. The appellate panel nevertheless felt constrained to substitute its own factual findings. After noting that the left engine was developing moderate power at impact, the panel nevertheless decided it must have failed—thus arguably entertaining mutually exclusive constructs of the accident. To arrive at this apparent contradiction, the appellate panel credited some lay witness testimony about hearing an engine "quit" and thought this must have signified a dual rather than single engine failure.

Although the defendants' experts provided explanations for lay misperceptions of engine sounds, they were unavailing in the panel's review of the record. The panel also credited their decision to testimony concerning some engine problems the plane had experienced in the past. But even if such evidence were true, the appellate court's theory of simultaneous failure of both engines, especially where the failures were asserted to be from different causes, is highly unlikely. The odds are strongly against it. One exception could be a power loss of an engine followed by inadvertent pilot shutdown of the good engine, in other words, pilot negli-
tically, was more consistent with a single rather than a dual
engine failure theory.¹⁹¹

A more likely scenario is the one advanced by defendants
(and found both by the trial court and the NTSB investigators),
that there was a single engine failure followed by pilot loss of
control. Contrary to the common belief that two engines are
safer than one, this crash shows that the opposite can sometimes
be the case. Private pilots of light twin aircraft are sometimes
inadequately trained to handle a single engine failure on take-
off. This is an especially demanding scenario, and the pilot
must act quickly to counteract the aircraft tendency to rapidly
go out of control.¹⁹² This complex set of tasks is made all the
more demanding when flying in fog because the pilot is obliged
to keep the plane right-side-up by reference to instruments.
The marginally trained pilot will probably not be equal to the
task. This, in fact, was the NTSB’s conclusion: although power
loss was the “first occurrence” (i.e., the nonconduct event), the
conduct-based finding was “airspeed . . . and aircraft handling
not maintained—pilot.”¹⁹³ In other words, pilot loss of control.

In each of the two remaining products liability cases in the
study, the jury found the plane’s manufacturer liable for a defec-
tive product. In a particularly bizarre crash case, “see and avoid”
issues were melded with products liability issues.¹⁹⁴ Edward
Cleveland attempted to take off in his Piper Super Cub from the
airport at Las Lunas, New Mexico, but only succeeded in run-
ning into a van that the airport owner had intentionally parked
in the middle of the runway. Cleveland’s estate sued the Piper
Company (Cleveland v. Piper Aircraft Corp.¹⁹⁵) for inadequate

¹⁹¹ The classic crash pattern associated with a complete power loss is straight
ahead furrow, other things being equal. This crash had a near-vertical impact
pattern, which is more indicative of pilot loss of control.

¹⁹² The necessary reactions usually consist of applying near maximum rudder
and aileron to counteract the rolling tendency, feathering the propeller on the
failed engine to overcome drag, and adjusting power on the good engine to
maintain a survival rate of climb.

¹⁹³ NTSB, BRIEF OF ACCIDENT No. 3338 Oct. 31, 1982. On the main issue of
interest—defective product versus pilot negligence—the Board was clear that pi-
lot conduct was a cause, saying that the power loss was unexplained. (No
mechanical failure was found by the investigators.)

¹⁹⁴ Cleveland v. Piper Aircraft, 890 F.2d 1540 (10th Cir. 1989).

¹⁹⁵ 890 F.2d 1540 (10th Cir. 1989). The case was remanded so as to give the
jury the opportunity to properly apportion liability between those responsible for
the collision and those responsible for crashworthiness. Case facts are reported
at the second appeal, 985 F.2d 1438 (10th Cir. 1993).
cockpit visibility and substandard crashworthiness. Cleveland had been conducting both glider tow operations and aerial photography with a movie camera set up in the front cockpit, and he was attempting to fly from the rear cockpit. The airport owner, thinking these operations were dangerous and in violation of regulations, closed the airport and stationed his van on the runway to prevent Cleveland from taking off. The appellate court’s holding that the plane’s manufacturer could be sued on a products liability theory for rear cockpit visibility was remarkable for its absolute disregard of approximately sixty years of standard aircraft design. Many dual-cockpit, tailwheel equipped aircraft are designed to be flown from the rear cockpit by a single pilot. Even if tandem seat “taildraggers” happen to be more difficult to taxi, take off, and to fly from the rear seat, where the controls are provided, it is not improper to undertake to do so. It is necessary for the pilot to assess visibility and compensate where required. The logical alternative for Cleveland in this case was simply to not fly from the rear seat.

The NTSB did not perceive the accident as one of design defect but of clear pilot fault. The report cited the pilot’s lack of “visual lookout” as the cause of the accident. This result is predicted by a standard legal analysis for the foreseeability of harm: in the absence of pilot negligence or lack of skill, it is not reasonably foreseeable that an aircraft taking off will crash into an obstacle placed in clear view on the runway. Nor is it reasonably foreseeable that a pilot flying a tandem-cockpit aircraft from the rear seat, would fail to make the necessary compensating actions. Not to do so would in fact be prima facie negligence, which would be the sole cause of a collision.

Argubright v. Beech Aircraft Corp. also involved an appeal of denial of defendant manufacturer’s motion for judgment n.o.v. A student and instructor had just taken off in a Beech Musketeer when the aircraft suddenly pitched nearly straight up, stalled, and dove into the ground. The student’s seat was found unlocked; this was stipulated as the initiating event in the sequence. A rare but well-understood accident sequence begins

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196 890 F.2d at 1542.
197 Cleveland, 985 F.2d at 1441.
198 One common compensating technique is “weave” taxiing. This enables the pilot to clear the intended taxi route and the initial takeoff run.
199 NTSB BRIEF OF ACCIDENT No. 2808 Sept. 7, 1983. The airport owner was also cited—but not the manufacturer. Id.
200 868 F.2d 764 (5th Cir. 1989).
with a pilot's unlocked seat rolling backwards during the takeoff phase. As an instinctive action, the pilot will retain a grip on the control wheel while sliding backwards; this of course will act to pull the aircraft up into a climb, usually a steep one. If the climb is not quickly countered by the pilot's either releasing the controls, or turning them over to the other pilot, assuming one is aboard, the airplane will climb steeply, stall, dive to the ground, and crash. That apparently was the accident sequence in this case.

The jury, upon the judge's instruction that the manufacturer owed a duty to warn plane occupants of the potential danger of the seat sliding back, found the manufacturer negligent. In reversing the judgment on the verdict, the appellate court said there was no duty under Texas law to warn of obvious dangers, and it would be obvious that if an airplane seat were left unlocked, it could slide back, with very dangerous consequences. The appellate panel suggested that it must be as apparent to pilots of airplanes as it is to drivers of automobiles that a stable seat is a prerequisite for maintenance of proper control. The panel, furthermore, felt constrained to observe that the manufacturer had indeed published in its pretakeoff checklist an instruction to insure the pilot seat was locked for takeoff. Thus, there could be no argument remaining that a pilot would be unaware of the need for a locked seat prior to takeoff. The NTSB, in its conduct-based causal findings, also cited the student pilot in this accident for improper preflight, loss of control, and failure to relinquish control.

4. The Passenger-Pilot Nexus

The final variance case in the study concerned a passenger claim of pilot negligence in a crash and survival situation. In Beck v. Thompson, the main issue was not the cause of the crash, which the court found immaterial to decide the case, but the failure of the pilot to insure that the plane had an operable seat lock was operative. The instructor was also cited for "lack of total experience." The accident investigation further disclosed that the seat lock was operative.

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201 Id. at 766.
202 Id. at 767.
203 Id.
204 Id.
205 NTSB, BRIEF OF ACCIDENT No. 2972 Apr. 27, 1982. The instructor was also cited for "lack of total experience." Id. The accident investigation further disclosed that the seat lock was operative. Id.
206 818 F.2d 1204 (5th Cir. 1987).
emergency locator transmitter (ELT) aboard,\textsuperscript{207} or alternatively, to warn the passenger of this deficiency. The pilot and the passenger survived the crash on a mountaintop but died of exposure. In finding no pilot negligence on the ELT issue, the trial court nevertheless made other findings that bore directly on pilot conduct in relation to crash causation.\textsuperscript{208} These court findings were examined in light of the NTSB investigative report.

First, the pilot was non-instrument rated yet undertook a long, cross-country flight across a mountainous area, at night, and in the middle of the winter. Not only did the pilot fail to get a preflight weather briefing when he departed San Antonio bound for Phoenix, he neglected to request an ATC “flight following.” He also did not activate his radar beacon transponder, which permits ATC to track a plane’s location and course. Furthermore, the plane lacked deicing equipment.\textsuperscript{209} Finally, the pilot had strayed 17 miles off the planned course and crashed at an altitude over 3000 feet below the minimum safe flying altitude for the area.\textsuperscript{210} Arguably, had any of these acts or omissions, or some of them, not been a part of the sequence, there would have been simply no requirement for a rescue operation. Or, had such an operation been necessary, the plane’s occupants arguably could have been found much more quickly.

Despite these trial findings, the court was unable to conclude that pilot conduct in this case was either negligent \textit{per se}, considering his many FAR violations, or that his conduct fell below an ordinary standard of care. The appellate court, in contrast, had no trouble finding pilot negligence, but the majority, over a strong dissent, adjudged the lower court’s findings as “not clearly erroneous.”\textsuperscript{211} The dissent argued forcefully that this crash clearly would not have occurred but for pilot fault and that any other finding would be clearly erroneous. The dissent’s assessment concurred with the NTSB investigatory result, which

\textsuperscript{207} A radio transmitting device which automatically activates to guide rescuers.

\textsuperscript{208} 818 F.2d at 1212-14.

\textsuperscript{209} As a rule, ice can be anticipated in any flight penetrating clouds, or even haze, depending on temperature. Stipulated weather at the crash site was possible visual conditions, with a chance of “marginal” visual conditions and a slight chance of light rime icing. These would have to be considered very marginal conditions for a non-instrument rated pilot planning a night flight in a plane lacking deicing equipment.

\textsuperscript{210} 818 F.2d at 1207. It is customary for pilots on cross-country flights to carry aeronautical charts depicting the elevation of terrain.

\textsuperscript{211} Id. at 1212-19.
cited the pilot for "continued VFR flight into adverse weather conditions."\textsuperscript{212}

D. Analysis

The matching of courtroom resolutions with the results of neutral, expert inquiry about two-thirds of the time—three-fourths considering the appellate stages—may seem a commendable achievement for the judicial system. It is possible, therefore, to conclude that any talk of tinkering with the system is premature. It is also conceivable that one hundred percent agreement should not necessarily be the measure of merit in this context because sometimes the NTSB will be wrong, and a contradictory verdict or judgment will be correct. But such an instance did not make itself particularly apparent in the thirteen "variance" cases appearing in this study. (Therefore, complete agreement would indeed have been the measure of virtue in this particular sample of cases.)

It is also arguable that these rates of agreement represent the upper limit of what is achievable considering the infirmities of factual abstractionism and the ambiguity inherent in the adversary presentation of technical facts and rules. But this is no argument for refusing to change those aspects of the judicial process that stand in the way of more technically reliable outcomes. This result is closer to being achieved where all expert information relating to the events (also including the versions of the parties) is made available to fact finders. One easy way to accomplish this is to change the law to admit into evidence the expert written opinion of the NTSB concerning accident causation.\textsuperscript{213} Another would be stronger official encouragement for judges to employ the inquisitorial method embodied in Federal Rule of Evidence 706, i.e., the jurist's use of her own neutral expert. Some systemic benefits accruing from such revisions might include a more coherent aviation tort precedential system along with greater settlement rates.

The data can yield various interpretations. For example, variance, which has been construed as random up to now may be the product of systematic forces. It would not be difficult, for example, to read the data as reflecting a systematic bias in the

\textsuperscript{212} NTSB, Brief of Accident No. 3-3436 Dec. 20, 1979.

\textsuperscript{213} The suggestions of the commentators (see supra Section IV) for special forums and jurisdictions are well taken. But this one fix probably has a high enough benefit-to-cost ratio to obviate the more elaborate schemes.
AVIATION TORTS

FTCA cases running against the government. Recall that this charge was the substance of the Dilk argument. These thirty-four sample cases included twenty-five claims against the government. Eight of these claims succeeded in the sense that plaintiffs secured a conclusive trial judgment based on a finding of government negligence. Seventy-five percent of these instances, or six of eight, reached incorrect results according to the NTSB investigations, i.e., the court either failed to include pilot error as a concurring cause (*Rodriquez, Jatko*, and *Transco*) or failed to eliminate FAA or NWS as a concurring cause (*Springer, Barber*, and *Schuler*). Two of these trial results were corrected on appeal (*Rodriquez* and *Schuler*). This meant that, ultimately, the government lost in four of the six cases that by an independent standard of neutral expertise, it should not have lost.

These numbers are small and therefore not statistically reliable; nonetheless, it is interesting to note that when controlled for type of defendant, the data do suggest that the government, when defending tort claims, may need to re-evaluate standards for selection of cases for trial. Thus, the important question in this context is not necessarily whether any pro-plaintiff or

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214 See Dilk, *supra* note 69 and accompanying text, concerning a perceived anti-government bias on the part of the federal judiciary when handling personal injury cases under the FTCA.

215 This statistic says nothing about government settlements or stipulations, which are doubtless influenced by trial experience in the federal court system.

216 *Norwest Capital Management & Trust* was another case wherein FAA weather briefers were found as a legal cause of the harm—although the NTSB report found otherwise. The only reason *Norwest Capital Management & Trust* escaped the final count of cases wrongly going against the government was that its final remand resulted in a finding of Largent's negligence as being "more that slight" in comparison to that of the briefers. Nonetheless, the government was put to the expense of a complex trial and a lengthy series of appeals. See *supra* note 169 and accompanying text.

217 Priest and Klein's "selection effect theory" says that any perceived pro-plaintiff bias is taken account of in litigant's strategy, i.e., attorneys will select cases for trial in such a fashion that wins will average fifty percent over the long term. Priest & Klein, *supra* note 3. Recent work, however, has questioned the generality of this theory. Clermont & Eisenberg, *supra* note 4. The latters' results have been replicated elsewhere. The Dept. Of Justice's Bureau of Justice Statistics reported the following in its National Center for State Courts project: (i) tort case results in the 75 most populous counties in the country, in 1991-92, averaged a 53% plaintiff win rate, but (ii) there was considerable variability in individual case types, from a low of 26% in medical to a high of 60% in auto. Barbara Franklin, *Learning Curve*, A.B.A. J., Aug. 1995, at 62, 65 (sidebar).
anti-government bias is extant in the cases but attorney analysis of the types of cases that should be tried.

This question is also illuminated by considering the “products” claimants in this sample, who did about as well against sellers and makers of allegedly defective products as FTCA plaintiffs fared against the government, viz., plaintiffs in Moorhead, Mergen, and Cleveland (though not in Argubright), ultimately prevailed on the central issue of a defective product—although wrongly, according to the NTSB investigation. Thus, instead of merely reflecting a higher than expected rate of plaintiffs’ judgments in the pilot-controller cases, this aggregate data may reflect more the defendant’s attorney’s excessive optimism.

One interesting question remains, and that is, why in the FTCA aviation cases do plaintiffs succeed at greater rates than predicted by theory? One would think that the findings and decisions of the federal judiciary would, in general, be easier to predict than those of juries. One explanation might lie in fundamental differences in the way judges and government attorneys (and their experts) view the outlines of the pilot-controller nexus. The Dilk article and the case histories suggest that the government views this nexus as analogous to a joint venture, where one party supplies the other with suggestions for conduct. These suggestions are founded on considerations of the need for one of the parties, the pilot, to get to where he wants to go, balanced against the systemic needs of overall air traffic safety and efficient airspace management.

In the government’s view, the pilot is apparently free to adopt or ignore these suggestions based on his best judgment given his immediate situation. In fact, the decisions of the foremost authority on the subject, the NTSB itself, in general approve the government interpretation. That is, in deciding FAA enforcement actions, the NTSB does not necessarily restrict its decisional scope to whether or not the pilot was confronted with an emergency, but whether a pilot deviation from an air traffic

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218 See Dilk, supra note 69.
219 It is literally true that the pilot may reject or accept controller directions. See the “P.I.C.” rule, 14 C.F.R. § 91.3 (1995), supra note 108 and accompanying text. See also 14 C.F.R. § 91.123 (1995) (“Compliance with ATC clearances and instructions”). The regulatory prerequisite is that the pilot be confronted with emergency conditions justifying independent action.
220 The NTSB, in addition to its accident investigation and safety recommendation duties, is the reviewing agency for FAA enforcement actions against pilots for violations. See 49 C.F.R. § 821.1 (1995).
clearance was prudent or reasonable under the circumstances.\textsuperscript{221} This view also tends to support the thrust of the P.I.C. rule, which attempts to unify authority and responsibility.\textsuperscript{222}

But if a tort case fact finder were to analogize this nexus to that of a user of land and her licensee or, perhaps, invitee, the fact finder might conclude that the pilot has placed himself in an environment "controlled" by ATC, which is then responsible for making the environment safe or warning of dangers—with the emphasis on "making safe." Use of the word "controller" can actually contribute to the making of this analogy. It connotes superior, almost exclusive, responsibility. Thus, it is not difficult to imagine how jurists well-schooled in the common law can make the unfamiliar—the air traffic control environment—familiar by analogy from the duties of a possessor of land. The problem is that both views are right, and both are wrong. The government's "cooperative venture" metaphor may be more fitting where the pilot happens to be better situated to appreciate all the dangers;\textsuperscript{223} the real property metaphor is perhaps more useful in other situations, as where the circumstances indicate that pilot's complete reliance on ATC, when flying in instrument conditions for example, was justified.\textsuperscript{224} To the extent that jurists will adhere to one view to the exclusion of others and that attorneys will fail to fully appreciate or account for this pos-


\textsuperscript{222} See supra note 146.

\textsuperscript{223} This is the "balancing" referred to in Richardson. 372 F. Supp. at 926.

\textsuperscript{224} Even when a pilot is operating under ATC control in instrument conditions, there are qualifications to this rule of reliance. Recall Barber, supra note 143 and accompanying text, wherein the pilot's reliance on ATC did not justify descending below initial approach altitude prior to receipt of a valid ILS and nondirectional beacon signal.
sibility, there is danger that the wrong cases will be selected for trial.225

VI. CONCLUSION

The object of this Article was to elucidate two problems. One was posed as a hypothesis: that decisional accuracy in technical cases varies inversely with the general inaccessibility of the facts. Intended as a palliative to this circumstance, the battle of the experts has proven as infirm as its name suggests. It succeeds only in transforming factual indeterminacy into ambiguity—a reduction in decisional "degrees of freedom" to be sure—but there remain avenues for even greater refinement. The second problem flows from the first. In the "liberating" context of factual ambiguity, decision-makers seem only marginally more likely to correctly resolve expert issues of liability than would be expected by chance. Furthermore, this sample of cases also tends to reflect that aviation litigators are continually being surprised by outcomes not predictable by a neutral, expert-informed interpretation. In other words, many times where the aviation accident litigant would seem to have a meritorious case in fact and in law, this circumstance will not necessarily be reflected in the legal outcome.

Litigants seem to understand that the injured tort plaintiff is a very appealing party to the jury, and settlement strategies tend to reflect this fact—although not adequately, apparently. Present research also shows that judges tend to favor the injured plaintiff, or to sanction the defalcating government, at greater than predicted rates. The significance of these observations is perhaps better appreciated in considering the treatment of charged pilot fault, whether as a legal claim or defense, as a "laboratory" variable. Pilot fault was offered as a defense in twelve of the thirteen variance cases (and as a claim in one—Beck). In every instance of claimed pilot fault but one, Nakajima, the NTSB investigatory conclusion confirmed it. Assuming argu-

225 Another possible explanation for FTCA case outcomes would lie in the inherent unfairness in the contributory negligence system as it has operated in this country. Judges could be expected to be more sensitive to this problem than juries. Yet, in only two of the jurisdictions whose law decided a case, Springer (South Carolina) and Jatkoie (Virginia), was a contributory negligence system purportedly in effect. See Curran, supra note 170, at 319 Table 1.
endo that these NTSB judgments are not seriously in error,\textsuperscript{226} then pilot fault will figure in the usual general aviation accident.

The judicial treatments of the cases, in contrast, allowed successful interposition of this as a complete defense (ultimately) in only two of the twelve cases where it was offered, \textit{Schuler} and \textit{Argubright}, and as a partial defense in three, \textit{Rodriquez}, \textit{Largent}, and \textit{Moorhead}. Interestingly, in this subset of sample cases, the NTSB found pilot fault as the exclusive cause in all but one, \textit{Rodriquez}, where the controllers were also cited. These results signify, assuming some degree of representativeness, that in many aviation tort actions where pilot negligence or lack of skill could be established as defenses, they are not. At least it is not as successful as would be implied by a standard of independent neutral expertise.

For aviation tort litigators this should suggest that a good legal case of pilot negligence, where there are other possible accident causes, should not necessarily be the touchstone for the selection-for-trial decision. It is not necessarily a good gauge. In the present state of affairs, a better criterion might be a keen understanding of which kinds of cases a hypothesized anti-government or pro-plaintiff outcome would be a possibility—regardless of the strength of one’s facts or the law’s clarity.

The cases appearing in this study thus suggest that a defense of pilot negligence needs to have particularly crystalline proof to qualify the case for selection for trial. A good guide for the litigator might be to relocate the bar for one’s proof up to the “clear and convincing” level for the selection-for-trial decision. The practical effect of this would be to alter the litigant’s settlement value unfavorably (to reflect true risks). This may not seem fair where the ostensible trial standard is a preponderance of the evidence, but this appears to be the \textit{retpolitik} of aviation torts at the present time. This strategy might also contribute to some stabilization of precedent and a possible increase in settlement rates. Note that this is a substitute strategy in lieu of admission of NTSB conclusions as evidence or of greater courtroom use of the neutral expert, under the rules of evidence.

\textsuperscript{226} An “anti-pilot” bias on the part of the NTSB is probably not the case. First, there would be no theory of which I am aware to account for it. Second, as discussed, each pilot-related NTSB finding in this study conformed fairly closely to results producible by a legal causation analysis.
Subsidiary strategies for prosecuting those cases selected for trial may revolve around insuring that counsel are competent: (1) to understand the nuances of aviation accident "facts" in order better to discern which rules are implicated if any; (2) to properly prepare experts for testimony—including factual aviation inferences that would be allowable to the expert;\(^{227}\) (3) to clearly convey the proper theory connecting the alleged pilot fault to the harm where it is an issue—along with acceptable theories excluding other causes; and (4) to work with aviation experts as an expert, i.e., the adroit authority who can summon forth from both friendly and adverse experts the winning technical interpretations. This is a possible formula for releveling the playing field.

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\(^{227}\) Recall *Transco*, 896 F.2d at 1435. *See supra* note 122 and accompanying text. In *Transco*, defendant's expert said that he knew of no "evidence" that the colliding pilots could have seen one another, even though they approached each other in a forward aspect in apparently clear conditions.