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Air Carrier Liability and Automation Issues

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ABSTRACT

Our intended topic is a general discussion of the basic elements of liability related to airline accidents to which fully automated cockpits have constituted an associated contributory factor. In addition we addressed the liability of air carriers arising from injuries or death caused to passengers traveling on international flights. For this purpose, we reviewed the Warsaw System and the different international instruments that constitute it. We also reviewed principles of common law applicable to aircraft manufacturers and the "Free Flight" as an example of the growing automation environment, which is a general benefit to commercial aviation but also a likely contributory cause for accidents in particular cases. In the last part we briefly discuss a personal view regarding the interplay between manufacturers and airlines under the 1999 Montreal Convention, which is an international treaty unifying the desegregated Warsaw System into one single instrument that is expected to enter into force in a few years.

RÉSUMÉ

Ce mémoire de maîtrise présente une discussion générale des éléments de base de la responsabilité civile des compagnies aériennes lors des vols internationaux et du rôle des manufacturiers lorsque les systèmes automatisés de pilotage constituent un facteur contribuant à l'accident.

Dans ce but, nous discutons du Système de Varsovie et des instruments internationaux qui l'intègrent. Nous révisons, de plus, les principes de *common law* applicables aux manufacturiers d'avions et le système du vol libre qui pointe à l'horizon, comme un exemple de l'environnent d'automatisation grandissante qui constitue un atout général pour l'aviation commerciale. Cette automatisation croissante peut par ailleurs devenir une cause contributrice d'accidents dans certain cas. Dans la dernière partie, nous présentons notre opinion quant à l'interaction entre les manufacturiers et les compagnies aériennes qui découle de la Convention de Montréal de 1999, traité international qui unifie le Système Varsovie dans un seul instrument qui doit entrer en vigueur au cours des prochaines années.

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I wish to give thanks and praise to the One who offers me the most solid reason to live, to that source of true love and eternity, to my God, I dedicate my effort and this work to the God of Israel, (I Chr. 29:11);

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INTRODUCTION

Airlines are entities authorized by governments to offer scheduled transportation service to the general public. As such, they must comply with extensive laws and regulations enacted to ensure safety and an orderly development of air transportation. Although they maintain high standards of professionalism, air transportation, as with many other businesses, is not exempt from accidents. However, not all accidents nor all passengers are in the same situation from a legal point of view. The applicable principles of law in international flights may differ from those applying to domestic flights. Concerning international flights, the international community has agreed over seven decades ago which principles of air carrier liability should be considered to safeguard the rights of passengers for injuries or death caused by such unfortunate occurrences. These rules are contained in the Warsaw Convention and its amendments.

Air transportation is changing every day and the way of flying is constantly evolving. Nowadays there are aircraft fully automated that perform tasks that were unthinkable years ago. This has brought benefits a benefit but also these new technologies have brought shortcomings. Along with these advanced techniques, the human factors have increasingly become a factor to study, due to the fact that in some cases the interface between technology and the human component present a situation of conflict and contribute to air accidents. Perhaps further studies in automation and human factors are needed, but also the role of the aircraft and the component manufacturer are relevant to these matters as well as for the apportionment of liability in cases of accidents.

We are facing great technological changes and the law must keep pace to be able to maintain the balance of interests between the participating parties and contribute in this way to the orderly development of the aviation industry.

CHAPTER I

Warsaw System

What is known as the "Warsaw System" is a compound of several international private law instruments establishing the applicable rules of air carrier liability for death or bodily injuries caused to passengers, and damages to cargo and baggage in international transportation. The Warsaw System is the most important body of international private air law; its components have been enacted throughout many years and this diversity has been based on the distinct stages that the aviation industry has gone through in its legal and technological evolution through history. Therefore, the legal principles contained therein have been subject to multiple interpretations and consequently to the same number of amendments which unfortunately have contributed to undermining the goal of uniformity sought in 1929. This system was created through the enactment of the "Warsaw Convention" on October 12, 1929.

This Convention represented a significant progress that provided economical protection to the then infant aviation industry. In 1929, the air industry was neither capable of affording the potentially high costs of an air accident that by its nature involves significant sums of money to pay as compensation, nor the high insurance premiums that would result from such risk expectation. In those years, one single air disaster could have amounted to the dissolution of an entire company, therefore what was needed was equity to capitalize and not large debts that would ultimately be reflected in the costs of operation and consequently in the cost of a ticket. On the other hand, it was necessary to protect the users from the inherent risks of a transportation system invented no more than three decades before (17 December 1903), and which was at that time considered highly hazardous. This protective balance was implemented in the Warsaw Convention by inserting a *"quid pro quo"* principle, which meant that while passengers were entitled to limited amounts of compensation, they did not bear the burden of proof that normally would have to be showed under a negligence case. They only had to prove the accident suffered to be entitled to compensation under a case of presumption of fault on the part of the

carrier, who under this Convention, must prove that he took "all necessary measures" to avoid said accident.

As years passed by, the aviation industry evolved in many facets; this reality led states to amend the Warsaw Convention on several occasions, the last modification taking place in 1999. This first Convention part of the Warsaw System was officially designated as "Convention for the Unification of Certain Rules Relating to International Transportation by Air", which we now proceed to discuss in the following section.

Convention for the Unification of Certain Rules Relating to International Transportation by Air of 12 October 1929

The Warsaw Convention establishes certain rules applicable to air carrier liability arising from injuries or death caused to passengers and the delay, loss or damage caused to cargo and mail in international transportation carried out for reward. For the purpose of this research we will discuss liability issues related exclusively to carriage of passengers.

We start by saying that there are certain legal conditions to be met in order to make the Warsaw Convention applicable. These elements are:

FUNDAMENTAL REQUIREMENTS FOR AIR CARRIER LIABILITY UNDER THE WARSAW CONVENTION
International character of the carriage
Contract of carriage concluded between the parties
Ticket properly delivered
The accident which caused the damage must have taken place on board of an aircraft or in the course of any of the operations of embarking or disembarking

Having in mind that our intended focus in this work will be on air carrier liability arising from air accidents involving flight crew negligence and automation as a contributory factor, we will discuss not only the *rationale* of the different amendments to which the Convention was subjected; but we will also make reference to the conditions under which the limits of liability stipulated in these instruments of private air law can be lifted. This is accomplished by showing proof of wilful misconduct on the part of the "air carrier", which in this case for the solely purpose of this work shall be understood as meaning "flight crews", to whom the concept of wilful misconduct or *"faute équivalente au dol"* can be applied when they breach their duties and standards of care owed to the passengers.

However, when wilful misconduct was present in a case like the one outlined above, the liability ceiling is broken producing unlimited liability. This wrongful conduct has been included in the Warsaw System by using different wording that for illustration purposes can be observed in the following table:

UNLIMITED LIABILITY UNDER WARSAW SYSTEM							
Warsaw Convention signed on 12 October 1929; and entered into force on 13 February 1933		Hague Protocol signed on 28 September 1955; and entered into force on 1st August 1963		Montreal Protocol 4 signed on 25 September 1975; and entered into force on 14 June 1998		Montreal Convention signed on 28 May 1999 and pending to enter into force	
English	*French*	*English*	*French*	*English*	*French*	*English*	*French*
Wilful Misconduct	Dol ou Faute équivalente au dol	Intent to damage or Recklessness	Intention de dommage avec conscience	Intent to damage or Recklessness	Intention de dommage avec conscience	No negligence or 3rd party negligence	No French Version

Firstly we will describe the liability regime in force under the Warsaw Convention to continue thereafter to review the amendments applied to substantial provisions of this international instrument.

Article 17 of the Warsaw Convention states a rebuttable presumption of fault on the part of the carrier, which entails the first step towards, as many authors have said, a "strict liability regime." Matthew R. Pickelman comments: "The conference at Warsaw in 1929 had two primary goals. First, it attempted to establish a certain degree of uniformity in [...] procedures governing liability arising out of international, private aviation transportation. Second, and more important at the time, the conference sought to establish a uniform system of strict but limited liability for air carriers in the event of international accidents involving passenger injury or death."[1]

[1] Matthew R. Pickelman, "Draft Convention for the Unification of Certain Rules for International Carriage by Air: The Warsaw Convention revisited for the last time?" (1998) 64 J. Air L. & Com. 273 (Lexis).

Michael S. Gill says, regarding the Warsaw Convention: "The Convention is founded upon a fault-based system of liability, but liability that is expressly limited. Thus, while guaranteeing recovery for the passenger upon proof of damage, it also assured the financial stability of carriers. The overriding aims of the Convention were uniformity and the elimination of all conflict of laws problems."[2] The main purpose of the Convention was the establishment of a system of law that could respond to the characteristics and special needs of the aviation industry and the passengers of those years. Most airlines in the years around 1929, with the exception of those in the United States, were publicly owned, which imposed a responsibility on the governments to achieve a certain level of financial shield and at the same time to be able to develop the new industry. It was also necessary to offer high levels of insurance protection to passengers facing that "risky" mean of transportation. This was reached and was called a "trade-off". Thomas J. Whalen confirms that "The fundamental structure in terms of liability was based upon a trade-off."[3] He explains the existence of a presumption of liability of the air carrier but at the same time a limit of liability up to 8,300 USD. He adds that this limit can be overcome in cases of "wilful misconduct" of the carrier. On her part, Diederiks-Verschoor states: "The legal basis of the liability of the carrier is a 'fault liability', but with a 'reversed' burden of proof, which means that the onus of proof lies with the carrier."[4] T. Whalen uses the term "trade-off", while Diederiks tells us that the Warsaw Convention reflects a *quid pro quo* because the carrier has the burden of proof but the passengers lose the benefit of full unlimited liability. Article 17 introduces the principle of air carrier presumption of fault in case of accidents: as can be noted from the transcription of such Article which reads as follows:

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[2] Michael S. Gill, "Turbulent Times or Clear Skies Ahead? Conflict of Laws in Aviation: Delict and Tort" (1998) 64 J. Air L. & Com. 195 (Lexis) [*Gill*].

[3] Thomas Whalen, "The New Warsaw Convention: The Montreal Convention" (2000) 25 Air & Space L. at 1 [*Whalen*]

[4] Diederiks-Verschoor I.H.Philepina, *An Introduction to Air Law,* 7th ed. (The Hague and New York: Kluwer Law International, 2001) at 72 [*Diederiks*].

LIABILITY OF THE CARRIER

Article 17

> "The carrier is liable for damage sustained in the event of the death or wounding of a passenger or any other bodily injury suffered by a passenger, if the accident which caused the damage so sustained took place on board the aircraft or in the course of any of the operations of embarking or disembarking."[5]

Besides the fault presumption included in the first line of Article 17, there was lack of clarification due to the word "accident," or *"blessure"* in its French version and it has provoked debate regarding its exact meaning. However, a general consensus has come from case law interpreting the term "accident" as an unexpected event that could not be foreseen. To specify the meaning of this term, we can mention that American courts have ruled that an accident cannot be so if the occurrence arises from the ordinary or regular operation of the flight or exclusively from the passenger's state of health. This same notion shall be confirmed at a latter stage in the Guatemala City Protocol as we will make some comments about such instrument. In the case *Husserl v. Swiss Air*[6] the court considered hijacking and sabotage included within the term "accident". One relevant aspect here is that the accident must be an external occurrence to the passenger and must take place between the moment that he is under the control of the airline until the point of destination when the passenger is no longer under the supervision of the air carrier.

Although the air carrier is presumed liable, the Warsaw Convention establishes defenses that can be utilized by the air carrier to exclude or limit his liability. These defenses are respectively:

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[5] *Convention for the Unification of Certain Rules Relating to International Carriage by Air*, 12 October 1929, online: Institute of Air &Space Law <http://www.iasl.mcgill.ca/private.htm#warsaw> [*Warsaw*].

[6] *Husserl v. Swissair*, [1972] U.S.Dist. LEXIS 11294 (D.) (Lexis).

Air Carrier Defenses

First Defense

"All necessary measures"

Article 20

> "1. The carrier is not liable if he proves that he and his agents have taken all necessary measures to avoid the damage or that it was impossible for him or them to take such measures."[7]

The defense of the air carrier consists in proving that "**all necessary measures**" were taken to avoid the accident or that "**it was impossible to do so**". It is interesting to read that this article does not include the words "wholly or partly" as is the case of article 21 of this Convention. The article 20 follows the rule of "all or nothing"; the article reads "the carrier **is**", it doesn't say "it could be" or "it may", and this means that under this provision the carrier can exclude or become fully liable, but not limit its liability. What should we understand by "all necessary measures."? In our view, the air carrier has the burden of proof that his employees or agents' conduct complied with all pertinent duties of care as provided by the corresponding regulations in force and applicable to the particular operation, and thus they did not do or omit any wrong or duty. To prove "all necessary measures", in the case of accidents in which the conduct of the flight crew is subject to discussion, their behavior should be "methodically dissected" from beginning to end in order to identify how they reacted to abnormal conditions of flight for which they are intensively trained. This would allow the carrier to evaluate if their behavior conformed to the standards of care set forth in the regulations and procedures manuals; and once this was established the defendant airline would be able to conclude in its own interest that it was impossible for the crew to have acted otherwise. The airline may have to show evidence supported by extensive analysis of technical elements such as cockpit voice recorders, data parameters of the general systems of the aircraft, statements from bystanders, testimony of survivors, meteorological graphics, air traffic control tapes, expertise of

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[7] *Warsaw*, *supra* note 5 at 13.

investigators and other elements of evidence appropriate to the complexity of an air crash investigation. We perceive here an important burden for the defendant as opposed to the relatively easier task for a jury finding out the "missing link of prudence" in the chain of events. Blanca Rodriguez sustains the difficulty of proving "all necessary measures", saying that "it presupposes that the carrier can piece together all the events leading to a crash", which is never an easy task.

The "all necessary measures" defense, according to the text of the paragraph 2 of article 3 and article 25 of this Convention, will be useless if the air carrier did not issue a ticket to the passenger or committed a wilful misconduct respectively.

It is important to note that the conduct under observation in article 20 is that of the "agent" of the airline; this term implies the existence of a contractual agreement between the individual reputed as "agent" who should be acting as a representative or on behalf of the carrier. This means that not every individual that participates in the preparation or operation of a flight is necessarily an "agent". It excludes manufacturers, air traffic controllers, ground handlers, aviation authorities and in some cases security services and so on. This also leads us to the idea that for attaining legal certainty the airline should always consider what kind of relationship it has with the persons involved in the preparation and operation of the flight.

The first part of article 20 makes reference to the defense of *"force majeure"* which intervened and caused the accident. This term suggests that it was impossible for the air carrier to avoid the damage. This can bring many issues into discussion because there are many factors absolutely out of the control of the pilots that can cause an accident. For example, these factors include bird-strikes, clear air turbulence and wind-shear.

However, every case shall receive a different approach depending on the particular circumstances. In some cases, some of these contributory factors can be predicted up to a certain point and dealt with under specific circumstances. A bird-strike may be unavoidable but the agent of the carrier may have to follow the applicable procedures in such cases. In the case of wind-shear, it is obvious that these

are meteorological phenomena out of the control of humans; however it is also true that pilots are trained to identify such conditions. There are also systems on board the aircraft that alert flight crew members of the presence of wind-shear in the vicinity of the airport. Based on this fact, it is assumed that the flight crew would respond accordingly. In case the crew fails to follow the pertinent procedures, a judicial court might reach an unfavorable decision for the air carrier. A practical example of a situation like this is the accident which occurred to the USAir DC-9 31 N954VJ flight 1016 landing in the Charlotte/Douglas International Airport, North Carolina, on July 2nd 1994. During the landing procedure the weather conditions were adverse and the likeliness of the presence of wind-shear was alerted; nevertheless the flight crew decided to continue the approach into severe convective activity conducive to a microburst. Due to these conditions the aircraft collided with trees and a private residence. Later on it was established by the accident investigation agency that the crew failed to recognize a wind-shear situation in a timely manner and follow all the necessary operating procedures to escape the wind-shear. The defense of "all necessary measures" and "*force majeure*" remain in force in the first paragraph of the article 20 of the Warsaw Convention and The Hague Protocol, but under the most recent international instruments this principle has been abandoned below a ceiling of 100,000SDR. In aviation accidents arising out of international flights the Courts shall apply the corresponding principle depending on whether the country in question is a contracting party of the Warsaw Convention, The Hague Protocol or the latter instruments on the subject such as Montreal Agreements of May 4th 1966, the IATA Intercarrier Agreement of October 31, 1995; the Implementing Agreement of February 1st 1996 as well as the European Regulation 2027/97 of October 9, 1997.

We describe in the following page another example of the same nature brought to court, in which a weather phenomena such as turbulence is unavoidable but the manner in which an airline can deal with it can make a difference between negligence and a "*force majeure*" situation in where "it was impossible to take all necessary measures".

This distinction might be made in court based on the way that the crew responded to an unavoidable situation of emergency that prevailed during the few seconds before the accident. If it is proven that the crew complied with all the operating procedures for those particular circumstances but the accident was still unavoidable it may fall into the category of "*force majeure*", but if the air carrier through the flight crew did not respond properly face this unavoidable situation, the Court may recognize a lack of compliance to the principle of "all necessary measures" where *force majeure* would not be applicable. The scope of the legal principle of "*force majeure*", for a better comprehension of the reader, can be found in the Civil Code of Quebec currently in force:

Art. 1470

"A person may free himself from his liability for injury caused to another by proving that the injury results from superior force, unless he has undertaken to make reparation for it. A superior force is an unforeseeable and irresistible event, including external causes with the same characteristics."[8]

The following case is not international *per se* but may further illustrate what was said in previous paragraphs about the uncontrollable and unpredictable nature of meteorological phenomena but on the other side the strict duties of air carrier agents during the occurrence of such circumstances. This weather occurrences may be well classified as event that cannot be controlled by human intervention, this is what would be called "*force majeure*", however even in these happenings the rule of "all necessary measures" is expected to be carried out by a flight crew to minimize the impact on safety.

Fleming v. Delta[9]

On the night of April 16, 1967, plaintiff, James Fleming, a medical doctor, took Delta Air Lines Flight 52 from New Orleans to Chicago. The flight made three scheduled intermediate stops, the last of which was at St. Louis, Missouri. When the

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[8] *Civil Code of Québec* Art. 1470 C.C.Q.
[9] *Fleming v. Delta*, [1973] U.S.Dist. LEXIS 13454 (D.) (Lexis).

plane was on descent into St. Louis, the plane passed through severe turbulence which caused Fleming to be thrown from his seat, striking his head against the window, breaking his glasses and causing severe chest and arm pain that were later diagnosed as angina pectoris. Since this event happened he has had recurring attacks of angina pectoris resulting in his eventual retirement from the practice of medicine. Fleming argues that the airline should have alerted him in advance about the turbulent conditions so he could have decided to fly or stay on ground. He also claims that due to the event which happened on board he acquired a debilitating heart condition. Delta denies the negligence of the airline and sustains that the subsequent attacks of angina pectoris are not the result of the cited event.

The Court stated that the airline has a duty to share information about weather disturbances that may be faced during the trip so the passengers can decide by themselves whether to board or not the flight. Although Delta had been previously notified about turbulence conditions, it failed to exercise a high degree of care by not sharing that information with the passengers, in consequence Delta was found negligent. Although it was recognized that Delta did not intervene in the causation of the "angina pectoris" of Mr. Fleming, it was recognized that Delta was negligent because it did not inform properly about the future meteorological disturbances. However, Delta did not cause the illness of this passenger.

Second Defense

"Contributory Negligence"

Article 21

> "If the carrier proves that the damage was caused by or contributed to by the negligence of the injured person the Court may, in accordance with the provisions of its own law, exonerate the carrier wholly or partly from his liability."[10]

We will begin the discussion of the doctrine contained in this article will start by explaining the principles of contributory negligence applicable in two of the most relevant systems of law, common law and civil law.

The article opens the door to the applicability of distinct systems of law under different jurisdictions concerning the reduction of liability of the air carrier when a negligent party intervened and contributed in part or entirely to the bodily injury or death.

Mr. E. Giemulla[11] depicts the contributory negligence defense as available when the first one did not result positively for the airline. He adds that the rule contained in this article lacks applicability when the air carrier, according to the article 20 proved that he took "all necessary measures" and comes into play when the carrier was not able to prove so. This interpretation means that when the airline is not able to prove that it took all necessary measures then there is a good and logical reason to use this defense. When it is not feasible to prove the first standard, then it becomes possible to prove the second. In other words, when the airline did not offer enough evidence and could not establish its innocence, it can alleviate its wrongfulness by using the second defense available by arguing that in such case the damage was due in part to the injured party. In clearer words, this notion is equivalent for the airline claiming that it did commit a wrongful act, but the damage was also caused in part by the passenger.

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[10] *Warsaw*, *supra* note 5 at 13.

[11] Elmar Giemulla *et al.*, *Warsaw Convention*, looseleaf (Boston, Mass.: Kluwer Law and Taxation Publishers, 1992). c. 3 at 1ff [*Giemulla*]

But not only is this defense perceived as the remedy in cases when it was not possible to prove the "all necessary measures" defense, it can also be conceived as a primary legal tool to counteract the *de jure* presumption of fault as opposed to the *de facto* based fault that arose when the carrier was not able to exclude himself from liability by introducing insufficient evidence in Court. We can summarize this idea by saying that an airline can claim that the injured party's conduct contributed to the accident either partly or wholly.

The burden of proof rests on the carrier; it must prove the fault or negligence of the injured party. The issue of the reduction of liability falls into the substantive law of the Court seized of the case.

Common Law / United States

Two definitions of contributory negligence are presented:

Kathleen M. O'Connor[12] defines it as "conduct on the part of the plaintiff that falls below the standard of reasonable care and contributes as a legal cause to the harm the plaintiff has suffered."

In the American Restatement of the Law (Second) it is defined as:

§ 463. Contributory Negligence

"Contributory negligence is conduct on the part of the plaintiff which falls below the standard to which he should conform for his own protection, and which is a legally contributing cause co-operating with the negligence on the part of the defendant in bringing about the plaintiff's harm."

The main issue discussed in article 21 is "contributory negligence". The historic rule of contributory negligence meant in the common law that the plaintiff would not recover anything if it is proved that he acted negligently. This was considered to be a punishment against the wrong conduct of the plaintiff and was based on the idea that

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[12] Kathleen M. O' Connor & Gregory P. Sreenan, "Apportionment of Damages: Evolution of a Fault-Based System of Liability for Negligence" (1995) 61 J. Air L. & Com. 365 (Lexis).

faulty behavior cannot be allocated to two parties. It was called the "all or nothing rule" which meant that the plaintiff recovered full compensation for the damages he bore, or nothing for having contributed to it.

However, the doctrine of contributory negligence was by statute abandoned in forty six states of the US, to be replaced by a new doctrine called "comparative negligence", which considers a criterion more similar to civil law countries of apportionment of liability. This means that both parties should be burdened with negligence due to the fact that both contributed to the injury and not only the plaintiff. The doctrine of "comparative negligence" is divided in three subcategories: pure comparative negligence; modified comparative negligence; and slight-gross.

Pure comparative negligence means that the plaintiff's damages are reduced to the extent of his fault and the defendant can be liable to the plaintiff even in cases in which the plaintiff was more negligent than the defendant himself, (13 out of 46 States in the US adopted this form of contributory negligence).

Modified comparative negligence refers to the rule where the plaintiff can recover damages as long as his fault is equal or no greater than that of the defendant. (31 out of 46 States in the US follow this principle)

Slight-Gross means that the plaintiff can recover damages from the defendant as long as his negligence was "slight" and that of the defendant was "gross". (2 States adopted this rule).

Regardless of the particular doctrine in use, there could be different cases in which plaintiffs in aviation cases have and could be found guilty of contributory negligence. As an illustration of this we include the following examples: when a passenger does not keep his seat belt fastened even though the corresponding sign in the passengers' cabin was on and suddenly the aircraft is subject to severe turbulence and the passenger injures his head; a passenger who, despite the advice of the airline personnel, insists on putting his excessively voluminous baggage in the overhead bin and afterwards the compartment door suddenly pops up and its contents fall on his head; or perhaps the typical and common case in which the aircraft after landing stops

at the taxiway before reaching the disembarking gate and the passengers are given firm instructions to remain seated until the airplane is at a complete stop, but a passenger who is apparently non-persuaded by the warning stands and attempts to make his way toward the exit door but the aircraft suddenly re-starts its taxi into the gate and the passenger stumble and injures himself.

Under common law, the defendant must prove that if the plaintiff's behavior had not occurred in the way displayed, he would not have been injured; under this principle the conduct of both parties are scrutinized by the Court in order to "measure" the level of fault performed by each of the parties which allows the proportional reduction of liability on the part of the defendant.

Civil Law

Michel Pourcelet[13] claims the following approach under civil law or "written law system" which is very similar in substance to the principles currently in force under common law system after the classical principle of the "contributory negligence" was abandoned. As in common law, a total exoneration of the air carrier is also possible, as long as the conduct of the plaintiff was the only cause of the injuries.

Under the civil law approach, when the victim is involved in the causation of the damage, the victim shall bear a portion of the responsibility in proportion of the seriousness of his or her fault, in relation to that of the air carrier. This principle is called apportionment of liability and can be read in article 1478 of the Civil Code of Quebec in force.

Liability Limit

The Article 22 of the Warsaw Convention, transcribed herein, indicates the monetary limits of compensation to which an air carrier may become liable. This limitation has given rise for a few decades to a true conflict, because as Saad says: "As the years passed, (after Warsaw Convention signature) the stability and certainty

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[13] Michel Pourcelet, *Transport Aérien International et Responsabilité*, (Montréal: Les Presses de l'Université de Montréal, 1964).

offered to the traveler were overshadowed by the harshness of inadequate recovery. The $8,300 limit on carrier liability had remained unchanged while inflation and national living standards steadily increased"[14] This circumstance, among others, led countries to amend the Warsaw Convention which contributed to its subsequent entire lack of uniformity.

[14] E.J. Saad, *Revised Warsaw Convention and other Aviation Disasters vol.8* (Cumberland Law Review, 1978) at 763.

Liability Limit

125,000 FRANCS OR 8,300 USD

Article 22

> "1. In the carriage of passengers the liability of the carrier for each passenger is limited to the sum of 125,000 francs. Where, in accordance with the law of the Court seised of the case, damages may be awarded in the form of periodical payments, the equivalent capital value of the said payments shall not exceed 125,000 francs. Nevertheless, by special contract, the carrier and the passenger may agree to a higher limit of liability."[15]

As was mentioned, the Warsaw Convention of 1929 rests on the principle of "presumptive liability", in which the airline is presumptively liable for physical damage caused to a passenger, cargo or mail. As can be noted, under this instrument, the airlines can be liable and ordered to pay as compensation an amount that ranges up to a maximum of nine thousand US dollars depending on the characteristics of every particular situation. The United States government deemed such amount insufficient according to its own standards of compensation granted at a domestic level. This was the main reason for the United States government to urge the whole international aviation community to implement additional agreements to allow airlines to implement increased amounts of compensation set forth in this Convention, and which was allowed according to the last sentence of article 22.

Unlimited Liability

The Warsaw Convention foresees two hypotheses in which the air carrier cannot avail itself of the limits of liability. The first one makes reference to the issuance of the ticket and the second to the wrongful conduct of the air carrier. The issuance of the ticket is relevant because it proves the legal bind between the contracting parties, the passenger and the air carrier. It also sets the clauses and conditions of carriage. In the case of international transportation it additionally contains the applicability of the

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[15] *Warsaw*, *supra* note 5 at 13.

Warsaw Convention and its related instruments. This penalty comes from the idea that if a passenger was not issued a ticket the air carrier deprived him of the right of getting acquainted with the compensations limits as well as getting additional insurance if he decided it necessary. The first hypothesis is contained in the article 3, which reads as follows:

First case: "No issuance of a ticket"

Article 3

"if the carrier accepts a passenger without a passenger ticket having been delivered he shall not be entitled to avail himself of those provisions of this Convention which exclude or limit his liability."[16]

Second case: "Wilful misconduct" (English version):

Article 25

"1. The carrier shall not be entitled to avail himself of the provisions of this Convention which exclude or limit his liability, if the damage is caused by his wilful misconduct or by such default on his part as, in accordance with the law of the Court seised of the case, is considered to be equivalent to wilful misconduct.

2. Similarly the carrier shall not be entitled to avail himself of the said provisions, if the damage is caused as aforesaid by any agent of the carrier acting within the scope of his employment."[17]

Second case: "*Dol*" (original French version):

Article 25

"1. Le transporteur n'aura pas le droit de se prévaloir des dispositions de la présente Convention qui excluent ou limitent sa responsabilité, si le dommage provient de son dol ou d'une faute qui,

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[16] *Ibid.*
[17] *Ibid.*

d'après la loi du tribunal saisi, est considérée comme équivalente au dol.

2. Ce droit lui sera également refusé si le dommage a été causé dans les mêmes conditions par un de ses préposés agissant dans l'exercice de ses fonctions. "[18]

For the analysis and application of this Convention, it has been always relevant to extract its original version since it includes the original terms and its interpretation of such terms will be more faithful to the original intentions of the drafters. This is with the purpose of attaining a more adequate interpretation not only from a doctrinarian point of view but also when this body of international law is applied by Courts in air accident cases.

There are two especially relevant terms in the article 25 of the Convention which allow us to know when the air carrier can become fully liable. The air carrier can be fully liable if the damage caused to passengers was caused by his wilful misconduct or *"dol"*.

FRENCH VERSION	ENGLISH VERSION
"DOL" OU "FAUTE EQUIVALENTE AU DOL"	***"WILFUL MISCONDUCT"***

In order to break the ceiling of liability established by the Warsaw Convention in favor of the airlines, plaintiffs have the burden of proof regarding "Wilful misconduct" or "*dol*".

[18] *Ibid.*

Conceptualizations of "wilful misconduct" in Common Law

(USA)

Regarding the concept of "wilful misconduct" we can start by stating the following equivalent concepts:

Wilful misconduct as:

- An intention to act not to injure;
- A higher degree of negligence;
- An intentionality to breach a duty;
- Reckless indifference to the safety;
- Equivalent to Gross negligence.

Wilful misconduct, according to the prominent lawyer in aviation law Lee S. Kreindler, is nothing but "intentional conduct". In the table just presented can be seen the two terms "Wilful misconduct" and *"dol"*. The English translation of this term according to Diederiks-Verschoor, "do not cover exactly the same concept considering that *'dol'*, is characterized by the intention to inflict a specific injury on another person, whereas in the case of 'wilful misconduct' the perpetrator must be aware of his misbehavior and the potential damage which may ensue without having necessarily intended to inflict a specific injury." Perry Becky[19], says that the term "dol" seems to imply intentionality. [20] He also claims that the tendency in France is to use the term *'dol'* as the equivalent to *'faute inexcusable'* (inexcusable fault). He says that in common law countries the term wilful misconduct is quite different to negligence and goes beyond it.

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[19] Perry S. Bechky, "Mismanagement and Misinterpretation: U.S. Judicial Implementation of the Warsaw Convention in Air Disaster Litigation" (1995) 60 J. Air L. & Com. 455 (Lexis) [*Bechky*].
[20] *Diederiks, supra* note 4 at 12.

To provide an example of case law under common law system, we cite the following opinion. The Judge of the State Supreme Court of New York, Capozzoli, in the case *International Mining v. Aerovias Nacionales de Colombia,*[21] cites the following definitions extracted from New York jurisprudence:

"Wilful negligence" has been defined as that degree of neglect arising where there is a reckless indifference to the safety of human life or an intentional failure to perform a manifest duty to the public, in the performance of which the public and the party injured have an interest.

The Judge goes on to say that wilful misconduct implies a conscious intent to do or to omit an act from which harm results to another. He also cites the "Shawcross and Beaumont" treatise on air law as defining wilful misconduct as follows:

"in English Law, "wilful misconduct" means a deliberate act or omission which the person doing or omitting: (i) knows is a breach of his duty in the circumstances; or (ii) knows is likely to cause damage to third parties; or (iii) with reckless indifference does not know or care whether it is or is not a breach of his duty or is likely to cause damage. It is essential to remember that the misconduct, not the conduct, must be wilful". On his part, the Judge Cohn of the Appellate Division of the Supreme Court of New York argues in *Goepp v. American Overseas Airlines*[22] that wilful misconduct is not only the positive act but also an "intentional omission of a manifest duty". Judge Cohn offers an excellent and practical analogy to further illustrate the debate. Negligence is present when a pilot unknowingly gives a wrong indication of his position. This act is wilful because he intends to give an indication; wilful misconduct is present when the pilot knows he is giving a wrong indication, and wilful misconduct is also present when the pilot willingly decides not to follow a regulation that he should have complied with.

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[21] *International Mining Corporation v. Aerovias Nacionales de Colombia,* [1977] N.Y. App. Div. LEXIS 10479 (Lexis).

[22] *Elisabeth Goepp v. American Overseas Airlines,* [1952] N.Y.App. Div. LEXIS 3076 (Lexis).

"American Courts have generally regarded "wilful misconduct" as equivalent to recklessness or gross negligence [....] in transforming *dol* to gross negligence American courts have avoided the difficult task of determining whether a defendant airline subjectively intended to cause harm."[23]

We can conclude here by saying that according to US Courts the notion of wilful misconduct is understood as that deliberate misconduct in which the wrongdoer decided not to follow the rules that are necessary to carry out a safe operation without having to prove the intention to cause damage.

(UK)

In English law the term "wilful misconduct" refers to an act or omission which is more serious than simple negligence. The person must have the knowledge that he is acting wrongly and he disregards the possible consequences. Negligence and wilful misconduct are not the same; negligence is a non-intentional lack of compliance of certain rules that are established in a certain time and place, but wilful misconduct goes beyond this, consisting in performing a given conduct in a deliberate way knowing the detrimental consequences of such behavior. Under UK law these two concepts are put together in order to make this differentiation.

We offer our own conclusion at the end of this section.

Conceptualizations of "*faute équivalente au dol*" in a Civil Law Country

(France)

Under a civil law system, like the system of France, we can observe a "dissection" of the different terms that are applied to conceptualize the terminology of "*faute équivalente au dol*".

- *Dol* as an intention to injure
- *Dol* as equivalent to *faute inexcusable* (inexcusable fault)

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[23] *Bechky, supra* note 19 at 27.

- Inexcusable fault entails a conscious expectancy of a probable damage
- Inexcusable fault has no intention to cause damage

We deem quite relevant at this point the definition contained in the *Code de l'Aviation Civile* (Aviation Civil Code) of France in force, which interprets the term *dol* of the Warsaw Convention as follows:

«Article L321-4

Pour l'application de l'article 25 de ladite convention, la faute considérée comme équipollente au dol est la faute inexcusable. Est inexcusable la faute délibérée qui implique la conscience de la probabilité du dommage et son acceptation téméraire sans raison valable.»[24]

This article teaches us that according to the French legislation the term *dol* can be interpreted as inexcusable fault or inexcusable negligence. With the purpose of harmonizing both versions of the Warsaw Convention, the drafters from the common law tradition in 1929 emerged with the term "wilful misconduct" as comparable to the French term: "*dol*" or "*faute inexcusable*".

From the previous transcript from the French Aviation Civil Code we deduce that the usage of the French original version for the word "*dol*" was and still is the equivalent for "*faute inexcusable*" (inexcusable fault). We will further clarify this in the following page.

Some authors have implied that the word "*dol*" means a simple intention to hurt or cause damage. We don't find this notion accurate. To analyze this concept it is central to consider that according to French legal theory there is a distinction between "*faute dolosive*" and "*faute inexcusable*", whereas the first term means "*intention formelle de nuire*", (absolute intention to cause damage) which happens when the wrongdoer understands the damage before he actually commits the act, but nonetheless he has the deliberate intention to cause damage, and in the second case

[24] *Code de l'Aviation Civil* Art. L321-4

there is a violation of a rule of care that was committed knowingly and deliberately but without an intentionality to cause damage.

The French legal theory divides *"faute inexcusable"* in two elements, material or objective and psychological or subjective. The first one encompasses a representation of the actual facts occurring on board during the accident, and compares them to the "reference conduct" of a prudent and professional pilot under the same or similar circumstances. It implies that the flight crew should have known the correct procedures to perform, it refers to the ignorance of the flight crew to carry out the air rules in force. This is also called in French doctrine *"faute lourde"* (aggravated fault). The second subjective element refers to the actual awareness or prior knowledge that the crew personnel could have had about the violation of a rule of care and the probability of causing damage without any intention of causing damage. This element makes reference to conduct performed with temerity and sustained for a given period of time, like a crew flying knowingly into adverse weather conditions hoping that no damage is produced. In short, as to the interpretation of these two concepts, the subjective and objective, we perceive that the difference between them basically rests on whether the pilot "knew or should have known his fault".

La Cour de Cassation in France advocated for the application of the objective criterion due to the fact that in many cases it is impossible to establish the previous knowledge of a pilot for he died in the accident. This Court held that it is not relevant whether the carrier had or did not have knowledge of the possibility of causing damage, it is enough to compare the conduct of the flight crew against an abstract reference used as a model of prudence where the personnel would not behave knowingly and willingly negligent. If the actual carrier does not pass such a test then it should be established as inexcusable fault. Thus, the interpretation more adequate for the Warsaw Convention is *"faute inexcusable"*.

Mr. Vincent Grellière, in his comprehensive doctoral thesis explains that although the common law Courts apply the subjective criterion, they use in their legal system the principle *"res ipsa loquitur"* (the thing speak for itself), which once applied to air accidents cases produces a result similar to the objective criterion.

Therefore it can be deduced that there is a similarity in the practical application of both principles: the subjective in common law system and the objective within a civil law system.

In practice, the application of the objective criterion brings to mind the idea of an emphasis on factual and technical studies of the last moments before the accident instead of a psychological approach regarding what the flight crew knew or had in their minds during those last minutes or perhaps seconds. The advanced technology demands *per se* an emphasis on an objective criterion, the increasing complexity of navigation systems impose more procedures to comply with and a higher degree of care, thus the possibility of an error in an external act or omission such as an error in piloting, undeniably also increases, putting aside the possibility of an internal analysis on the psychology of the individual.

Modernization and automation of aviation have promoted to a large extent an intricate and complex work environment for flight crews, which has led pilots around the world to situations where they do not foresee nor have any previous knowledge of the possibility of causing damage. This situation emphasizes the applicability of an objective criterion where the state of mind of the crew before the accident should not be considered for the establishment of a wilful misconduct or *faute inexcusable.*

Comments

We summarize the preceding arguments as follows: The purpose of including the terms wilful misconduct or *dol* was to establish the cases under which the Convention's limit on the liability of the air carrier could be lifted. These cases were supposed to be encompassed in the term "wilful misconduct", but there was a little difficulty, the meaning of such term did not correspond to the civil law term *dol.* There were interpretations as to whether the term *do*l was equal or not to the English term, some emphasized the element of "malicious intent to cause damage" element contained in the term *dol*, others pointed out that in French legal doctrine it was rather interpreted as *faute inexcusable*, which is more similar to wilful misconduct; then, the question arises, which interpretation should prevail within the Warsaw Convention?

The idea behind these concepts was to prevent the air carrier from knowingly committing a violation of a rule of safety that may result in causing damage to passengers (cargo and baggage). In solving this discrepancy the resultant interpretation was to give to the term *dol* the meaning of "*faute inexcusable*", which means "*extrême sottise*" or "*une grande insouciance*", these two French terms, being equivalent to the English terms "gross negligence" or "recklessness". This type of default (*faute*) is the one referred to in the legend inserted in the article 25 of the Warsaw Convention of 1929 that reads: "*d'une faute qui, d'après la loi du tribunal saisi, est considérée comme équivalente au dol*".

We conclude this section by saying that an air carrier may be fully liable if its agents or servants engage in wilful misconduct or *faute inexcusable*, in other words, in conduct performed by an airline employee who knowingly contravenes an air regulation with inexcusable ignorance or with full consciousness of his breach hoping that the probable damage might not be produced.

SUBSEQUENT INTERNATIONAL TREATIES AMENDING THE WARSAW CONVENTION OF 1929

There have been seven amendments to this Convention herein listed; the purpose of these modifications shall be furthered discussed.

International Treaties:

1. The Hague Protocol of 1955
2. Guadalajara Convention of 1961
3. Guatemala City Protocol of 1971
4. Montreal Protocol 1 of 1975
5. Montreal Protocol 2 of 1975
6. Montreal Protocol 3 of 1975
7. Montreal Protocol 4 of 1975

THE HAGUE PROTOCOL OF 1955

"The Hague Protocol was adopted at a diplomatic conference convened by the International Civil Aviation Organization at The Hague from September 6 to 28, 1955. It was attended by delegates from forty-four states and observers from eight international organizations. It had previously been decided to amend the Warsaw Convention rather than attempting to write an entirely new Convention"[25]

Liability Limit Increased

This Protocol replaces article 22 of the Warsaw Convention and double the amount of compensation from $8,300 to approximately $16,600 USD, becoming the new ceiling of monetary compensation. This amount was established largely because

of the intervention of the United States. The US government proposed an increase of $20,000, but the rest of the delegations opposed it, so an agreement was reached at an intermediate amount which was not enough in the opinion of the US delegation. This circumstance led the US Government to refrain from ratifying the Protocol and the subsequent drafting and implementation of the Montreal Agreement in 1966 that we will discuss later. Among the arguments that explain the position of the United States, is their claim that the amount included by Warsaw Convention was not justified because the air industry had become stronger and financially more stable.

Liability of the Successive Carrier

Article 1 extends the application of the Convention to the successive carrier performing the international flight. This system of flying is commonly known as "code-sharing", which consist in a commercial agreement between two airlines where each airline can offer services using in its tickets the two-letter code of the other. The two airlines in question coordinate schedules to make the service appear as one indivisible service. In the absence of such an agreement, the customer would have to rely on different airlines with different schedules for a trip between different cities not served by one single airline.

Full Liability of the Carrier for not issuing a ticket

Article III

Amends article 3 paragraph 2 of WC

> "Nevertheless, if, with the consent of the carrier, the passenger embarks without a passenger ticket having been delivered, or if the ticket does not include the notice required by paragraph 1 (c) of this Article, the carrier shall not be entitled to avail himself of the provisions of Article 22."[26]

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[25] John Thomas Thachet, *Limitation of Liability in International Air Transport* (LLM. Thesis, IASL McGill Faculty of Law 1994) [unpublished] [*Thachet*].

[26] *Protocol to Amend the Convention for the Unification of Certain Rules Relating to International Carriage by Air,* 28 September 1955, online: Institute of Air & Space Law <http://www.iasl.mcgill.ca/airlaw/private/warsaw/hague1955.pdf> [*Hague*].

As can be noted from this text, the requirement of the issuance of a ticket remains in force in The Hague Protocol; the only innovation was the statement of the ticket as meaning *prima facie* evidence of the existence of a contract between carrier and passenger.

Article XI

Replace art 22 of W.C.

Possibility to Increase Liability through Private Contract

"Nevertheless, by special contract, the carrier and the passenger may agree to a higher limit of liability."

This important provision is kept in the text of the Hague Protocol. This clause allows the conclusion of subsequent agreements or "special contract" to increase the limits of liability. The Montreal Agreement of 1966 and 1996 allow the possibility to conclude such a "special contract" to increase the ceilings of liability. Its convenience has been acclaimed for practical purposes because it doesn't require following the extensive process of government legislatures approval, since it is concluded only among air carriers.

The relevance of article XIII of the Hague Protocol cannot be minimized since it amends article 25 of the Warsaw Convention, a discussion of which we include after the transcription of the article:

Liability of the Carrier

Article XIII

Paragraphs 1 and 2 in article 25 of the W.C. shall be deleted and replaced by the following:

"The limits of liability specified in Article 22 shall not apply if it is proved that the damage resulted from an act or omission of the carrier, his servants or agents, done with intent to cause damage or recklessly and with knowledge that damage would probably result; provided that, in the case of such act or omission of a servant or agent, it is also proved that he was acting within the scope of his employment."

FRENCH VERSION	*ENGLISH VERSION*
INTENTION DE PROVOQUER UN DOMMAGE	**INTENT TO CAUSE DAMAGE**
TEMERAIREMENT AVEC CONSCIENCE	**RECKLESSLY AND WITH KNOWLEDGE**

In the English version of the Hague Protocol of 1955 the carrier cannot avail itself of the limits of liability in two cases:

1. "intent to cause damage"

2. "recklessly and with knowledge that damage would probably result"

The French version reads as follows:

1. 'l'intention de provoquer un dommage,...'

2. 'soit témérairement avec conscience qu'un dommage en résultera probablement,'

The Hague Protocol substituted the terms *dol* and wilful misconduct by "intent to cause damage or recklessly and with knowledge that damage would probably result..." Diederiks Verschoor explains that the elements of the two preceding terms

of the Warsaw Convention are now merged in the wording of article 25 of the Hague Protocol.

Having reviewed article 25 of the Warsaw Convention and the Hague Protocol we consider that the difference in the wording of the two versions is not significant because the same legal notions are contained in both instruments. The legal principles characterized in *dol* or *faute equivalente au dol* and wilful misconduct of Warsaw are contained separately in the text of the amended article 25 of The Hague Protocol. This is made clearer when, according to the concepts herein discussed, we can identify that the term wilful misconduct is the equivalent for recklessness, and the term *dol* conceptualized as an intention to injure is contained as that act or omission with intent to cause damage of the Hague Protocol. For this we say that a substantial change is not perceived from Warsaw to Hague, though there are relevant aspects of the latter that need to be discussed.

The term "Recklessness" is defined as a concept that implies a higher degree of ordinary negligence. It is heedless indifference to consequences, an indifference to the wrongness of a conduct and to the rights of third parties; although it does not necessarily mean that the act is done intentionally or purposely.

Verschoor affirms that a reckless conduct with "knowledge" can be proved following the objective or subjective criterion. Under the objective criterion the conduct can be assessed as referring to the "behavior of the pilot [...] against what a pilot of average competence would have done in similar circumstances [...] in the subjective criterion, personal circumstances must be taken into account."[27] According to the French author Mr. Vincent Grellière, the objective test is applied in the majority of courts in France, Canada, Greece and South Korea, while the subjective test is applied in Belgium, Gabon, UK, some French Courts, Swiss Courts, Italy and Argentina.

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[27] *Diederiks, supra* note 4 at 12.

The "American Restatement of Laws Second Torts", defines Reckless Disregard of Safety as follows: "The actor's conduct is in reckless disregard of the safety of another if he does an act or intentionally fails to do an act which it is his duty to the other to do knowing or having reason to know of facts which would lead a reasonable man to realize, not only that his conduct creates an unreasonable risk of physical harm to another, but also that such risk is substantially greater than that which is necessary to make his conduct negligent". Recklessness is identified in the French theory as "*témérairement*", implying an audacious conduct disregarding the safety of others.

As to "Intention to cause damage," it has been defined as the "knowledge, awareness of the fact that damage is actually a result of the act or omission in question together with the desire or purpose to bring about the result."[28].

The expression: "with knowledge that damage would probably result," or in its French version, "*avec conscience qu'un dommage en résultera probablement*", makes reference to the subjective or psychological content in the principle of *faute inexcusable* (inexcusable fault). This concept attempts to establish the wrongdoer's knowledge of two things: the first one of the knowledge of his conduct breaking a rule of safety and secondly, the likeliness of causing an accident, not necessarily certain knowledge but rather knowledge of the probability of damage. This leads us back to the analysis of whether the pilot knew or should have known the possibility of causing damage. La *Cour de Cassation* in France ruled that it is necessary that the subject has had an actual knowledge of his error as well as the probability of damage without wanting to cause it.

The objective interpretation of this principle states that to establish inexcusable fault the conduct of the pilot must be assessed against the conduct of a prudent pilot under the same or similar circumstances. If the standard prudent pilot could have had such knowledge, then the element of "knowledge that damage would probably result" is found.

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[28] *Giemulla, supra* note 11 at 19.

Whether the pilot knew or should have known, can only be decided by the trial judge on a case by case basis. "He must discover whether or not knowledge that damage would probably result did in fact exist, following a due consideration of the outward course of events, the triggering event and surrounding circumstances"[29].

The use of the objective or the subjective criterion will depend on the rules of interpretation of the Court seized of the case. The two interpretations are still in force and subject to *lex fori* interpretation.

On the one hand, we reckon that in this Protocol the factor of the intention to cause damage is still considered. There exists a conception of a conduct that can be displayed in two possible ways, the first with intention to cause harm and the second with an intention to breach a duty of care hoping that damage is not produced. The difference between conduct in which there is an intention to breach a duty (wilful misconduct) and simple negligence is illustrated in a case before a Spanish Court in which an air carrier lost a parcel to be transported from Barcelona to Moscow. The plaintiff claimed wilful misconduct but the Court sustained that this was not a case of wilful misconduct but of negligence because there was no **intention** [emphasis added], to commit such action.

On the other hand, as our conclusion, we find that the Hague Protocol addresses the two ideological views discussed around the article 25 of the Warsaw Convention, these two being the notions of *dol* as an intention to cause damage and wilful misconduct identified as recklessness. The two different notions are clearly summarized in one phrase: "intent to cause damage or recklessly and with knowledge that damage would probably result." In conclusion, we perceive in the first part of this phrase the inclusion of one of the two elements of *dol*, (*faute dolosive*); and in the second part we observe the *faute inexcusable* containing its two theories of knowledge of the wrongdoer, the objective and subjective, whose application will depend on every jurisdiction.

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[29] Vincent Grellière, *La responsabilité du transporteur aérien international* (D. Jur. Thesis, *Université des sciences sociales de Toulouse*, 1973) [unpublished]. (translation of the author)

Finally, applying such elements to the performance of flight crews, we identify two different hypotheses in which the cap of liability can be overcome. The first one is when a pilot deliberately and consciously takes a risk knowing the probability of causing damage. The second, the more improbable when he decides to cause damage. In both cases the airline might be found guilty and fully liable to the injured passengers or to their estates.

Article XIV

After Article 25 of the Convention, the following article shall be inserted:-

Article 25 A

"1. If an action is brought against a servant or agent of the carrier arising out of damage to which this Convention relates, such servant or agent, if he proves that he acted within the scope of his employment, shall be entitled to avail himself of the limits of liability which that carrier himself is entitled to invoke under Article 22.

2. The aggregate of the amounts recoverable from the carrier, his servants and agents, in that case, shall not exceed the said limits.

3. The provisions of paragraphs 1 and 2 of this article shall not apply if it is proved that the damage resulted from an act or omission of the servant or agent done with intent to cause damage or recklessly and with knowledge that damage would probably result."[30]

This article establishes the principle that prevents plaintiffs from recovering larger sums than the amount prescribed in the Convention by suing an agent or servant of the air carrier and thus obtaining sums beyond the limits of compensation as laid out in the Warsaw Convention.

Reed v. Wiser, appealed before the United States Court of Appeals for the Second Circuit in New York, NY, is a very often referred case based solely on the interpretation of the article 22 of the Warsaw Convention is. In this case, significant

principles are discussed and established, as well as an explanation as to the convenience of the inclusion of this amendment carried out in the Hague Protocol of 1955.

The case stated that one of the aims of the Warsaw Convention at the time of its drafting was the setting of a limitation of liability in order to offer a financial shelter in favor of the then infant industry which meant financial certainty through fix costs of operation. This circumstance has become inadmissible and claimants have made attempts to overcome such limits.

In *Reed v. Wiser*, a lawsuit was filed against the President of TWA and his "Vice-President of Security" for failing to take due precautions to avoid the placing of a bomb onboard an airplane that crashed on September 8th 1974. But plaintiffs were not successful. In respect of the liability limitations, the Judge opined against the plaintiffs that the ceilings of liability "could be circumvented by the simple device of a suit against the pilot and/or other employees, [...] which would force the American employer, [...] to provide indemnity for higher recoveries as the price for service by employees who are essential to the continued operation of its airline. The increased cost would, of course, be passed on to the passengers."[31] This means that the intention of the ruling in this case as in the Hague Protocol in 1955 was to provide a disincentive for suits against employees of the airline with the sole purpose of getting higher amounts of compensation than those explicitly foreseen in the text of the Warsaw Convention. By allowing these types of legal action, it would go against a fundamental principle of the overall Warsaw System, which is the setting of fixed limits of compensation as provided in article 22. Because of this circumstance that was foreseen years before this case it became necessary to amend and include an additional article 25A. And the ruling in this case further confirmed this principle.

The notion above dates back to 1929, when the Warsaw Convention was drafted. It was said that the Convention regulated not only the air carrier but also the employees since they were an extension or *longa manus* of the company and legally

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[30] *Hague, supra* note 26 at 35.
[31] *Reed v. Wiser*, [1977] U.S. App. LEXIS 13660 (Lexis) [*Reed*].

speaking were the same person. Nevertheless, through the years there have been numerous opinions in favor and against the interpretation of the Convention regarding whether it provided for the legal protection to flight crews in cases of accident. Some affirmed that the servants were not protected and in case they became the target of a lawsuit they would be indemnified by the carrier as agreed in their labor contracts, but in these cases the carrier would have to assume the risk of paying unlimited compensation. Finally, after disputes of opinion, in 1955 there was a consensus and the article 25A was drafted and inserted in the Hague Protocol. This new article has "the effect of enabling a servant or agent, acting within the scope of his employment, to avail himself of the same limits of liability as those applicable to a carrier"[32].

In sum, the Hague Protocol included the following changes:

- "Requirements for passenger ticket and baggage check were simplified;
- Passenger liability limits were doubled from 125,000 francs to 250,000 francs;
- The concept of "wilful misconduct" in Article 25 of the Convention was amended and the term recklessness was introduced;
- Article 25A was introduced to extend the liability limits of the carrier to a servant or an agent acting within the scope of their employment;
- Provisions were made to award court costs and other expenses of litigation."[33]

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[32] *Ibid.*
[33] *Thachet, supra* note 25 at 35.

GUADALAJARA CONVENTION OF 1961

The only relevant amendment in this Convention is set forth in its article 1. It makes the distinction between **contracting carrier** and **actual carrier** according to the following definitions:

Contracting carrier is a person who as a principal makes an agreement for carriage governed by the Warsaw Convention with a passenger.

Actual carrier is a person other than the contracting carrier, who, by virtue of authority from the contracting carrier, performs the whole or part of the carriage.

Both carriers shall be subject to the Warsaw Convention rules, the contracting for the whole carriage and the actual only for the transportation performed. The liability limitation rule on the part of the servants or agents of the actual air carrier acting within the scope of their employment is also applicable to them.

This Convention was mainly necessary because many air companies named "charters" started to appear and special rules applicable to this type of service were needed. This new Convention sets forth also the rules of liability pertaining to the contracting carrier, distinguished from the actual company that performs the carriage by authority from the other. For this reason the contracting carrier is liable and can be fully liable even for the acts or omissions committed by the employees of the actual carrier.

GUATEMALA CITY PROTOCOL OF 1971

(Not in force)

"A Diplomatic Conference on the revision of the Warsaw Convention as amended by the Hague Protocol met at Guatemala City from 9 February to March, at the invitation of the Government of Guatemala [...] The Conference was attended by the Representatives of 55 States and 2 international organizations. The Protocol was drawn up in three authentic texts in the English, French and Spanish languages [...] and signed at Guatemala City on 8 March on behalf of 21 States."[34]

This Protocol is not in force, but has been considered by many specialists as a document worth studying for its innovative content. The absolute limit on air carrier liability is about 100,000 USD, and this cannot be exceeded under any circumstance even in cases when the damage was caused by the servants or agents with "intent to cause damage or recklessly and with knowledge that damage would probably result". The carrier keeps the defense of contributory negligence or other wrongful act or omission of the person claiming compensation. The strict liability rule does not apply when the death or injury arose from the state of health of the passenger.

The purpose of this Protocol is to amend the Warsaw Convention as amended by the Hague Protocol of 1955. Its relevant modifications are as follows:

"As amended by the Guatemala Protocol, the Warsaw Convention provides that the air carrier shall be absolutely liable for injuries or death suffered by a passenger during international carriage by air and in circumstances described in the Convention as amended. Also, the air carrier's liability for the aggregate of all claims will be for proved damage, subject to a limit of US $100,000 per passenger. This limit may not be exceeded. However, a State which becomes a Party to the Protocol will be free to establish its own domestic system to supplement the compensation payable to

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[34] Council, *Annual Report,* ICAO, 1971, ICAO Doc. 8982 A19-P/1. (1971).

claimants under the Convention in respect of death, or personal injury of passengers"[35]

The US delegation considered the amount of 100,000 dollars provided insufficient protection to their citizens and they claimed that this fact would not allow a long-term agreement, consequently in spite of the innovative content of this Protocol the United States did not ratify it, which led other countries to take the same steps. The US representatives sought from the international community the implementation of parallel supplemental compensation systems available to injured passengers, a plan that would not place a greater burden than that of the 100,000 dollars on air carriers but only on the beneficiaries of such program, which refers to the passengers. Under this plan it was foreseen that the passenger would have to pay an additional insurance premium of $5 USD added to the cost of the ticket, and this payment would entitle a passenger in the case of accident to recover larger substantial amounts of money than those explicitly laid out in the text of the Guatemala Protocol. This proposal was accepted and led to the inclusion of the article 35A in this Protocol; however, as we mentioned before, this Protocol never came into force because the US did not agree with its content.

In the final provisions of the Guatemala City Protocol the section D foresees that the protocol would enter into force when 30 States ratify it and five of these countries must account "for at least 40 percent of the total internationally scheduled air traffic flown by carriers of ICAO members nations in that year." Having in mind that the United States counted fifty percent, it was said that this provision was made to contribute to the acceptance of that country. However, the United States did not ratify the instrument.

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[35] ICAO *Bulletin* ICAO, 1971, Vol. 26 No. 10

Liability of the Air Carrier

Article IV

Article 17 of the Convention shall be deleted and replaced by the following:-

Article 17

> "1. The carrier is liable for damage sustained in case of death or personal injury of a passenger upon condition only that the event which caused the death or injury took place on board the aircraft or in the course of any of the operations of embarking or disembarking. However, the carrier is not liable if the death or injury resulted solely from the state of health of the passenger."[36]

The Guatemala Protocol establishes a strict liability regime regardless of fault on the air carrier in cases of damage caused to passengers, and introduces in the text of article 17 an explicit mention of the exclusion of liability for a previous and inherently precarious state of health of the passenger before the occurrence of the "accident". The introduction of the word "personal injury" has caused a great debate in respect whether such term may entail mental damage. The general interpretation was to consider the mental injuries only if they were caused by a physical injury.

For the first time, article 20 of the Warsaw Convention is substantially amended and under the Guatemala Protocol said article regarding death or wounding caused to passengers, it is foreseen that the air carrier cannot avail itself anymore of the defense of "all necessary measures to avoid the damage or that it was impossible for them to take such measures." This defense is removed and the absolute liability regime is established. This new principle is not anymore a rebuttable presumption of fault, the regime applies regardless of fault.

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[36] *Protocol to Amend the Convention for the Unification of Certain Rules Relating to International Carriage by Air, signed at Warsaw on 12 October 1929, as Amended by the Protocol done at The Hague on 28 September 1955,* 8 March 1971, online: Institute of Air & Space Law <http://www.iasl.mcgill.ca/airlaw/private/warsaw/guatemala1971.pdf> [*Guatemala*].

Exclusion of Air Carrier Liability by Negligence

Article VII

Article 21 of the Convention shall be deleted and replaced by the following:-

Article 21

"If the carrier proves that the damage was caused or contributed to by the negligence or other wrongful act or omission of the person claiming compensation, the carrier shall be wholly or partly exonerated from his liability to such person to the extent that such negligence or wrongful act or omission caused or contributed to the damage. When by reason of the death or injury of a passenger compensation is claimed by a person other than the passenger, the carrier shall likewise be wholly or partly exonerated from his liability to the extent that he proves that the damage was caused or contributed to by the negligence or other wrongful act or omission of that passenger."[37]

This wording is different from earlier versions in which does not appear a clear distinction in cases where the passenger and the claimant are not the same person. The Guatemala Protocol makes clear this circumstance by stating one and the same rule that becomes equally applicable to the passenger or the claimant acting on behalf of the latter.

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[37] *Ibid.*

Limitation of Liability

Article VIII

Article 22 of the Convention shall be deleted and replaced by the following:-

Article 22

"1. (a) In the carriage of persons the liability of the carrier is limited to the sum of one million five hundred thousand francs for the aggregate of the claims, however founded, in respect of damage suffered as a result of the death or personal injury of each passenger."[38]

According to this Protocol, air carriers were strictly liable up to 1,500,000, francs, which is equivalent to 100,000 USD, this was the limit that cannot be exceeded "not even when it is proved that the damage resulted from an act or omission of the carrier, his servants, employees or agents, done with intent to cause damage, or recklessly and with knowledge that damage would probably result."[39] Although this amount is not supposed to be exceeded it is subject to a periodical increase and to domestic supplementary systems of compensation.

Supplementary system of compensation

Article XIV

After Article 35 of the Convention, the following Article shall be inserted:-

Article 35 A

No provision contained in this Convention shall prevent a State from establishing and operating within its territory a system to supplement the compensation payable to claimants under the Convention in respect of death, or personal injury, of passengers. Such a system shall fulfill the following conditions:

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[38] *Ibid.*
[39] *Diederiks, supra* note 4 at 12.

(a) it shall not in any circumstances impose upon the carrier, his servants or agents, any liability in addition to that provided under this Convention;

(b) it shall not impose upon the carrier any financial or administrative burden other than collecting in that State contributions from passengers if required so to do;

(c) it shall not give rise to any discrimination between carriers with regard to the passengers concerned and the benefits available to the said passengers under the system shall be extended to them regardless of the carrier whose services they have used;

(d) if a passenger has contributed to the system, any person suffering damage as a consequence of death or personal injury of such passenger shall be entitled to the benefits of the system."[40]

The innovative system referred to in the previous article 35A is the system of additional coverage by insurance plans instituted at a domestic level within the jurisdiction of the Contracting Parties to this Protocol. In order to implement this system the State in question must fulfill the conditions cited above.

Another interesting innovation in this Protocol appears in article 22, paragraph 1 (a) in which is included schedule for a periodical revision of the liability limits. Such revisions shall take place during the fifth and tenth years after the date of entry into force of the Protocol.

In sum, the Guatemala Protocol introduced major changes that made it an innovative instrument compared to its predecessors. The liability regime was modified from a presumed liability to absolute liability up to 1,500,000 francs. The only defense available to the carrier is the contributory negligence. The "state of health" of the passenger is explicitly foreseen in the wording of the article. The principle of intentional or reckless misconduct to lift the limits of liability is removed.

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[40] *Guatemala, supra* note 36 at 47.

MONTREAL PROTOCOL NUMBER 1, 1975

(In force 15 February 1996)

TO AMEND WARSAW CONVENTION, SIGNED AT MONTREAL 25 SEPTEMBER 1975

LIMITS IN SDR

Article II

Article 22 of the Convention shall be deleted and replaced by the following:

"Article 22

In the carriage of passengers the liability of the carrier for each passenger is limited to the sum of 8 300 Special Drawing Rights. Where, in accordance with the law of the court seised of the case, damages may be awarded in the form of periodic payments, the equivalent capital value of the said payments shall not exceed this limit. Nevertheless, by special contract, the carrier and the passenger may agree to a higher limit of liability."

The Protocol 1 replaces the gold reference clause contained in Warsaw Convention of 1929 as a method to calculate payments arising from liability by introducing the use of Special Drawing Rights or "SDR" which is a term coined by the International Monetary Fund. This method was devised following certain complications in the implementation of the gold reference. For example, in the US there was a fix official price of Gold in dollars, however, there could be found a different price of gold in the free market; at one point Courts were applying two different prices of gold. It was necessary to solve these discrepancies through this new system of SDR, which consists in a fixed sum based on the value of five currencies, giving a more stable reference of value to calculate amounts of compensation.

MONTREAL PROTOCOL NUMBER 2, 1975

(In force 15 February 1996)

TO AMEND THE WARSAW CONVENTION, AS AMENDED BY THE PROTOCOL DONE AT THE HAGUE ON 28 SEPTEMBER 1955, SIGNED AT MONTREAL, ON 25 SEPTEMBER 1975

Article II

Article 22 of the Convention shall be deleted and replaced by the following:-

Article 22

"1. In the carriage of persons the liability of the carrier for each passenger is limited to the sum of 16 600 Special Drawing Rights. Where, in accordance with the law of the court seised of the case, damages may be awarded in the form of periodic payments, the equivalent capital value of the said payments shall not exceed this limit. Nevertheless, by special contract, the carrier and the passenger may agree to a higher limit of liability."

This Protocol replaces the gold clause incorporated in the Hague Protocol of 1955 for the same reasons explained in the case of the Warsaw Convention of 1929. The amendments proposed in the Protocols 1 and 2 were basically focused on the increase of amounts of compensation, and a change of Gold Standard to SDR, a stable system devised by the International Monetary Fund.

MONTREAL PROTOCOL NUMBER 3, 1975

(Not in force)

To amend Warsaw Convention, as amended by the Protocol done at The Hague on 28 September 1955 and at Guatemala City on 8 March 1971, signed at Montréal, on 25 September 1975

"The Guatemala City Protocol of 1971 required the ratification of the United States for its entering into force; however, the United States declined to ratify because the reference to the gold clause was not acceptable to them. MP 3 rectifies this by replacing the concept of gold clause by SDR."[41] This Protocol equals an extension of the Guatemala Protocol, adopting its provisions but excluding the requirement to come into force, especially in reference to the ratification of the United States, which was no longer necessary. The SDR term was intended to be the solution for the great fluctuations of gold value due to the continuing devaluations of the American dollar in the seventies. Besides that, the value of gold could be manipulated in many countries which would have amounted to subject the supposedly "fixed" limits of compensation set forth in the protocol to have different limits of compensation in each country, and ultimately to a great level of uncertainty.

Article II

Article 22 of the Convention shall be deleted and replaced by the following:-

Article 22

"1. (a) In the carriage of persons the liability of the carrier is limited to the sum of 100,000 Special Drawing Rights for the aggregate of the claims, however founded, in respect of damage suffered as a result of the death or personal injury of each passenger.

Where, in accordance with the law of the court seised of the case, damages may be awarded in the form of periodic payments, the equivalent capital value of the said payments shall not exceed 100 000 Special Drawing Rights."[42]

Article III

"In Article 42 of the Convention paragraphs 2 and 3 shall be deleted and replaced by the following: "2. At each of the Conferences mentioned in paragraph 1 of this Article the limit of liability in Article 22, paragraph 1 (a) in force at the respective dates of these Conferences shall not be increased by an amount exceeding 12,500 Special Drawing Rights."[43]

On 25th September, the Montreal Protocol number 4 was signed and came into force on June 14th 1998. This protocol was mainly focused on issues related to cargo and mail, which is why we will not enter into that discussion for not being related to the main issue of this work. We will only mention this reference to said instrument: "Protocol 4 regulates the liability of the carrier for the transportation of goods in the same manner as the Guatemala Protocol does for passengers"[44]

The aim of the first three protocols was the updating of the gold clause by replacing them for the SDR concept.

Taking into account that different countries were at the same time contracting parties to different treaties making up the Warsaw System, it was necessary to draft different protocols at the same date amending different treaties in order to allow that

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[41] *Thachet, supra* note 25 at 35.
[42] *Additional Protocol No. 3 to Amend the Convention for the Unification of Certain Rules Relating to International Carriage by Air, signed at Warsaw on 12 October 1929, as Amended by the Protocol done at The Hague on 28 September 1955 and at Guatemala City on 8 March 1971,* September 25, 1975, online: Institute of Air & Space Law <http://www.iasl.mcgill.ca/airlaw/private/warsaw_montreal1975c.pdf> [*Protocol 3*].
[43] *Ibid.*
[44] *Diederiks, supra* note 4 at 12.

the concept of SDR would be extended and applied to all the States. If this had not been done, the uniformity would have been compromised.

INTERNATIONAL PRIVATE INSTRUMENTS APPLYING HIGHER LIMITS OF LIABILITY THAN WARSAW CONVENTION

The article 22 of the Warsaw Convention makes a reference to a "special contract". In our opinion, this notion of the special contract hosts a sort of uncertainty regarding the adequacy and permanency of the limits established in the Warsaw Convention. It was believed that in the future the parties might wish to increase the limits of liability of the air carrier in cases of wounding or death caused to passengers. That is why this provision foresees the possibility for the parties to contract a higher limit of liability.

The instruments herein referred are

1. Montreal Inter-carrier Agreement of 1966
2. IATA Agreement 1996

MONTREAL INTERCARRIER AGREEMENT OF 1966

On February 1966, fifty countries convened in the city of Montreal. In this conference the US government insisted on the far low limits of compensation and advocated a revision for an increase ranging from $75,000 to $100,000 or through a contractual waiver of liability between the air carriers. However, the rest of the delegations did not agree on such levels of compensation. The Montreal conference ended without reaching any agreement on the mentioned issue. After this disagreement, the US government denounced the Warsaw Convention.

Given the circumstances, the international community recaptured the discussions of liability limitations. The US was open to accept a limitation of $75,000 only if it was coupled with absolute liability. The community offered to the United States to accept liability up to an amount of $75,000 without making any statement whether the air carriers should be subject to an absolute liability regime or not. This plan was

accepted and finally agreed, then the US withdrew its denunciation one day before the deadline.

The intercarrier agreement is a private contract between airlines and the Civil Aeronautics Board of the United States, by which airlines agreed to waive the limit of liability of the article 22 of the Warsaw Convention as well as the defense of "all necessary measures" of the article 20(1) for damages caused to passengers for death or bodily injuries. This agreement is applicable to flights going to, from or with an agreed stopping place within US territory.

"The goal of the United States was to establish an international compensation system based upon the principles of absolute liability and limited compensation, thereby serving the interests of: (a) rapid settlement of disputes without the vexations and delays of protracted litigation; (b) a proportional diminution of legal fees; and (c) limited exposure for the carriers in the event of a major catastrophe."[45]

The air carriers under this private contract become strictly liable up to the cited amount without any prejudice of the provisions concerning unlimited liability in cases of wilful misconduct. Regarding this private contract, we consider it to be very fortunate that full liability in cases of wilful misconduct be implemented. These cases of wilful misconduct should at all times be sanctioned. The seriousness of such misconducts must be foreseen because of their harmful consequences that may result when safety is compromised or prioritized below other factors.

[45] *Cyrus v. TWA*, [1977] E.D. Pa. LEXIS 12423 (Lexis).

IATA AGREEMENT OF 1996

(In force February 14, 1997)

This agreement was carried out under the auspices of the International Air Transport Association and the Air Transport Association. The existence of this Agreement is legally based on Article 22 (1) of the Warsaw Convention, which foresees the possibility of carrying out private agreements between passengers and air carriers by which they can agree on higher limits of compensation. The main difference between this agreement and the first Inter-carrier agreement of 1966 is that the air carriers that are part of this private contract waive certain defenses of the Warsaw Convention and the ceiling of $75,000 was abrogated as had been set forth under the first IATA agreement.

This agreement rests on two principles or tiers; the first one refers to the principle of strict liability up to an amount of 100,000 SDR and the second to rebuttable presumed liability above 100,000 SDR.

Airlines "waive all limits of liability, but retained the right to invoke the 'all necessary measures' defense of Article 20 for that portion of a claim in excess of 100,000 SDRs. The carrier, except where it could prove contributory negligence, was, in effect, strictly liable for provable damages up to 100,000 SDRs for bodily injury or wrongful death as a result of an accident, and was presumptively liable to an unlimited amount"[46]

The IATA agreement is a "private voluntary agreement under which carriers would waive the passenger liability limits of the Warsaw Convention and its related instruments [...]. Because these agreements waived the Warsaw liability limits for participating carriers, they effectively superseded the 1966 Montreal Inter-carrier Agreement, by which carriers had merely waived the limits on liability up to $75,000 per passenger"[47]. This agreement requires carriers to pay up to 100,000 SDR

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[46] *Whalen, supra* note 3 at 12.

[47] U. S., *Letter of transmittal from the President of the US to the Senate*, (IATA Legal and Corporate Secretary, online: IATA <http://www.iata.org/legal/_files/USstatedepartmentreportMC99.pdf.>.

(approximately $135,000) to accident victims, regardless of carrier negligence. Consequently, "any accident victim having a claim against a carrier that was party to this second IATA agreement would have an absolute right to recover up to 100,000 SDR of proven damages."[48]

The contributions made by this agreement are:

- Waive of limitations of liability arising from Article 17 of the Convention that foresee cases of injuries or death caused to passengers, which excludes claims related to cargo, baggage;
- Carrier shall not avail itself of any defense with respect to claims not exceeding 100,000 SDR;
- Air carriers are presumptively liable to an unlimited amount for bodily injuries and death for the amout exceeding 100,000 SDR (Art. 17 and 20 (1) Warsaw Convention);
- Passengers can file suits according to the law of their domicile;
- Claims can be settled by arbitration procedures.

The IATA agreement was the object of expressions of congratulations by many sectors of the international community because it was said that what could not be done by the governments was achieved by private entities in a far shorter period of time and with better results. As defined by Trevor Atherton, "The IATA scheme is a radical private sector initiative designed to reform some of the key problems of the Warsaw System"[49]

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[48] *Ibid.*

[49] Trevor, Atherton; "Unlimited Liability for Air Passengers: The position of Carriers, Passengers Travel Agents and Tour Operators under the IATA Passenger Liability Agreement Scheme". (1997) 63 J. Air L. & Com. 405 (Lexis).

EUROPEAN UNION

The European Community issued the Council Regulation EC No. 2027/97, 9 October 1997 on air carrier liability in the event of accidents. This regulation lays down the obligations of Community air carriers regarding liability in cases of death or bodily injuries caused to passengers for damages sustained in the air transportation. It applies to Community air carriers and those who fly through the territory of the member states. The air carrier is strictly liable up to 100,000 SDR and above that limit is presumptively liable unless it proves contributory negligence or the "all necessary measures" defense. This Regulation has been of great controversy for its alleged incompatibility with Warsaw system and the Montreal Convention of 1999. It has been said that there should not exist a parallel system of air carrier liability other than the Warsaw System. The aim of the Warsaw Convention is uniformity and universality, however the European Council has intended to establish a second system that might at any moment enter into conflict with Warsaw. That is why many States and experts have highlighted the inconvenient of the European system that may require States to carry out actions in contravention of the previous and universal system already in force. Currently IATA and airlines are exercising pressure in order to have this Regulation amended or even denounced. UK supports the view of a conflict between two systems of liability. In any event, we need to say that this Regulation is not being enforced by any State member.

MONTREAL CONVENTION OF 1999

(PENDING TO ENTER INTO FORCE)

In February 1996, the International Civil Aviation Organization (ICAO) instituted a "Study Group on the Modernization of the Warsaw System". "The primary objective of the study was to evaluate critically the present problems associated with the current air carrier liability regime. The study primarily focused on determining the adequacy of the current liability regime and of proposed limits..."[50] From this study it was concluded the necessity of devising a legal system establishing the following:

- "provide a two-tier liability regime for recoverable compensatory damages in case of injury or death of passengers, comprising: (i) liability of the air carrier up to 100,000 SDR, irrespective of the carrier's fault; (ii) liability of the air carrier in excess of 100,000 SDR on the basis of negligence, the defense of contributory negligence of the passenger or claimant being available in both instances;

- include elements of the Warsaw Convention, The Hague, Guatemala City and Montreal Protocols as well as the Guadalajara Convention, to the extent that they are appropriate, give effects to, and are consistent with the foregoing."[51]

These legal principles were consolidated in a new instrument that promised to replace the outdated and fragmented Warsaw System; this was entitled as "The Convention for the Unification of Certain Rules for International Carriage by Air, done at Montreal, May 28, 1999.

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[50] J.C. Batra, "Modernization of the Warsaw System-Montreal 1999" (2000) 65 J. Air L. & Com. 429 [2000] (Lexis).

[51] *Diederiks, supra* note 4 at 12.

Liability of the carrier and extent of compensation for damage

Article 17

Death and injury of passengers - damage to baggage

"1. The carrier is liable for damage sustained in case of death or bodily injury of a passenger upon condition only that the accident which caused the death or injury took place on board the aircraft or in the course of any of the operations of embarking or disembarking."[52]

In discussing article 17 of the Montreal Convention of 1999, Diederiks-Verschoor explains that it has the same content as the Warsaw Convention and the textual changes do not appear to be substantive. Regarding the wording of this article and in concordance with the previous author, Thomas J Whalen says: "this language differs slightly from the language of Article 17 of the Warsaw Convention; the changes do not appear to be substantive."[53]

Article 20

Exoneration

"If the carrier proves that the damage was caused or contributed to by the negligence or other wrongful act or omission of the person claiming compensation, or the person from whom he or she derives his or her rights, the carrier shall be wholly or partly exonerated from its liability to the claimant to the extent that such negligence or wrongful act or omission caused or contributed to the damage. When by reason of death or injury of passenger compensation is claimed by a person other than the passenger, the carrier shall likewise be wholly or partly exonerated from its liability to the extent that it proves that the damage was caused or contributed to by the negligence or other wrongful act

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[52] *Convention for the Unification of Certain Rules for International Carriage by Air,* May 28 1999, online: Select Documents on International Affairs <http://www.austlii.edu.au/au/other/dfat/seldoc/1999/4713.html> [*Montreal*].

[53] *Whalen, supra* note 3 at 12.

or omission of that passenger. This Article applies to all the liability provisions in this Convention, including paragraph 1 of Article 21."[54]

This provision is not only applicable to that level above 100,000 SDR but also to the first tier of liability which does not exceed such amount. This defense remains available at all times under this Convention even though apparently this paragraph of article 21 clearly foresees that an air carrier shall not be able to exclude or limit its liability, but obviously this is an exception. "This Article preserves the carrier's defense of contributory negligence in the case of passenger, baggage and cargo claims."[55]

Article 21

Compensation in case of death or injury of passengers

"1. For damages arising under paragraph 1 of Article 17 not exceeding 100,000 Special Drawing Rights for each passenger, the carrier shall not be able to exclude or limit its liability.

2. The carrier shall not be liable for damages arising under paragraph 1 of Article 17 to the extent that they exceed for each passenger 100,000 Special Drawing Rights if the carrier proves that:

(a) such damage was not due to the negligence or other wrongful act or omission of the carrier or its servants or agents; or

(b) such damage was solely due to the negligence or other wrongful act or omission of a third party."[56]

This article foresees the defenses available to the air carrier. The carrier is the one who bears the burden of proof and must show evidence to prove that it took all necessary measures to avoid the damage or that it was impossible to do so. This is

[54] *Montreal, supra* note 52 at 62.
[55] *Whalen, supra* note 3 at 12.
[56] *Montreal, supra* note 52 at 62.

similar to the content of the article 20 of the Warsaw Convention but with new wording.

In an attempt to illustrate the content of article 21 we present the following table:

ARTICLE 21 OF MONTREAL CONVENTION OF 1999	
FIRST TIER: **AIR CARRIER IS STRICTLY LIABLE UP TO 100,000 SDR** **SECOND TIER:** **DEFENSE OF NON-NEGLIGENCE AND 3RD PARTY'S NEGLIGENCE AVAILABLE AFTER 100,000 SDR** **CONTRIBUTORY NEGLIGENCE AVAILABLE IN BOTH CASES**	**AIR CARRIER IS PRESUMPTIVELY LIABLE ABOVE 100,000 SDR** **DEFENSES AVAILABLE:** **ITS OWN "NON-NEGLIGENCE",** **THIRD PARTY'S NEGLIGENCE,** **OR,** **CONTRIBUTORY NEGLIGENCE OF THE INJURED PARTY**

The air carrier is at all times liable up to 100,000 SDR with the exception being the last paragraph of article 20. This same article foresees the defense of contributory negligence that can exonerate the air carrier partly or wholly. Above that amount the air carrier is subject to a rebuttable presumption of fault unless the carrier proves before the Court that he did not commit any wrong conduct or that the accident or damage was caused by a third party over which the carrier had no control.

It is said that the non-negligence proof is a difficult task to show, because in many occasions the causes of accidents are not fully established but merely probable causes of accidents can be attained and the standards of relevance that Courts would grant to such "probable cause" are still pending.

The carrier must prove that they were using a well-maintained aircraft and that the flight crew complied with all the procedures that they are normally required to follow in the operation. "Realistically, based upon historical data, plaintiffs likely will be able to point to *some* action which the pilot or the airline itself should have taken to avoid the accident. The practical result likely will be that most Montreal

Convention litigation will result in the unlimited liability of the airline and the only dispute will be the amount of damages."[57]

The Montreal Convention also foresees in article 23 a periodical review of the limits of liability as well as the possibility of implementing a special contract by which the parties agree to a higher limit of liability or no limitation at all. Payments to the victims of an accident are set forth in advance. This Convention also contemplates the combined carriage of the contracting and actual carrier, in which servants or agents of one or the other carrier can avail themselves of the limits of liability.

Article 29

Basis of claims

> "In the carriage of passengers, baggage and cargo, any action for damages, however founded, whether under this Convention or in contract or in tort or otherwise, can only be brought subject to the conditions and such limits of liability as are set out in this Convention without prejudice to the question as to who are the persons who have the right to bring suit and what are their respective rights. In any such action, punitive, exemplary or any other non-compensatory damages shall not be recoverable."[58]

Mr. Whalen says that "The battle ground here will be what constitutes non-compensatory damages?"[59] He makes this statement due to the fact that it is widely accepted that the Warsaw Convention does not allow the awarding of other than compensatory damages. This would mean that punitive and all other genres of damages cannot be recovered by the victims. However the Montreal Convention the vague term "non-compensatory damages", which in the opinion of Mr. Whalen may leave the door open to different interpretations of the exact meaning and scope of the term. This possibility, added to the third paragraph of the preamble of this

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[57] *Whalen, supra* note 3 at 12.
[58] *Montreal, supra* note 52 at 62.
[59] *Whalen, supra* note 3 at 12.

Convention that points out the notion of restitution as a relevant principle in Montreal 1999, this principle goes farther than the mere notion of compensation. Last but not least, the inclusion of the term "or otherwise" also leaves the door open to attempt to base claims on domestic law instead of using the Convention as the exclusive legal basis for claims arising from international air transport. By using other legal recourses, a fundamental principle of the Warsaw System would be violated. If the Montreal Convention allows this it would go against the traditional principle of compensation that has characterized the Warsaw Convention. Thomas Whalen argues that article 29, which is the same as article 24 of the Warsaw Convention, contradicts a fundamental principle of US jurisprudence settled by the Supreme Court of that country in the case *El Al Israel Airlines v. Tseng*, 525 U.S. 155 (1999), which consists in making the Warsaw Convention the exclusive basis to file claims arising out of international transportation.

Article 30

Servants, agents - aggregation of claims

> "1. If an action is brought against a servant or agent of the carrier arising out of damage to which the Convention relates, such servant or agent, if they prove that they acted within the scope of their employment, shall be entitled to avail themselves of the conditions and limits of liability which the carrier itself is entitled to invoke under this Convention.
>
> 2. The aggregate of the amounts recoverable from the carrier, its servants and agents, in that case, shall not exceed the said limits"[60]

It is possible that a claimant decides to sue not only the carrier, but additionally an agent or servant of the company because of the injuries suffered by the aviation accident. In these cases the Convention foresees a protection of the servants of the air carrier, and these employees can take advantage of this principle which limits the amounts up to which they might be liable to compensate the injured party. Sometimes

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[60] *Montreal, supra* note 52 at 62.

the claimants intend to obtain larger amounts that those foreseen in the Convention by suing the agents or servants, but this principle prevents claimants from obtaining higher limits of compensation than those strictly foreseen under the Convention. Regarding the text of this article, Mr. Thomas Whalen opines that "A far better formulation, in the interest of airline safety, would have been a provision whereby the pilots and employees of the carrier cannot be liable at all, so long as they acted within the scope of their employment."[61]

In sum, the Montreal Convention of 1999 adds the following elements:

- Strict liability up to 100,000 SDR;
- Rebuttable presumption of fault above that limit;
- Advance payments to victims of accidents under Article 17;
- Passengers can file claims according to the law of their domicile;
- Simplification of documentation related to passengers, as well as cargo;
- Introduces the possibility to use arbitration procedures in relation to cargo

The Montreal Convention of 1999 has received criticism as to the maintenance of limits of ceilings of liability to which many specialists and especially the United States are historically opposed to; however there is a general consensus in the sense that this Convention represents a significant step to modernization and unification of the Warsaw System. We still have to wait until this Convention is ratified by thirty states to observe its application and its evolution, then its merits or shortcomings will surely arise.

[61] *Whalen, supra* note 3 at 12.

Warsaw System and Product Liability

We saw that the Warsaw System is a body of international private air law instruments establishing principles that regulate air carrier liability arising from injuries or death caused to passengers, as well as damage caused to cargo, baggage or mail. The Warsaw System had its specific purpose and its goal consisted in offering protection to an infant industry when it had just started to operate. Today the aims have shifted and the environment is a different one and the emphasis is more focused on the protection of the air traveler and unification of private air law rules.

The Warsaw System basically regulates the role of the two primary participants in air transportation, airlines as a corporate body and passengers. It emphasizes the aftermath of an accident as to how and when the compensation shall be made to the victims of such an unfortunate occurrence.

The Warsaw System is an important topic in aviation accident law, but it is not the only one. This system of law does not make any reference to the previous scenario behind an accident and its different consequences that also run parallel to the Warsaw System applicability. We are referring to the corresponding bodies of law making up a given domestic system that regulates the manufacturing of aircrafts and their systems as well as the liability attached to such making. This regime of liability is not included in the Warsaw System, since this system of private law excludes manufacturers and foresees only air carriers involved in international transportation. The airline as we already discussed can be found guilty of wilful misconduct or recklessness in conducting its flight operations, but to what extent are the airlines and its agents or servants truly responsible and thus liable for air accidents? Wilful misconduct can be triggered by other factors that are not always under the control of airlines regardless of the best training provided to its crews. These factors do not fall into the scope of the before mentioned Conventions and may lead to the non liability of the air carrier, but rather to liability of third parties, specifically manufacturers covered by domestic law.

The cause of the accident can be originated not only by a plain breach of duties on the part of the agents or servants of the air carrier but also can be influenced by cockpit automation or in a different scenario by a defective aircraft system considered a vital component for the safety of flight. Then we face two different scenarios, one related to negligence induced by cockpit automation and another in which the conduct of the pilot is not involved, for example defective product cases.

Technology is changing daily and along with it the factors surrounding an accident are evolving and deserve new and different approaches both technically and legally speaking. However, we consider that in order to establish a coherent explanation, before entering into the topic of Product Liability, we have to look first into the analysis of automation as a contributory factor to air accidents, which we will discuss in the following chapter.

CHAPTER II

Growing automation environment and accidents where automation is a contributory factor

Definition of automation

"Automation is the allocation of functions to machines that would otherwise be allocated to humans. Flight deck automation, therefore, consists of machines on the commercial transport aircraft flight deck, which perform functions otherwise performed by pilots. Current flight deck automation includes autopilots, flight management systems, electronic flight instrument systems, and warning and alerting systems. Flight deck automation has generally been well received by pilots and the aviation industry and accident rates for advanced technology aircraft are generally lower than those of comparable conventional aircraft"[62]

Automation is already a reality; several human tasks that used to be manually performed now are executed through highly sophisticated technology with diminished human intervention. This advance in technology has reached many fields of the human development including the air industry, and specifically the air commercial transportation, added to the fact that this industry is a dynamic subsector that is changing daily by incorporating new technologies to improve the quality and safety of its services. The phenomenon of automation means machines doing increasingly more and humans significantly less. Under the traditional procedures commercial aviators use dials, knobs and papers, now the cockpits are becoming paperless, as in the case of the Australian airline "Qantas", and the charts can be stored in digital formats introduced in onboard computers.

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[62] Federal Aviation Administration, "Flight Deck Automation Issues," online: Flight Deck Automation Issues <http://flightdeck.ie.orst.edu/FDAI/issues.html> [*Flight Deck*].

"The world has changed significantly for air travelers in the 1990s. New generation aircraft, such as the Airbus A319/320/321/330/340 series and the Boeing B777 are now in service. These aircraft are 'fly-by-wire'[63]; their primary flight control is achieved through computers. The basic maneuvering commands which a pilot gives to one of these aircraft through the flight controls are transformed into a series of inputs to a computer, which calculates how the physical flight controls shall be displaced to achieve a maneuver..."[64]

The implementation of these new technologies brings to our discussion the interaction between human factors and automation. The advanced systems of air navigation have as a main objective to make the tasks of pilots easier by enabling them to execute all procedures involved in the aircraft operation with more precision and safety. However, there have been cases in which the combination of human factor plus automation has not produced the expected results and such circumstance has even been recognized as a contributory factor to air accidents. In some of these cases the high level of automation has adversely affected the pilot's performance.

From the air accidents summaries that will be described in the subsequent paragraphs and from the technical reports made by the investigating authorities, it has been well concluded and documented that flight crews have a tendency to over-rely on automated systems of air navigation. The risk of this over-confidence on aircraft automation is that it can evolve into negligence characterized as wilful misconduct when pilots place the aircraft in abnormal conditions to which the inboard computers were not designed nor programmed to operate or even pilots have not been properly trained. It is precisely through this process that negligence comes into play and is amongst the most frequent causes of air accidents, in short, negligence arising from a wrongful interaction between man and machine can be legally characterized as result in recklessness or wilful misconduct.

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[63] The concept *fly-by-wire* means the replacement of the physical link between the pilot's flight controls, the controls that make the aircraft go up and down and turn left or right - with an electronic link through a computer.

[64] Peter B. Ladkin, "*Abstracts of References and Incidents*" online: University of Bielefeld Faculty of Technology <http://www.rvs.uni-bielefeld.de/publications/Incidents/DOCS/FBW.html#Introduction>.

In the cases that will be discussed later on, we would like to concentrate on the technical aspects of automation as a correlated factor leading to airline pilot's negligence or wilful misconduct and hence to air carrier liability. The purpose of including these types of cases is to try to reach a conclusion as to whether the new automated air navigation technologies could be an inductive factor for pilots to fall into negligence and if so, to what extent. On the other hand, someone might well conclude that automation is not a contributory factor for wilful misconduct but just another technology that at the end of the day will not increase the risks of the operation, would reduce the safety margins and along with it, increase the insurance premiums and the risk of incurring liability, creating a major problem from the legal and economical point of view.

Free Flight: Definition and Status

The most current and palpable evidence of the growing automation environment is the free flight system, which is in its first stages of implementation and will be eventually coupled with the most advanced systems of air navigation on board aircrafts throughout the world.

The Radio Technical Commission for Aeronautics, which is a committee appointed in 1994 by the Federal Aviation Administration in the United States with the task of developing "navigation, control and communications standards" defines free flight as "A safe and efficient flight operating capability under instrument flight rules in which the operators have the freedom to select their path and speed in real time. Air traffic restrictions are only imposed to ensure separation, to preclude exceeding airport capacity, to prevent unauthorized flight through special use airspace, and to ensure safety of flight."[65] In other words this is a new concept of flying based on the already existing instrument flight rules but improved with the newest technology in the field of telecommunication. This is a system that offers airline and general aviation pilots more freedom for flying with much fewer constraints imposed by air traffic controllers.

To understand the particularities of this new system we will attempt to explain first how the current system of air navigation and air traffic control works. For this, we must remember first that there are two basic methods of conducting a flight, through visual or instrument rules. The free flight is based on the second method. The infrastructure in operation nowadays allows aircrafts to navigate under instrument flight rules from point "A" to point "B" with the use of ground based radio navigation aids. These radio stations are called VORs (Very High Frequency Omnidirectional Range). These stations radiate beams at 360° that are captured by the onboard units installed in aircrafts, which interpret the signal as heading and position in relation to the station facility that emits the signals. This method allows pilots to navigate from one station to another but always limited to a range of 130 nautical miles and constrained by ground obstacles and meteorological conditions.

In order to follow a route, airplanes usually fly from one point to another subject to the geographical location of such navigational aids. This method of flying is called dead-reckoning or "point to point". The paths that connect these "navaids" are the routes in the sky followed by airplanes, which are called "airways". The utilization of these "highways in the air" must be filed and authorized by an air traffic control agency before the flight commences, any subsequent departures from that clearance must be again notified and approved. "The air traffic controllers on the ground actually have the last word on every aspect of a plane's flight, such as when the plane takes off, at what altitude it flies, what speed the plane travels, if and when turns are made, and when and from what direction to land."[66] This system of air traffic control according to many experts is very constraining for the efficient and quick flow of air traffic and represent an impediment for airlines to save fuel and other operative expenses.

Under free flight, pilots are allowed to fly when they want to and where they want to, which is just the opposite of the current way of flying. The pilot or carrier dispatcher will be able to choose the airway, speed, and altitude most convenient for

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[65] Allison K. Lawter, "Free flight or free fall" (1997) 62 J. Air L. & Com. 915, [2000] (Lexis) [*Allison*].
[66] *Ibid.*

their plans. "The pilot's flexibility will be restricted only: (1) to ensure separation; (2) when traffic density at busy airports or in congested airspace precludes free flight; (3) to prevent unauthorized entry into special use airspace; and (4) to ensure safety of flight."[67]

This system is based on the idea that aircrafts in flight are encircled in two airspace zones. We can understand these two zones as enormous double layer "bubbles" surrounding an aircraft in the sky. The closest to the airplane itself would be the "protected" zone; this area should never enter into contact with another's aircraft protected zone. The second and larger bubble that goes beyond the former is the "alert" zone; when this "second bubble" overlaps another's alert zone, it activates a system that warns the pilot and the air traffic management agency in the ground about the proximity of another aircraft in order to assess the situation and to take immediate action for avoiding a collision. Under free flight the separation between aircrafts in the air is vertically and horizontally reduced, which allegedly will create more usable space and will help to prevent the congestion of mainly en-route traffic.

This system is characterized by its high level of innovation and represents a further step toward flight automation. As it may seem obvious, there will be a new set of technological components that will be implemented for the utilization of this system. Airspace users and air traffic "managers" will rely on advanced technology such as:

- Global Positioning System (GPS);
- Wide Area Augmentation System (WAAS); Augments accuracy of earth positioning in certain areas;
- Traffic Alert and Collision Avoidance System (TCAS). It is already in use, it alerts the existence of air traffic in the vicinity of an aircraft while in flight;

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[67] U. S., Federal Aviation Administration, *Free Flight: An Introduction,* online: <http://www.faa.gov/apa/publicat/freeflgt.htm> [*Free Flight*].

- Two-way data link (TWDL), and Automatic Dependent Surveillance-Broadcast (ADS-B). These two components integrate a system that is used to exchange data between air traffic management and the aircraft, such as "identification, time, position, velocity and other time sensitive surveillance information".[68]

Definitely the most important and central technology used in free flight is the Global Positioning System or "GPS". The GPS is a "worldwide radio-navigation system formed from a constellation of 24 satellites and their ground stations [...] [that] use satellites in space as reference points for locations here on earth."[69] This technology calculates and determines the exact position on earth with an astounding accuracy of meters and even centimeters in an advanced version. The Department of Defense of the United Sates, who is the owner and service provider of the whole system, offers two types of GPS services, the extremely accurate "precise positioning service" and the "standard positioning service." This last service is the one available to civil use with an augmented version in certain cases.

In this respect, it is extremely important to point out the relevance of the communication reliability between air traffic management and the users, therefore data link system between ground and air shall be an important issue since depends upon it to a great extent the orderly progress of the whole system.

"... [T]he transition to free flight is inevitable in light of the aging ATC infrastructure and airline cost management."[70] Since 1990, this flight program has been gradually implemented in the US. It started by allowing aircrafts flying above 39,000 feet above mean sea level and 200 miles away between the point of departure and arrival to file the flight plans they choose; and some time after, this level was reduced to 35,000. The first Free Flight Phase I has already been implemented in certain areas of the United States and currently numerous tests to assess system

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[68] Bill Elder, "Free Flight: The Future of Air Transportation entering the Twenty-first century" (1997) 62 J. Air L. & Com. 871 (Lexis).
[69] Trimble, "All about GPS" (2002), online: Trimble <www.trimble.com/gps/why.html>
[70] R. Colin Keel and Kyle B. Levine, "US Airlines on Course for Free Flight" (1997) 62 J. Air L. & Com. 675 (Lexis).

performance are being carried out. The operational benefits, acceptability and safety are being carried out by NASA and other European research agencies. The Phase 2 will be applied to a wider geographic zone and its full operation will take place on December 2005.

The application of Free Flight shall also have important economic repercussions. Airlines will be able to plan their flights more efficiently and they will have the opportunity to save time and fuel, potentially millions of dollars, with which there should also be a benefit for travelers and the industry itself.

We believe Free Flight will definitely change the current way of flying. Although some concepts of this air navigation method are already in use, this innovative system would completely replace the current procedures with which the aviation community has been familiar since the fifties. A critical view of this development follows. Allison K. Lawter says that "people can become too dependent on technology...," and continues by saying that "...some argue too much emphasis is being placed on new technology without properly addressing free flight's effects on human performance. Without doubt, there is still much work to be done in this area."[71] To support her statement she cites Dr. Earl L. Weiner, expert in pilot performance at the University of Miami, who poses the following question: "what happens when the automation fails? A collision is coming between very inexperienced pilots and very sophisticated aircraft".

Even the general public, which very often is not aware of the intricate technical procedures of operating an aircraft, more or less knows that a pilot flies with the constant aid of traffic controllers who communicate with the flight crew through voice messages. That also might become a thing of the past; in the near future it is planned that electronic data-link systems will substitute the voice communication and will be interpreted by the computers on board and not by the pilot, who in the opinion of experts, is still limited by language barriers and subject to correct interpretations by the "human recipient".

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[71] *Allison, supra* note 65 at 73.

As we already mentioned, we believe that the implementation of this system will change the perspective of the pilots. Under Free Flight they will have to be more familiarized and more alert than before in respect to the traffic that surrounds their flight. Its concentration will not be exclusively devoted toward the systems to fly the aircraft but they will bear the additional burden of a new task within the cockpit that used to be the responsibility of the air traffic controllers.

Impact of the free flight on the responsibility of the pilot-in-command

Several aviation experts say that free flight is not much different from the current system, and we agree to a certain extent. One of them, Bill Elder, who is a commercial pilot himself and an aviation lawyer in Washington D.C., argues that the responsibility of traffic separation will shift from the ATC to the pilot, but "the basic accountability concepts underlying the distribution of responsibility will not be altered". He says that we already have the concept of "see and avoid" as well as the TCAS, (traffic alert and anti-collision avoidance system) which leads to the conclusion that the changes will be only a matter of degree but not substantial.

Kathleen McChesney Goodman, a professional pilot and associate in a legal firm established in Dallas, Texas; says that "ATC will only interfere if a conflict develops" and "pilots and controllers must share responsibility."[72] She adds that "free flight transfers additional responsibility to the pilot." She points out that "...pilots operating under free flight will have greater responsibility for traffic separation [...] air traffic controllers will, to some extent, become air traffic managers." She maintains that the liability regime that should prevail in this field is the concurrent responsibility between air traffic control and pilots, and not only to the pilots according to the current approach. She concludes by saying "Courts considering accidents which occur under free flight should apply a similar analysis rather than revert to the traditional PIC rule (Pilot in Command) [...] courts should abandon the outdated PIC concept in aviation tort litigation generally; most certainly should not extend it to the uncharted skies of free flight."

Allison K. Lawter reminds us that the international trend since the Chicago Convention of 1944 and up to this day has been to place full responsibility on the pilot in command for the operation of the aircraft. This concept was set forth in this international multilateral treaty and subsequently has spread to the domestic regulations of the contracting states, creating a universal criterion that sets the principles of responsibility on this legal figure.

In her article, mentioned in previous pages, Lawter holds a skeptical position by concluding that "the success or failure of free flight cannot be fully realized until free flight is fully implemented some ten to twenty years down the road." The Swiss consultant Francis Schubert in his illustrative lecture entitled "Free Flight and ATM liability"[73] offered during winter 2001 at the Institute of Air and Space Law at McGill University, concluded his talk in the following way: "The 'see and avoid' principle and the 'pilot-in-command' rule need not be trashed as such, but need to be applied in ways which reflect the reality of today's commercial aviation. These ways will probably increasingly conclude that under the circumstances of future accidents, it is unrealistic to expect the pilot to have full visual traffic situation awareness." Mr. Gonzalo Fernandez Castro, a professional commercial pilot who works as a first officer in an Airbus A320 for "*Mexicana*" (a major Mexican airline), is in favor of the implementation of this new technology "as long as clear rules are established."

As can be seen from previous paragraphs, there are numerous opinions and conclusions. Some predict that there will be no change, others believe there will be changes only to a small degree and the rest are cautious to offer any conclusive argument. In our opinion, we perceive a modification in the responsibility of the pilot-in-command. The airline pilot is going to acquire new responsibilities that were left behind in the years when the first aviators flew visually on biplanes carrying mail. The pilots will in some way reassume tasks such as being responsible for air traffic, just as they used to do back then. We maintain that there is a high probability of

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[72] Kathleen McChesney Goodman, "Free Flight and the Pilot-in-Command Concept: A recipe for Disaster?" (1997) 62 J. Air L & Com. 653 (Lexis).

[73] Francis Schubert, "Free Flight and ATM liability" (Air Law Lecture, IASL McGill University, Winter 2002) Published in a printed excerpt.

witnessing an increasing tendency in Court decisions that find air carriers liable for wilful misconduct in air accident cases when this project is fully implemented.

This change would be caused by the transfer of new duties and responsibilities from ground to air, from the air traffic controllers to the flight crew. Certainly there will be new technology to assimilate and a period to get used to it.

According to the new scheme, the tasks of the pilot will not only be flying the aircraft but also being aware of the external traffic that may involve a risk of collision. It is true that the pilot already has the duty of being alert of the warnings issued by the anti-collision system which involves the surrounding traffic; nevertheless he would have to keep wider and more significant surveillance of the traffic in the contiguous airspace and take the corresponding actions. This surveillance function had been placed on the air traffic controllers, but in the future it will be performed by the pilots.

In any case, it is evident that new duties will be added to the multiple tasks of the flight crew. As the operation of this system spreads to in different jurisdictions, commencing in the US, we will be able to avert the prevalent trends in the interpretations rendered by courts. We particularly agree with the author Kathleen McChesney Goodman in the sense that we can observe that the interaction between the air traffic controller and the airspace users has been one of close cooperation. The role of ATC has always facilitated the safe performance of flights by issuing directions related to the heading, altitude and speed. On the other hand, it is evident that the team directly responsible for the flight is the crew, since they have the "controls at hand" and they know all the on-board systems to properly operate the aircraft. This suggests that the air transportation is conducted by a duet of technical experts in different fields and responsible to different degrees but with a common objective. They form together a binomial that today is still inherent to the idea of flying, the pilot and the air traffic controller. That is why we believe that there should be a modification from the roots as to how we are going to perceive and comprehend the role of each one of these professionals in the aviation industry. Because of their closely related duties and functions, and as a consequence their concomitant

responsibilities, the liability should then be considered concurrently and proportionately shared between pilots and controllers depending on every particular case.

The role of the liability of the manufacturer for potential failures of the sub-systems of the free flight infrastructure follow the basic principles contained in other sections of this work, mainly product liability. However, this subject would deserve a separate and deeper study since we should start by making a distinction between free flight users and the service provider. In the case of GPS, the signal provider is the US Government and the user is the whole world. Regarding this issue, it has been stated by the European Commission that working out the future liability system for the Global Navigation Satellite System as an international structure, is simply not feasible up to this time, but it can be sustained that under the current technologies the principles of sharing and concurrent liability between the diverse domestic entities participating in free flight such as the GPS primary signal provider, the augmentation system operator, "non-provider states", air traffic control agencies, air carriers, aircraft operators and equipment manufacturers will prevail and play a fundamental role in the future systems of air navigation.

Accidents related to automation

Air France Exhibition Flight

On June 26th, 1988, the magnificent shining white airbus A320 was performing a low pass over the runway of the airport of the town Habsheim near Mulhouse, France. The pilot had planned two maneuvers over the airfield; one at low speed with flaps extended landing gear down at a height of 100 ft above the runway; and the second on clean configuration. In the first pass they reached 100ft, the radio altimeter emitted a "100 ft." aural message; nevertheless they continued their descent nearly 50 ft and even 30-35 ft above the runway. At this point the pilot kept that altitude with the engines idle and its pitch attitude (angle of the nose) slightly increased. Seconds later the pilot attempted to start a go-around manoeuvre by accelerating the airplane's speed but a few seconds later the aircraft touched the tree-tips at the end of the runway and caught fire.

This case is very interesting because apparently the pilots fully relied upon the automated response from the on board systems. In this case the "auto throttle" system was not programmed to discriminate between normal and that specific abnormal condition (the low passes). From the report, our understanding is that the system of the A320 was designed to automatically activate a "go around" in certain and given conditions of speed, altitude and angle of attack (angle of the nose). We must remember that a "go-around" is carried out when a pilot decides for safety reasons during the landing phase not to land the aircraft and executes a sudden climb and returns to being airborne. In this accident, the pilot tried to activate a go around in unusual conditions such as higher angle of attack, less speed and a very low altitude. These conditions were the reasons for which the computer "thought" that the aircraft was actually landing instead of taking off; that is why it was "illogical" and "unsafe" for the computer to activate a go-around by itself while the aircraft was actually being landed by the pilot. This caused a struggle between a pilot wanting to lift his airplane and a computer that had "decided" to land the aircraft, and as we can see from the ending of this sad story, the computer prevailed.

To accomplish his intended task, experts argue that the pilot should have kept the aircraft at 100 feet and not lower, in order to rely on the automated activation of the auto-throttle system which was supposed to take the aircraft back to air; however, after 30 seconds of flying in landing configuration, the landing mode becomes permanently engaged and the auto acceleration system never came on again. By the time the pilot realized his circumstances and attempted to go up it was too late. As in any accident, the fatalities are caused by a chain of errors. In this case apparently the first human error consisted in the pilot taking the aircraft lower than he should, which induced the automated system to deactivate any possible attempt to take off or climb again, once the system was in this mode then the conflict human-machine started. Michel Asselin, pilot in command of the Air France aircraft stated in a press conference "*Je pousse la manette des gaz et puis j'attends. Qu'est-ce qui se passe? Rien! Je n'ai pas de moteur*"[74], He said that he pushed forward the throttle handle but it did not respond, he concluded that it was a technical failure, however he was condemned in France to prison for 20 months for negligence. In the preliminary report carried out by the French aviation authorities can be read what follows:

Ont également contribué à l'accident l'impossibilité pour l'équipage d'identifier le mode dans lequel le pilote automatique s'est placé et la confiance de l'équipage dans les réactions prévisionnelles de l'avion.

In an official accident report[75] can be read "Automation may work well under normal conditions but, due to design limitations, not have the desired behavior under unusual conditions, such as those close to the margins of its operating envelope. This can lead to unsafe conditions."

In this case there is an evident technical conflict between the machine and the human. This technical conflict can lead to liability issues. The result of an accident investigation may allow to conclude more precisely the real cause of the accident and the extent to which every factor contributed to the occurrence. On many occasions

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[74] Maurice, "*Le procès du crash de l'Airbus A- 320 à Habsheim débute à Colmar*" *Le Monde* (23 November 1996) (Lexis).
[75] *Flight Deck, supra* note 62 at 70.

pilots face complex circumstances while flying that require a prompt decision. In the middle of those circumstances the automated systems may issue an apparent or real response that would contradict the human action, thus a conflict arises. Depending on every particular case it would be necessary to find out the technical status and the human response at the time of the incident or accident in order to identify the degree of intervention and influence of these two parties for the unfortunate consequence. It may then result in liability for the manufacturer in the case that it produced a defective system incapable of predicting certain operative conditions, or even for the air carrier due to lack of training that caused negligence in the crew, affecting the overall safety of the flight.

American Airlines Flight 965

The case *Cortes v. American* Airlines[76] was originally filed in a District Court in the State of Florida and later was brought to the United States Court of Appeals in the Eleventh Circuit. It was based on the accident that took place on December 20th, 1995 near Cali, Colombia.

On December 20, 1995 American Airlines flight 965 took off from Miami International Airport bound for Cali, Colombia; and crashed near its destination. This type of aircraft was equipped with a flight management computer in which the pilot can insert all the waypoints to follow from its origin through its final destination. In this case, the approach chart has four waypoints depicted to get to Cali airport, from north to south, which are:

- Tulua VOR station (43 miles north of the Cali VOR, not lower than 15,000 feet)
- Fix point known as "D21 CLO," (21 miles north of the Cali VOR, 5,000 feet)
- Rozo NDB (12 miles to the north of the Cali VOR, 3900 feet)

[76] *Cortes v. American Airlines,* [1999] U.S. App. LEXIS 13191 (Lexis) [*Cortes*].

- Cali (VOR 9 miles south of the airport, 3,100 feet)

The runway on which the aircraft was to land was number 1 (adding one zero means heading 10° north) if approached from the south, and 19 (190° south) when approached from the north. The copilot of this flight had never before flown to Cali, but despite that, the day of the accident he was flying the airplane and the Captain was handling radio-communications. The company American Airlines issued a "Pilot Reference Guide for Latin America" in which flight crews were strongly warned never to fully trust the air traffic controllers in South America.

American pilots are taught that the air traffic controllers in South America will issue clearances to descend in the middle of mountainous terrain and controllers assume that pilots precisely know where they are flying and their exact position, altitude, speed, heading and all possible ground obstructions. The flight crews have the duty of verifying the reliability of the clearances they receive by comparing them against those proceedings depicted on the pertinent navigational charts. American Airlines highlights this by stating in their manuals: "Know where you are: know where you are going: and know how to get there." They add: "It is totally the pilot's responsibility to avoid terrain." "If there is any question as to position, do not descend."

Air Traffic Control cleared Flight 965 to the Cali VOR by saying, "descend and maintain [15,000] feet" and told them to "report Tulua VOR." The Captain questioned ATC that he had understood that the flight was "cleared direct to Cali VOR", ATC responded by saying "Affirmative," then the Captain programmed the Flight Management Computer to fly the aircraft directly to Cali.

Here is where the errors began to occur. The controller authorized to fly "directly" to the Cali VOR, in Latin America the use of the term "fly directly to" means "go directly through the published route", which means to fly the route just as it is shown in the charts. In North America this term is understood as "go directly through the non-published route". This clearance, in the mind of the pilot, authorized him to head the airplane to the VOR at discretion, which means that the pilot can

follow the route he chooses straight to the radio station without the burden of exactly flying the published route. According to this clearance the pilot programmed the computer to fly directly to Cali according to the North American interpretation and not to the Latin American conception of the air traffic controller, which was the first wrongful act.

On the arrival chart to Cali, Colombia, can be seen at the top the "Tulua" station and at the bottom "Cali" station. Without entering into unnecessary details as to the interpretation of such chart, we will mention that a flight crew wishing to land at the "Alfonso Bonilla Aragon" airport in Cali, Colombia; must comply with this official arrival procedure and check first on "Tulua", then fly to the report point called "D21 CLO." From there it must turn left southward on 193° heading until reaching the beacon called "Rozo". From "Rozo" a pilot would have two alternatives depending on air traffic control advisories; he can fly straight to runway 19, or follow the official procedure which consists of continuing flying to "Cali" station, making a U-like turn and landing on runway 1.

In this case the flight was offered the alternative of not flying over the Cali VOR but landing directly after passing over "Rozo", however he was still requested to report over "Tulua", which evidently –apparently only in the mind of the Colombian air traffic controller meant that the flight 965 should have complied with the published arrival procedure. After that, the Captain requested to fly "direct to Rozo," he was cleared and requested once more to report over Tulua at 5,000 feet.

Then, one of the pilots tried to program the Flight Management Computer to fly automatically to the Rozo NDB by typing the letter "R," which he apparently thought was the identifier for Rozo. A total of twelve waypoints appeared on the screen of the CPU; the first of these was a beacon known as "Romeo", located approximately 132 miles to the northeast of the aircraft's position. It was the identifier for this waypoint that the pilot executed, sending the aircraft on a prolonged and pronounced turn to the left, towards the east and the mountains. They did not verify if the chosen waypoint was actually Rozo and whether the runway change was suitable.

It is suggested that once Rozo was tuned, the radio's navigation needle would have been pointing toward the right rather than basically straight ahead, which is perfectly consistent with the aircraft's ongoing turn to the left and wholly inconsistent with the published route. They turned manually to "Tulua," and by that time they were far from the published route while had also been descending. In those brief minutes ATC requested altitude and then the aircraft crashed ten miles east of the airway. The aircraft hit close to the summit of "El Deluvio", one of the peaks lining the east side of the valley. Seconds before the impact the alarm in the cockpit alerted them of the proximity of terrain and then they tried to climb the airplane but it was ineffective, because the speed brakes that were deployed several minutes earlier had not been pulled back.

The lower Court concluded in this case that the passengers can establish wilful misconduct "by showing that the defendant's conduct amounted to an extreme deviation from the standard of care under circumstances where the danger of likely harm was plain and obvious [...] even if the defendant did not subjectively realize that its conduct placed its passengers at significant risk of harm"[77]

The District Court applied the "wilful misconduct test" used by the Eleventh Circuit in *Butler,* which requires the realization of one of three alternatives for wilful misconduct to take place:

- Intentional performance of an act knowing that the act likely would result in injury or damage;
- An action taken with "reckless disregard" of the consequences; or
- A deliberate failure to discharge a duty necessary to safety.

The flight crew of American Airlines flight 965 was allegedly engaged in a chain of errors that led them to an unfortunate fatal accident. They apparently were not adequately familiar with their navigation charts and forgot the instructions contained in their operations manual; they complied with doubtful and obscure traffic control

[77] *Cortes, supra* note 76 at 83.

directives without hesitation; the accuracy of a critical waypoint for the procedure was neither verified nor confirmed; the heading and altitude were not permanently monitored. These errors were basically occurred because the pilots did not follow the standards of care contained in the regulations and operation manuals. The District Court was of the opinion that applying a rigorous objective analysis led to the conclusion that the conduct of the flight crew amounted to nothing less than wilful misconduct.

Automation

"The accident airplane, a B-757, is one of the first automated "glass cockpit" types of transport aircraft introduced into the commercial aviation fleet in recent years. [...] These automated airplanes employ computers, known as FMSs (Flight Management System). The FMS is considered highly reliable; it can also exercise almost complete flight path control through pilot inputs."[78]

From the transcriptions extracted from the Cockpit Voice Recorder the following dialogue took place between the pilots of AA965:

The first officer asked, "Uh, where are we?"

9 seconds later asked, "Where [are] we headed?"

The captain responded, "I don't know ... what happened here?"

It was further established that the first automation-related error by the flight crew, the selection of Romeo instead of Rozo, was a simple one. The Flight Management System unit had identified all the closest radio stations in the vicinity of the aircraft, and at the top of the list displayed by the computer was the identifier "R", which according to the information provided to the pilots by the chart distributor stands for Rozo, but in the computer database stood for Romeo, which is a radio station near Bogotá, Colombia; and not Rozo near Cali, Colombia; in order to enter Rozo station, he should have entered the four letters of the identifier R-o-z-o". As can

[78] Peter B. Ladkin, "*AA 965 Cali Accident Report*" online: University of Bielefeld Faculty of Technology <http://www.rvs.uni-bielefeld.de/publications/Incidents/DOCS/ComAndRep/Cali/calirep.html>.

be deduced, the information and data furnished to the crew was certainly misleading, and this was an additional link in the chain of errors. "The investigation determined that because of rules governing the structure of the FMS data-base, Rozo, despite its prominent display as "R" on the approach chart, was not available for selection as "R" from the FMS, but only by its full name. The evidence indicates that this information was not known by the flight crew of AA965."[79]

It is important to note that the *Dirección de Aeronáutica Civil* of Colombia (Direction of Civil Aviation) inserted as items 3 and 4 in its final investigation report as contributory causes the following statements:

"**3**. FMS logic that dropped all intermediate fixes from the display(s) in the event of execution of a direct routing. "

"**4**. FMS-generated navigational information that used a different naming convention from that published in navigational charts"

According to our interpretation, the failure reduces itself to the two following ones. First, the computer should not have been programmed to discriminate which fixes the crew may need or not. Second there should not have been discrepancy between the information depicted in printed charts and the corresponding contained in the electronic database. They both should always be the exactly the same.

As recommendation number 2, the same aviation authority stated:

"Evaluate all FMS-equipped aircraft and, where necessary, require manufacturers to modify the FMS logic to retain those fixes between the airplane's position and one the airplane is proceeding towards, following the execution of a command to the FMS to proceed direct to a fix."[80]

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[79] *Ibid.*
[80] *Ibid.*

Pilots may over-rely on automation

"the history of flight indicates that the AA965 flight crew did not effectively use all navigation information that was available to them and that they relied almost exclusively on their EHSI for navigation."[81]

The characteristics of this accident allow us to identify distinct contributory factors in an air accident that may also have distinct legal consequences. The pilot and the actions assumed towards the automated systems will lead to the necessity of imposing liability to one or the other. There is an undeniable tendency of making the air carrier through the pilot's actions responsible for the entirety of the accident. However, investigations should be more cautious and take into account the human machine interface as an important factor to analyze. This interface is not always human-centered. Investigations do not consider the probable human lack of awareness about unexpected responses from the system. The environment is now different than the one prevailing when all the current legal instruments were enacted, thus they should be adjusted and modernized according to the current technologies.

[81] *Ibid.*

Lufthansa Airlines Flight 2904

On the 14th of September 1993, an Airbus A320-211, serial number 105 with the nationality marks D-AIPN operated by Deutsche Lufthansa as flight DLH 2904, with the route Frankfurt-Barcelona-Frankfurt-Warsaw-Frankfurt, progressed normally until Warsaw Control Tower warned the crew that wind shear[82] existed on the approach to Runway 11. According to their flight manual instructions, they landed at an increased speed and with this speed touched down on Runway 11 in Okecie aerodrome.

In this case, the airplane landed with a lighter than usual touch on the runway surface due to the fact that the aircraft had to apply more speed because of the presence of wind shear, as well as a strong tailwind and a layer of water on the runway. All of these factors resulted in a complicated landing where the two main landing gears did not touch the runway at the same time. These circumstances caused the left landing gear to touch the ground 9 seconds after the right gear. Hence the left wheels did not exert enough compression against the runway surface during those 9 seconds. This resulted in an automated response of the brake system delaying the deployment of spoilers and thrust reversers that are used exclusively on ground to break the speed and lift in order to allow the airplane to come to a full stop. The delayed deployment of the three components of the brake system of the Airbus A320[83] was 9 seconds, time enough to prevent the aircraft from coming to a full stop within the distance of the runway. The aircraft overran the end of the runway and after traveling another 90 meters its left wing collided with an embankment. When the aircraft collided with the embankment, the fuel tanks were damaged and fuel began to spill on the left side of the fuselage. The fuel was ignited due to the contact with hot parts on the left engine.

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[82] Wind shear is a change in wind speed and/or direction over a short distance. It can occur either horizontally or vertically

[83] Braking System consists of ground spoilers, engine reversers and wheel brakes.

Because the computerized systems did not "feel" or register enough compression on the landing gears, its programmed logic concluded that the aircraft had not landed yet; this inhibited the function of the braking system.

"Actions of the flight crew were also affected by design features of the aircraft which limited the feasibility of applying available braking systems as well as by insufficient information in the aircraft operations manual (AOM) relating to the increase of the landing distance."[84]

The official accident report states that pilots have the responsibility but may lack authority. "In emergency, the crew is unable to override the lock-out and to operate ground spoilers and engine thrust reversers."[85] This statement shows the lack of authority of the pilots facing the systems that conduct by themselves some functions of the aircraft according to its own program, regardless of inputs the crew may carry out.

It also states that the understanding of the automated system may be inadequate. The steering technique utilized in the phase of landing was utilized to counterbalance the lateral wind component that greatly affected the touchdown of the aircraft over the runway. It resulted in a touchdown on one main undercarriage leg only and in the false impression on the part of the crew that touchdown was efficient. In reality the immediate start of operation of braking devices was not possible. The traditional technique of carrying out a landing with a lateral bank was applied, but with the automated system such as the one installed on this aircraft, this maneuver was risky because the system was not designed to recognize it and thus it did not respond as expected by the crew, but instead misinterpreted the command as if the aircraft was not landing in the ordinary way.

Automation may not work well under unusual conditions. "The programme which subjects actuation of all braking devices [...] when selected will extend

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[84] Peter B. Ladkin, *"Report on the Accident to Airbus A320-211 Aircraft in Warsaw"* online: University of Bielefeld Faculty of Technology <http://www.rvs.uni-bielefeld.de/publications/Incidents/DOCS/ComAndRep/Warsaw/warsaw-report.html>.
[85] *Ibid.*

provided that either shock absorbers are compressed [...] at both main landing gears. Engine reversers, when selected, will deploy provided that shock absorbers are compressed at both main landing gears."[86]

In this case there was apparently a defective design in the computer's operation of the braking system that did not perform in accordance to the requirements at the moment of the event. The system did not allow the pilot to introduce the inputs he undoubtedly wanted in order to avoid overrunning the runway. We perceive a lack of proper design that did not foresee situations like a differential braking in a wet runway with the presence of a wind shear. The pilot decision had little to do with the situation in question and his decision-making ability was greatly affected by the automated system. The control of the landing phase was left to the computers and not to the humans, we don't say this is all wrong but we would seek a balance that would allow the crew to assume control in situations of emergency like the above cited.

In the official accident report it was concluded that the emergency brake systems should be implemented regardless of the logic of the aircraft. In this case the Court may place responsibility on the manufacturer under product liability for a defective design resulting in the inadequacy of the automated systems that did not contemplate all the possible circumstances to which the aircraft could be subjected. The question regarding the liability of the air carrier depends on the findings as to the competency of the agent or servants of the airline to avoid such an accident. Whether their conduct was wilful or reckless shall be analyzed to determine the legal standing of Lufthansa.

China Airlines Boeing 747-SP Accident

The information pertaining to this accident was extracted from the report NTSB/AAR-86/03 elaborated by the NTSB of the United States.

On February 19, 1985, China Airlines Flight 006, Boeing 747 SP-09, N4522V, was flying from Taipei, Taiwan to Los Angeles, California. When the flight was near San Francisco at about 41,000 feet msl the engine number 4 lost power. While the pilot tried to regain normal power the aircraft rolled to the right and nosed over, and

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[86] *Ibid*

entered an uncontrollable descent. The airplane was finally stabilized when it was at 9,500 feet and was safely diverted to San Francisco International Airport. The airplane suffered major structural damage and only 2 persons among the 274 passengers and crew on board were injured seriously.

In the chapter on Behavioral Factors related to Automation of the accident final report, was included the following paragraph:

"The automatic flight systems of the Boeing 747 SP were such that the airplane could be programmed for and was capable of fully automatic flight throughout the entire route. Once the airplane was so programmed, all that was required of the flightcrew was to monitor the progress of the airplane and from time to time update the information required by the airplane's computers. Thus, the flight crew had been relegated to the role of monitors and had been serving in this role for almost the entire flight until the autopilot was disconnected."[87] The autopilot was disconnected in order to regain the control of the aircraft that had been lost due to the unexpected situation during the flight.

This case is evidence that as computers are added, the participation of pilots have been diminished, the pilot doesn't have anymore to handle the aircraft, it is "piloted" by the computer.

The phrase utilized in the NTSB report was that "pilot's physical workload has been reduced and, during some phases, eliminated". The NTSB cites in this report that "one researcher stated that with the addition of computers to the cockpit, the pilot's job is changing from one of manually flying the aircraft to one of supervising computers which are doing navigation, guidance, and energy management calculations as well as automatically flying the aircraft."

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[87] Peter B. Ladkin, *"China Airlines Boeing 747-SP Accident Report"* online: University of Bielefeld Faculty of Technology <http: www.rvs.uni-bielefeld.de/publications/Incidents/DOCS/ComAndRep/ChinaAir/AAR8603.html>.

Notably, the NTSB determined that one of the two probable causes for this event was the captain's over-reliance on the autopilot after the loss of thrust on the No. 4 engine."

Major concerns have been identified by the Oregon State University and from Research Integrations Inc. as conflicts between automation and flight crews.

The information, concepts and the technical conclusions contained in this section were greatly based on and extracted from a website providing a database of human factor issues related to flight deck automation and summarizing the findings of an extensive study conducted by a team of researchers from Oregon State University and from the Research Integrations Inc. in Tempe, Arizona, USA. It is also indicated in this report that the study was funded by the US Federal Aviation Administration, Office of the Chief Scientific and Technical Advisor for Human Factors.[88] This team surveyed accident and incident reports, pilots, aviation experts and performed automation analyses to identify flight deck automation issues. Some of their conclusions are here reproduced to illustrate and try to show the interaction between automation and human factors in the aviation industry and how the former has in certain cases adversely influenced the performance of pilots.

Different statements have been made regarding the complacency that evolves in flight crews when they are involved in a fully automated environment. In particular cases these new systems have been the first link in a chain that leads to unfortunate events.

Pilots may become complacent: "When automation functions reliably, as it does most of the time, it may induce pilots to be less alert in monitoring its behavior and less prepared to take immediate action when needed."[89] This human reaction is a natural consequence of the new technologies not only in aviation but of course in different fields of human activities. The complacency can lead to negligence and diminish the abilities that should be acquired by training. The idea of a system that

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[88] *Flight Deck, supra* note 62 at 70.
[89] *Ibid.*

can be conducted automatically can divert the attention and concentration that should be kept during all phases of the operation.

Pilots have responsibility but may lack authority: "Automation design may limit the authority of a pilot to perform a function even though he/she still has responsibility for it."[90] The role of manufacturers is fundamental. They should take into account more seriously the importance of the interface between human and machine. The design has to be designed for an active crew and not a crew that is limited to the passive role of monitoring the multiplicity of systems.

A B747400 first officer said, "[t]oo much control taken away from the pilot. I believe automation should assist, not replace the pilot." There must be a complementary function between these two parties. If the users of these systems emphasize that they are being replaced, then it means that balance between these two components is not being attained.

Failure modes may be unanticipated by designers:

"Some possible failures may not be anticipated by designers so there are no contingency procedures provided to pilots, possibly increasing troubleshooting workload and the opportunity for error."[91] This is the other side of the coin, in which one side is complacency but the other is not less real with the difficulty of overriding advanced systems. In order to diminish the inherent risks of the most advanced technologies, intensive and comprehensive training should be the rule in order to reduce these situations in which all the technology cannot be enough to foresee the likelihood of accidents. These three following statements also reflect the new situation that has been occurring with increased automation.

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[90] *Ibid.*
[91] *Ibid.*

New tasks and errors may exist:

"Automation may change and/or add pilot tasks, possibly making new (often more serious) errors possible."[92]

Pilot's role may be changed:

"Automation may change the role of the pilot from that of a controller to that of a supervisor. Because most pilots are not adequately trained for and experienced in this role, errors may result."[93]

"Solving the problem of cockpit automation is a definite priority because pilots are distrustful of advanced technology aircrafts."[94]

Comments

In this chapter we have talked about automation. It is undeniable that the main objective of automation has been to make the job of humans easier and we believe that this has been fulfilled. However, the topic of automation cannot be treated in a simple manner; there are many circumstances and factors surrounding the science of automation that should be considered. According to extensive research and studies, the automation has also brought collateral effects that have not been positive. We are convinced that every technology brings solutions but also harmful side effects that need to be further studied in order to counterbalance or at least alleviate these negative consequences.

It would not be accurate to say that automation has been the fundamental cause of accidents, at the end of the day in most cases it is the human who commit the errors, but it is also true that in some of those cases the automation was an associated contributory factor. Many experts have pointed out that what is needed is more intense flight crew training to develop the necessary techniques to apply them in the

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[92] *Ibid.*
[93] *Ibid.*
[94] Temesha Evans-Davis. "Pilot fatigue: Unresponsive Federal Aviation Regulations and Increasing Cockpit Technology Threaten to Rock the Nation's Pilots to Sleep and Compromise Safety" (2000). 65 J. Air L. & Com. 567 (Lexis).

field and through that to help decrease the incidence of these unfortunate man-machine episodes.

The engineering designers have to keep in mind all the factors that may make a pilot decide to take a different course of action from that of the automated response of the system, and enable him to overcome it. Computers can't exercise nor substitute the good judgment of the human. All they can do is to carry out the tasks for which it was programmed and to produce automatic responses in certain but not in all unforeseen circumstances. Advance technology is welcomed but we are not in favor of systems that tend to take the control from airmen in decisive moments for the overall safety of the operation.

We believe that it is necessary to concentrate more on finding the balance between the development of the old piloting skills and the new computer systems. The line that divides the traditional airman and a computer programmer is becoming sadly and dangerously blurred, we must not let that happen.

These technologies also lead us to admit that automation has assumed the control that humans used to have years ago. Thus the legal adjustments should be made accordingly. We may ask who shall be responsible and in some cases liable to the users, the manufacturer or the air carrier? Our perspective is that all parties play important roles and even in cases of accidents undeniably all of them are more or less involved. Automation development is promoted by the manufacturer, and in case of mishaps they may argue that they were due to the lack of training of flight crews. Both parties are fundamental to the aviation industry and both must be taken into account for the accomplishment of their common goal: safety and reliability in air transportation. Flight crews must be legally protected from events in which their authority is being overrided by the computers. Air carrier insurers surely advocate placing liability on manufacturers. But in all this, automation should be further studied and considered for the modification of a legal environment that encompasses the operation of advanced technologies for the benefit of this subsector of transportation.

CHAPTER III

Current liability regime for the aircraft manufacturer

Warsaw System and Product Liability

As we went through the previous sections of this work, it might have been noticed that the Warsaw System does not contemplate liability rules applicable to aircraft manufacturers. These latter entities are subject to a different system of law, that is the domestic legislation of every jurisdiction as opposed to the international regime of air carriers. In the present work we intend to focus on the role and legal regimes of liability applicable to aircraft manufacturers. We will start by mentioning basic notions of product liability that regulate aircraft and component manufacturers; thereafter we will include a few pertinent aviation accident cases brought to Court.

The exclusion of aircraft manufacturers from the Warsaw System has meant in some cases plaintiffs seeking alternate defendants in aviation liability cases in order to choose the most favorable target for their interest, which in many cases means from whom can be obtained the best recover in monetary terms. This implies two possible scenarios: the first one shows an air carrier sheltered by a system of international agreements establishing ceilings of liability that contemplate liability exclusively terms of compensatory damages as opposed to punitive damages; in the second set there is a manufacturer exposed to full liability and vulnerable to pay quite large amounts of money as punitive damages. This and other reasons will lead plaintiffs to study with their attorneys the best course of action to follow. According to Andrew Harakas, an expert in accident aviation law there are basic rules that may allow us to foresee when a lawsuit instituted against an air carrier might not be successful, which are:

- The passenger cannot obtain Article 28 jurisdiction in the US over the carrier;

- There is a viable Article 20(1) defense for amounts over 100,000 SDR; or
- The passenger believes that he can obtain an award of punitive damages.

We don't mean to highlight only the pecuniary side as being the major motive moving claimants to pursue lawsuits against manufacturers under product liability theories. In fact, in many cases the rationale for suing an aircraft manufacturer is based on the reasonable fact that the aircraft or one of its components could have been the main cause of accidents due to a malfunction or a defective design and not necessarily due to the flight crew's negligence, wilful misconduct or recklessness. The exposed reasons can influence a victim to file a legal claim under product liability against the aircraft manufacturer to seek damages in excess of the ceiling of liability of the air carrier.

The significance of the Warsaw System regarding liability still remains, as Michael S. Gill indicates: "The Warsaw Convention has therefore had a certain measure of success in creating a uniform regime to deal with international aviation law; but there are several important topics that it does not address. These topics namely issues of recoverable damages and title to sue carriage surpasses the defined scope of the Convention and the product liability of aircraft manufacturers, remain subject to conflict of law rules."[95] He adds: "The Convention does not provide a rule of substantive law for all the matters which may arise. And, importantly, the Convention only covers the relationship between passenger and carrier, leaving aside aircraft manufacturers' liability."[96] The fact that the Warsaw Convention does not explicitly contemplate aircraft manufacturers' liability does not decrease; diminish its significance in aviation law. This is a matter of different scopes of applicability based on historical reasons.

US Courts have recognized that the wording "liable for damages sustained" contained in the article 17 of the Warsaw Convention limits recovery of compensatory damages and excludes punitive damages, which is an award that can be

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[95] *Gill, supra* note 2 at 12.
[96] *Ibid.*

granted to plaintiffs in non-Warsaw suits. Mr. Harakas summarizes a similar concept by saying: "the only real option to sue in many cases is the manufacturer".

The allusion to aircraft manufacturers requires a general review of the representative current theories on product liability. We start by offering some concepts of this doctrine.

Product Liability

We will specifically make reference to the doctrine of Product Liability under common law in the United States. We base our choice on two reasons: the first justification from a legal point of view is because in such country the theories of tort law and product liability have been significantly developed; and the second factual reason is that the most important aircraft and component manufacturers in size as well as in global dominance, such as Boeing, Textron, Raytheon, Northrop, Collins, Honeywell and Garmin are located in the United States. It has also been recognized that the current doctrine applied in product liability litigation have been mostly developed in the United States. Concerning this perception Michael S. Gill says "[i]n terms of size and technology, the United States air transportation system is at least thirty years ahead of Europe. As a consequence, it is hardly surprising that aviation litigation should have been focused in the United States."[97] Robert M. Byrom says "Historically, United States manufacturers have supplied most of the world's general aviation aircraft."[98]

The sale of a product to the public can be regulated by different principles of law. The principles of law applicable between a seller and a purchaser of a product are not the same as those of third parties that did not obtain the product directly from the primary seller or manufacturer. The legal relationship between the seller and the purchaser is ruled by contractual law. But what is the relationship between subsequent buyers and the main manufacturer or distributor? In this case there is no contractual relationship or "privity of contract"; the purchasers may not even be sure

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[97] *Ibid.*

[98] Robert M. Byrom, *Product Liability of United States' Aircraft and Component Manufacturers* Vol. I (LLM. Thesis, IASL McGill Faculty of Law 1993) [unpublished].

about the identity of the manufacturer, but the consumers need legal protection against the possible injuries that might be caused by a product deemed unsafe or defective. The common law system created legal figures called "torts" that are applied to cases like the aforementioned. A tort can be defined as a "civil wrong, wherein one person's conduct causes a compensable injury to the person, property, or recognized interest of another, in violation of a duty imposed by law."[99] One important tort is "product liability", which refers to the physical harm caused to the user or consumer or his property by the unsafe condition of a product.

According to the comprehensive treatise in air law "Shawcross and Beaumont", one fundamental principle on which product liability rests is based on the following definition: "The basis of products liability is the putting into circulation of an article in a defective condition. The defect may be due to negligence in the manufacturing process or be the result of some basic design fault."[100] We should be cautious here regarding the use of the term "negligence", since it may imply a separate and different doctrine unrelated to the nature of strict product liability in tort, where negligence involves fault on the part of the defendant's behavior as opposed to a defect resting on the defendant's product itself.

The doctrine of product liability refers to putting into circulation a defective product that represents a danger to the expected consumers or users and to the damage that such deficiency can cause. Not only manufacturers are subject to product liability but also the other parties involved in the chain of commerce, like the seller, assembler, importer, supplier, distributor, licensor, lessor and franchisor, and sometimes the repair shop. These bear the responsibility of putting a defective product into the stream of commerce.

Aircraft manufacturers have the duty of offering products that can be used safely. There was an early and renowned case of product liability in aviation in which the manufacturer was found negligent in the design of the aircraft's systems of gas exhaustion and carburetor drain that put the aircraft at risk to catch fire and cause

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[99] Edward J. Kionka, *Torts in a Nutshell*, 3rd ed. (St Paul, Minn., 1999)
[100] Christopher N. Shawcross *et al*, *Air Law*, looseleaf (Great Britain: Butterworths, 1977).

injuries. This case took place in the first decades after aircrafts had been invented; it made reference to different rules of liability that used to be based on fault, which by then meant a great burden on the plaintiff to prove. Nowadays, the standards of proof for product liability have changed just as the technologies applied to this dynamic industry have also changed; from a fault-based system to a strict liability system.

But when do aircraft manufacturers become liable? And what is the relationship between manufacturers and aviation accidents? Concerning aviation crashes, these are not only very unfortunate events but also legally and technically speaking very complex issues. The parties involved are numerous and diverse. In the first place, the passengers are the most obvious parties involved; secondly there are also bystanders on ground, and indirectly the passengers' families can also be victims. On the other hand, there are other parties that in some cases might have directly or indirectly contributed to the accident which can include flight crews, air traffic controllers, airport authority, ground handlers, maintenance personnel, aeronautical authorities and aircraft manufacturers. All of these parties may have contributed within their corresponding scope of involvement in the air industry to such occurrences.

For the purpose of this work, we are going to take as a fundamental reference the two editions of the "Restatement of Law", which were drafted in the United States and encompass the generally accepted principles of the theory of product liability.

Second and Third Restatement of Torts

The "American Law Institute" was established in 1923 and is in charge of surveying various jurisdictions within the United States in order to monitor the general state of the law. This institution compiles the general laws in force in said country and presents them in a more orderly manner. In 1965, the American Law Institute published "The Second Restatement of Torts". In May 1997, this Institute abolished the compilation to make way for the revised compilation of tort law or "Third Restatement of Torts", which in the opinion of experts is more adequate for the development of product liability theory in modern times.

This Third Restatement contributed a more advanced theory of liability for product defectiveness which covers manufacturing defect, defective design and defect because of inadequate instructions or warnings.

This new legal compilation coming from Court judgements is gradually spreading and being accepted in the United States and therefore it has produced an impact on aircraft and component manufacturers, particularly concerning the standards for defective design considering the multiplicity of systems involved in the manufacturing of aviation products.

The standard of liability to which commercial sellers or distributors must adjust to when they cause harm for defective products is foreseen in the Restatement Third of Torts in Product Liability, which reads:

"One engaged in the business of selling or otherwise distributing products who sells or distributes a defective product is subject to liability for harm to persons or property caused by the defect."

Product Liability Theories

We will start by stating the basic principles of product liability applicable to aircraft manufacturers. These rules will allow us to get a general understanding of the legal framework in which the aircrafts and components manufacturers have evolved.

The first question is: What is a defective product? "A defective product is one that differs from the manufacturer's intended result or from other ostensibly identical units of the same product line"[101]

A product can be defective because of a: manufacturing defect, a design defect or inadequate warnings.

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[101] Lee S. Kreindler *Aviation Accident Law*, looseleaf (New York, 1971).

Manufacturing Defect

Concerning manufacturing defect, the Restatement (Third) of Torts articulates:

"A product contains a manufacturing defect when the product departs from its intended design even though all possible care was exercised in the preparation and marketing of the product"[102]

As can be noted, the element of fault is excluded by stating that regardless of all due care the product shall be deemed defective if the other conditions are met. This provision refers to when the defect was brought into being during any stage of the manufacturing process and rendered the product substantially different from the others coming from the same product line, in other words, a manufacturing defect affects only one unit that is originating from the projected manufacturing design and not the whole line of products. Aircraft manufacturers must keep a close inspection and a strict control of quality in order to be able to detect any possible defect in any of the units manufactured; for example, if an altimeter is improperly calibrated, its use would entail a great hazard to the users, this would be especially true under instrument flight rules in which the pilot would not be able to know the altitudes or the flight levels at which the aircraft is flying. If this defect goes undetected, it may end in an air collision or an uncontrolled approximation into ground.

Aircrafts are designed by highly professional engineers according to high standards of care set by extensive regulations originating from aeronautical engineering science itself and embodied in a federal set of laws. These laws are considered the minimum standards that are expected to be complied with by the manufacturer. Despite these high standards of quality, it is possible that a product unit comes out defective due to an inadequate inspection, a deficient quality control, inadequacy of materials, or an improper delivery of the product. Sometimes the defect does not affect only one product unit by the whole line of production, in which case the defect is called a design defect.

Design Defect

In order to establish defectiveness in design it is necessary to apply the "risk-utility" and the "reasonableness" tests. These tests mean that a producer is liable when the unreasonable danger posed by the product could have been avoided by the adoption of an alternate design considering its feasibility and convenience at the time of the sale. The risk-utility test poses the question of whether the benefit of the product surpasses its inherent risk.

The Third Restatement of Torts defines:

Section 2(b) - Design Defect

"A product is defective in design when the foreseeable risks of harm posed by the product could have been reduced or avoided by the adoption of a reasonable alternative design by the seller or other distributor, or a predecessor in the commercial chain of distribution, and the omission of the alternative design renders the product not reasonably safe."[103]

Defect in Marketing or Failure to Warn

It is the duty of the manufacturer to adequately warn the consumer about the inherent risks in the design of the product.

The Third Restatement of Tort provides as follows:

A product "is defective because of inadequate instructions or warnings when the foreseeable risks of harm posed by the product could have been reduced or avoided by the provision of reasonable instructions or warnings by the seller or other distributor, or a predecessor in the commercial chain of distribution, and the omission of the instructions or warnings renders the product not reasonably safe."

The manufacturer is obliged to communicate all pertinent instructions and warnings related to the use of the product. When the manufacturer fails to do so he

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[102] Mark R. Irvine. "American Law Institute Adopts New Restatement for Design Defect Cases" (1998), online: Aircraft Builders Council <http://www.aircraftbuilders.com/lawreport/1997/lr1997c.htm>.

can become liable for failure to warn. For example, a well known common warning related to light single engine aircrafts which is well emphasized in the flight manual is the danger of standing in close proximity to the engine propellers regardless whether the master electric switch is off or on. This is because of the permanent possibility of its blades suddenly spinning as a response to the smallest input of force applied into any area of its blades' surfaces; a single accidental touch may make the blades rotate and this means an injury caused by blades spinning at more than 2000 rpm in the less sophisticated aircraft. For this reason, it is necessary to be duly informed about the hazard involved in standing in the vicinity of a propeller aircraft.

The following case is in our opinion a very interesting and useful one because it deals in a very straightforward manner with the standards and principles needed to establish a product liability case.

Nesselrode v. Executive Beechcraft[104]

On July 23, 1981, George Nesselrode and two business associates boarded a Beech Baron Model 58TC airplane at Kansas City, Missouri's Downtown Airport. Three minutes after taking off the airplane crashed, killing the pilot Gerald Hultgren and his three passengers. The twin-engine airplane was designed by Beech Aircraft Corporation and owned, operated and maintained by Executive Beechcraft, Inc. The wife of the decedent Mr. Nesselrode filed a lawsuit against Beech and Executive.

Plaintiff's lawsuit against Beech and Executive was based on strict liability in tort according to the following premises:

- Defective design of the right and left elevator trim tab actuators;
- Defective manufacturing;
- Failure to warn against the possibility of reverse installation of such components.

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[103] *Ibid.*

[104] *Jane Nesselrode v. Executive Beechcraft,* [1986] Mo. LEXIS 274 (Lexis).

The issue to establish in this case was the defective design of the elevator trim tab actuators. First of all, we will briefly explain what these components are and how they function.

The elevators are two surfaces similar to small wings located in a lateral plane on both sides of the vertical stabilizer which is the tail or empennage. The elevators have the important function of making the aircraft climb or descend. To make the aircraft climb, pilots pull the wheel backwards, and do the opposite when they wish to descend. Carrying out this task even in light and small airplanes requires in principle a great deal of physical effort since it is similar to be "holding the airplane with the arms." However there is a system devised to relieve pilots from exerting this effort; this system is made up of two other smaller flaps (trim tabs) inserted at the trailing edge of the elevators. These two additional surfaces actuate exactly in the opposite direction of the elevators, when elevators go upwards to make the airplane climb, the trim tabs go downwards in order to create an aerodynamic force that makes the elevators go up. By following this process, flying an airplane becomes nearly effortless. The pilot has at all times the possibility of controlling the position of the elevators and trim tab actuators. The elevators are controlled by the main wheel or stick in front of the pilots and the trim tabs in light airplanes are controlled by a wheel that can be rotated up and down, up for descents and down for climbs.

In the present case, the mechanics of "Executive" installed the parts of the actuators in such way that the trim tabs were acting exactly in the opposite way as commanded by the pilot. This meant that the airplane was going down when the pilot wanted to climb and vice-versa.

Six days before the crash, "Executive" replaced the actuators of the aircraft in the wrong way. The plaintiff claimed that the defective design theory is founded on the fact that the right and left actuators as designed by Beech, are visually identical but functionally distinct. As such, they are capable of being interchanged and reversed during installation, which rendered them defective and unsafe. Plaintiff also argued that Beech was at fault regarding the failure to warn theory because the very nature of the design of the actuators created the need for a warning. The absence of a warning

detailing the possibility of reverse installation and its consequences also caused the actuators to be sold in a "defective condition" according to plaintiff.

Judge Billings of the Supreme Court of Missouri says that the core concern in strict tort liability law is safety. Therefore, the primary issue to analyze in a design defect case is whether the product's design creates an unreasonable risk of danger to the consumer or user when put to normal use and how this defect cause injuries. The Judge held that these aspects are "the heart and soul of a strict tort liability design defect case: unreasonable danger and causation." In this case the Judge analyzed whether the evidence presented by the plaintiff sufficed to establish product liability.

The maintenance inspector and mechanics of "Executive" stated that it was not possible to differentiate by visual inspection the right actuator from the left actuator and that they were unaware that it was physically possible to reversely install the right and left actuators.

They believed that the actuators had been designed according to the "work or no go" industry standard, which makes reference to the physical impossibility of installing components or critical flight parts in the wrong way because they simply would not fit, making the only alternative to install them in the right way. Plaintiff offered into evidence an exhibit that contained a description of Beech's own design policy, which reads:

> "The phrase, "go right or no go" ... is a requirement that replaceable parts of aircraft must be so designed that they cannot be installed any way but the right way. As a design policy, it shall apply to all Beech products in applications where the consequence of wrong assembly presents any hazardous condition to the article, its occupants or users. Do not apply this design policy literally to parts which can be more economically designed interchangeable end for end, providing the intent of installation safety is not jeopardized."[105]

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[105] *Ibid.*

Regarding the same issue, FAA regulation requires the following design characteristics:

> "Each element of the flight control system must have design features or must be distinctly and permanently marked so as to minimize the possibility of incorrect assembly that could result in the malfunctioning of the control system."[106]

"A key element of plaintiffs' theory of defective design was the feasibility of an alternative design which would have conformed to the industry standard and which would have guarded against reverse installation. Plaintiffs' expert witness, Mr. Garrelts, provided examples of a number of alternative design features that would have made the actuators safer. One of those possibilities was [...] that the actuators could be physically imprinted with the letters "R" and "L", standing for "right" and "left"."[107]

Regarding the causation of the accident, Judge Billings said: "We find the evidence legally sufficient to support a finding that Beech's design was a proximate cause of George Nesselrode's death. In summary, we think a jury composed of reasonable men and women could come to the conclusion that actuators lacking 'murphy proof' design features, when put to normal use, do present an unreasonable risk of danger." The "Murphy proof" refers to the "work or no go" test.

In this case it was stated that to determine failure to warn, the plaintiff must establish each of the following elements:

- the defendant sold the product in the course of his business;
- the product was then unreasonably dangerous when put to a reasonable use without knowledge of its characteristics;
- the defendant did not give an adequate warning of the danger;

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[106] *Ibid.*
[107] *Ibid.*

- the product was used in a manner reasonably anticipated;
- the plaintiff was damaged as a direct result of the product being sold without an adequate warning;

In the case just presented, the trim actuators had a 50% possibility of being properly installed as the correct manner of installation could not have been foreseen by the mechanics of "Executive." This was due to a lack of warning as to the risks arising from the characteristics of these products, which did not allow a reasonable user to know the possibility of a reversed installation, because there was no physical guidance or feature indicating the correct manner of installation. The design was perhaps adequate for its intended use, but it was deficient; in this case the risk prevailed against its benefit, and its defectiveness contributed to the overall performance of the aircraft, making it unsafe.

The jury returned a verdict of $1,500,000.00 for plaintiffs against Executive and Beech. The pilot Gerald Hultgren was assessed as having had 0% of fault

One of the most complex and interesting cases that the NTSB (National Transport Safety Board) of the United States has ever handled, directly related to product liability, was USAir flight 427, Pittsburgh. This case has been pointed out as an important case in the history of air accident investigation. The investigation took five years to be completed; tests and analysis related to all the imagined factors that could have surrounded the event were concluded. Its primary significance comes from the fact that it offered the opportunity to prevent other possible accidents by detecting, fixing and redesigning a defective aircraft component that was present in other aircrafts of the same type.

Flight 427 USAIR/Pittsburgh

A case of defective design

On September 8, 1994, a Boeing 737-300 of USAir scheduled as Flight 427 was in the approach phase to land at Pittsburgh International Airport. A few minutes before landing, the airplane crossed the wake turbulence of another aircraft that had

just passed by, and suddenly the rudder fully deflected to the left. This circumstance prompted the pilots to apply right rudder, which is used to make the airplane to turn about its vertical axis, in order to counterweight such unexpected occurrence. However, the rudder did not respond as expected and suddenly the airplane spiraled down and twenty-three seconds later the aircraft crashed into the western Pennsylvania countryside, killing all 132 passengers on board.

After five years of extensive investigation, the NTSB concluded that the probable cause of the USAir flight 427 accident "was a loss of control of the airplane resulting from the movement of the rudder surface, which [...] most likely deflected in a direction opposite to that commanded by the pilots as a result of a jam of the main rudder power control unit..."[108]

In this case, the catastrophe was due to a defective design of a component of the airplane's rudder that caused a jamming that produced an uncontrollable deflection. This component was a valve integrated into the rudder hydraulic system that was supposed to act in such way that would deflect the rudder according to the commands of the pilots. However, its defectiveness caused a reverse output, which in the middle of a flight with more than one hundred passengers on board evidently becomes not only an unsafe design but a "fatal" defect. In this case the aircraft was spiraling down left and the crew applied hard and insistent inputs to make the airplane bank to the right, but unfortunately the aircraft rudder acted as if it were commanded to go even further to the left, this made them fall into a deeper irremediable attitude that caused them to crash.

Under strict product liability a defective design can make a manufacturer liable, and this type of strict liability is a very sensitive one because once it is established the defectiveness of a product in design, it implies that all products part of the same line of production bear the same problem, transferring the problem to hundreds of users and putting into risk thousands of lives. This circumstance in the case of big companies like Boeing can cost millions and millions of dollars to issue bulletins to

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[108] Aviation Attorneys of America, "Solving the Mystery of USAir Flight 427" online: <http://www.aviationattorneys.org/usair427.shtml>. online:

correct this problem and when feasible even to recall the product to be fixed, and this is without taking into account the bad reputation that such act brings to the company. In this particular case, due to the publicity and the evident failure from Boeing in designing the aircrafts rudders, Boeing reached millionaire settlements with the representatives of the decedents and this company would have been entitled to recover from the air carrier.

We consider that the principles of "unreasonably dangerous" and "risk-benefit" are beyond any doubt applicable to this case because it is clear that the risk of the product outweighed the benefit provided. Experts established corrective procedures to follow in case of inadvertent deflections of the rudder in commercial airplanes, but the reversal was a feature that had not been detected in the original design and thus flight crews of USAir and two other airliners who underwent exactly the same problem did not have the chance to be trained for this type of unexpected abnormal conditions.

Helicopter Sikorsky/Maryland

Defective design

On January 8, 1975, a Sikorsky helicopter CH-53D Sea Stallion flying from New River, North Carolina to McGuire US Air Force Base in New Jersey, crashed near Salisbury, Maryland killing all five passengers on board. The parties agree that the helicopter crashed when one of its six rotors fractured while in flight. It was stated in the legal proceedings that other helicopters are provided with devices that warn pilots when a blade is at risk of an imminent fracture; however, the helicopter referred to here did not have any device to warn the pilot about such an imminent event.

In product liability the producer is liable for physical harm caused to the users of the product that he sells assuming that the product will not be altered in any way by an intermediary. The seller is strictly liable even if he had taken all necessary measures to prevent the damage.

In the case just mentioned, the Maryland Court of Appeals adopted a seven factors test to know when a product can be deemed defective:

- the usefulness and desirability of the product;
- the availability of other and safer products to meet the same need;
- the likelihood of injury and its probable seriousness;
- the obviousness of the danger;
- common knowledge and normal public expectation of the danger (particularly for established products);
- the avoidability of injury by care in use of the product (including the effect of instructions or warnings), and
- the ability to eliminate the danger without seriously impairing the usefulness of the product or making it unduly expensive.

Plaintiffs claimed that the helicopter was defective because it lacked a warning system which made the aircraft dangerous although the crew used it according to all regulations. The usefulness and desirability of the product was not established for the reason that the lack of it was the indirect cause of the accident; the plaintiff presented a design that was intended to make the helicopter safer. The Judge instructed the Jury to reach a verdict whether the lack of the warning device constituted a defective design and he instructed that the plaintiff must establish the following four essential elements:

- the product was in a defective condition at the time that it left the possession or control of the manufacturer;
- that it was unreasonably dangerous to the users;
- that the defect was a proximate cause of the deaths; and
- that the product did reach the user without substantial change in its condition.

Due to the lack of the warning device, the pilot could not know about the imminent hazard into which he was about to go. The proper operation and care that he had displayed was not sufficient to overcome the obstacle of the defect that was unknown to him. This circumstance took the helicopter to an unreasonable level of additional hazard to its users. It became irrelevant whether the operator followed all regulations contained in the flight manuals and instructions issued by the defendant Sikorsky if the manufacturer did not provide the pilot with the pertinent information about to avoid this type of accident.

The criteria to find the defectiveness of a product according to the Court of Maryland must consider various factors that require a careful analysis related to the manufacture and use of the product itself. It is not enough that the plaintiff claims defectiveness, the evidence showing must consider an alternate design of the product; costs of producing, distributing, selling, using, and maintaining the product under the original design and the alternate design; the probable harms arising from the alternate design among others factors including the seven considered above.

The jury was also instructed to analyze the case to determine if the warnings and instructions at the time of manufacture were not adequate, and whether this was a proximate cause of the crash. In this case Sikorsky was found liable under the design defect theory.

Northwest Airlines Flight 255/Detroit[109]

On August 16, 1987; Northwest Flight 255 took off from the Detroit Metropolitan Airport, but it did not gain enough altitude, so that at the end of the runway the aircraft struck a lamppost, due to this first impact the aircraft was severely damaged and seconds after, crashed, killing one hundred fifty-four passengers, crew and two bystanders. The aircraft was an MD-80 model manufactured by McDonnell Douglas.

It was showed in the evidence that the flight crew had forgotten to set the flaps and slats which are necessary to lift the aircraft. In addition, they had apparently

disconnected the warning system because they did not want to be bothered with the beeping that alerts pilots of such failure. Northwest claimed that a circuit breaker manufactured by Texas instruments used in the aircraft's warning system ("Central Aural Warning System," or "CAWS") failed, causing the warning system to fail also.

In 1990, McDonnell Douglas presented evidence to support its theory of the case, saying that the flight crew had a history of negligence and that they did not follow various checklists required by FAA regulations, by disconnecting the system that could have warned them of the error which they incurred. Northwest supported that various design defects exacerbated the crew's mistake. According to Northwest, "the aural warning system did not function because the circuit breaker wired to the system was defective. Had the breaker worked, the aural warning system would have worked, and the crew would have aborted the takeoff".

Northwest claimed that the liability of the manufacturer of the MD-80's aircraft design and safety system rested on several theories: (1) strict liability for defective manufacture; (2) strict liability for defective design; (3) strict liability for failure to warn; (4) negligent manufacture; (5) negligent design; (6) negligent failure to warn; and (7) negligent failure to comply with government regulations. McDonnell Douglas's defense was "sophisticated user", defined as one who, by virtue of its knowledge, skill and experience can or should be aware of the risks in the use of the product.

In this case we can observe how Northwest based its claims on the three current theories of product liability, asserting that McDonnell Douglas as a manufacturer put into the stream of commerce a defective product that may have entailed a serious risk of harm to the users. This amounts to manufacturing defect, design defect and inadequate warnings as stated in the Third Restatement of Torts. Furthermore, if the circuit breaker malfunctioned there could be a shared responsibility between McDonnell and the manufacturer of such component. It should be then established if the circuit breaker was designed improperly, or if the alleged defect was acquired at

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[109] *Polec v. Northwest*, 86 F.3d 498 (D.) 1996

the time of being manufactured, this latter defect probably being less serious because it would not affect all of the line of the same component.

In the previous chapters, we have briefly discussed the legal regime applicable to air carrier liability for wounds or death caused to passengers in international flights. We have also talked about automation as a contributory cause of air accidents. Automation has been conceived by some people as the panacea for the modern human problems and for others it has been an evil solution that is gradually supplanting the human being initiative and force. Automation in aviation implies advanced and complex technology, and this technology is intended for the enhancement of air transportation. However in certain cases it has become the opposite of this and it ended up being a shortcoming that has compromised to a certain extent the safety of aircrafts. When conflicts like these arise in air accidents the airlines are put into a position in which they need to start legal proceedings against manufacturers in order to recover the compensation for contribution or indemnity paid to passengers and damages caused to air carrier property. Passengers' estates may decide to do the same against the manufacturer. In these cases the courts, whether under contractual or tort law, would eventually apportion liability on one or another party according to the specific case. But in all this we may ask ourselves what the interaction between aircraft manufacturers and air carrier liability is under the Warsaw System. This deserves further comment in the following chapter.

CHAPTER IV

Air Carrier and aircraft manufacturer liability

"One of the most common issues that arise in air crash liability trials is the issue of the comparative fault of the operator versus the manufacturer. Two of the most common defendants in air crash trials are the operator and the manufacturer and the jury must assign a percentage of faults to each if they feel both are culpable. Thus, one of the major battles that go on in such trials is the question of determining who has more comparative fault."[110]

In the coming years, the panorama in commercial aviation liability in several countries will be subject to significant changes. The Warsaw System and its wilful misconduct concept will be replaced by the new international instrument of the Montreal Convention of 1999, discussed earlier, which will make the plaintiff's to show "wilful misconduct" on the part of the air carrier unnecessary. The burden of proof will change from the plaintiff to the defendant. The unlimited liability of air carriers will be consolidated. The defendant air carrier will have to prove its "non-negligence" for damages exceeding 100,000 SDR for each passenger, which in the opinion of experts is a difficult task, thus, the system will become more favorable to plaintiff-passengers.

The role of the manufacturer in the accident may become material for the upper tier of the Montreal Convention because the air carrier may try to prove that the mishap could have been caused by a third party. The airline first of all will have to show that it acted according to the highest standard of care, but even doing so the factors and particularities of the accident were probably due to a mechanical defect out of its control and to which it was never warned by the manufacturer. This controversy will turn into a dispute between the carrier and manufacturers as third parties.

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[110] Phillip J. Kolczynski, "Aviation Product Liability" (2001), online: AVweb <http://www.avweb.com/articles/prodliab.html>.

In a few years from now we will witness in aviation law the beginning of the era of the Montreal Convention of 1999, the commencement of a new system that divides international private law in two parts, the before and after Montreal 1999. By this we mean to say that the regime of air carrier liability will be different from the traditional system in existence since 1929. In those years, the economical environment for air carriers was different and the manufacturer industry had started to take its first steps.

Under the Montreal Convention, the ideal of uniformity and the reintegration of the desegregated current system shall be finally fulfilled once the 30 ratifications are effected, allowing the Montreal Convention of 1999 to enter into force.

The Montreal Convention, as was discussed in the first chapter of this work, encompasses a two-tier system. At the first level, up to a 100,000 SDR, air carriers are strictly liable retaining the contributory negligence defense; at the second level, above the 100,000 SDR ceiling they are subject to a presumption of fault unless they show evidence that their agents and servants did not act negligently or that the accident was due to a third party's negligence.

This Convention has been already criticized by experts for its alleged flaws which have promptly been highlighted. It has been said that this Convention is a pro-user instrument, and this is attributed to the fact that the standards needed to exclude liability above the 100,000 ceiling are by nature quite difficult to achieve. "Based on the complexity of international air disaster investigation, it should prove to be a challenge for airlines to prove a total lack of fault for most losses."[111] Accidents and specifically air crash accidents are in many cases caused by pilot's error and in other occasions due to mechanical malfunctions, which may translate into air carrier liability or strict product liability of the manufacturer.

This notion leads us to another approach that consists of an overview of product liability under the current Warsaw System and its relevance with the coming Montreal Convention of 1999.

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[111] Alan H. Collier, "The Road to Montreal" (1998), online: Aircrafts Builders Council: Aerospace Liability Insurance <http://www.aircraftbuilders.com/lawreport/1999/index.htm>.

In the current system of aviation liability in relation to passengers who suffer injuries or death arising out of international transportation, we identify two different general pictures in which two parallel systems of law converge in the same event. One is the international scenario which is compounded by rules of private international law constructed on theories of presumption of fault and strict liability; and the other is the domestic scenario on statutory law, common law principles and strict product liability doctrine when the case requires it.

The legal scheme regulating air carrier liability in international flights, which is the focus of this work, has traditionally foreseen low limits of compensation as was then required by the prevailing needs that characterized the first stages of aviation. In order to exclude his liability the air carrier had the burden of proving its innocence. Aircraft manufacturers on their side had been subject to proof of negligence but when less elementary technologies were developed more than seventy years ago in different areas of science, it was understood that a modification was needed, At that time strict product liability arose in the US.

In an attempt to describe the liability of manufacturers and air carriers which shows their differentiation as well as their interaction, we would say that under the Warsaw System there is a more favorable panorama for the air carriers due to the fact that injured passengers can obtain higher compensations from manufacturers. But this circumstance, with the coming of the Montreal Convention of 1999, has changed in favor of passengers and manufacturers. The international community made long efforts to build a system more favorable to consumers and the results were certainly accomplished. This benefited the international passenger and also to a certain extent the manufacturer, who now may become the second alternative to be targeted by claimants instead of the first target to be sued in order to get higher amounts of compensation for death or injuries.

The preceding scenario is now in its twilight; a new international instrument will show up to change the panorama as well as the expectations of the current participants. Every party will be affected in different ways. The additional factors

discussed earlier will come into play once the Montreal Convention of 1999 comes into force.

The Montreal Convention has a tendency to be even more favorable to the general public than previous instruments as the ceilings of liability for injuries or death caused to passengers were removed and its remedies are subject to higher standards of proof on the part of the air carrier.

This is a significant change that will definitely influence a change in the legal contentions between airlines and manufacturers when the latter are contributing to the accident. The role of passengers in their role as plaintiffs may also change. The application of the Montreal Convention may induce claimants in international flights to abandon the traditional idea of suing manufacturers; they may now target airlines as their best choice to sue, based on the lowered standards of proof established by the Montreal Convention. This situation may also motivate airlines in turn to sue manufacturers in order to recover but what we can for certain foresee in all of this is the coming of a different scenario in the litigation context and a reallocation of lawsuits in accident aviation law.

The inclusion of the Article 37 of the Montreal Convention of 1999 becomes relevant in this respect:

Article 37

Right of recourse against third parties

> "Nothing in this Convention shall prejudice the question whether a person liable for damage in accordance with its provisions has a right of recourse against any other person."

The antecedent of this article is found in the text of the Guatemala Convention and in the Montreal Protocol 4. These Conventions protect the rights of the parties that may be liable under that Convention to recover when the case merits this.

We consider that the Montreal Convention expressly confirms and reminds airlines that they always have the alternative to make use of all their legal resources to recover from third parties; these third parties can be aircraft and component manufacturers. The passenger or consumer is now more protected while the big companies will be in the legal arena to solve mutual issues before courts or by arbitration proceedings.

The expected scenario that will be established by the Montreal Convention is further confirmed by its Article 24, which foresees a five year periodical revision of the ceilings up to 100,000 SDR contemplating an adjustment of such limits considering inflation. The possibility of agreeing to higher limits or no limits at all is available too. A benefit for the claimants under Montreal Convention is the article which foresees the immediate availability of advance payments for the victims.

Surely manufacturers will not want to raise issues as to the convenience of the soon implementation of Montreal 99. This time may be their time: in the past the governments made efforts to protect the airlines and consumers, this time the changes seem to be somewhat beneficial for the manufacturers industry.

We conclude this chapter by saying that we should wait for the implementation of the Montreal Convention and observe the effects that it may have on all of the parties in the field of aviation accident law, including passengers, air carriers, and the third parties that are often manufacturers.

CONCLUSION

Aviation is currently immersed in an era of new challenges in every respect that we might think of. In the legal realm, airlines will soon enter into the Montreal Convention era, which is a long awaited unifying legal body of international private law in the field of airlines liability. This instrument of international law will put airlines to a test: in the case of accidents, the airlines and their insurers will have to conduct quite rigorous litigation to prove contributory negligence, this being their only defense under the Montreal Convention. When this defense is not available, then the issue would evolve around proving their "non-negligence" in the second tier, which is the weakest defense and the least convenient we believe. Under these new standards of proof the role of the air carriers shall be more active and decisive before the Courts, and at that moment we will be able to observe what will be the tendencies that will be established through Court judgments based on the principles of the Convention as well as its resultant jurisprudence.

We identify that under the Montreal Convention there is an increased risk of liability for air carriers. To be able to eventually cope with this situation, airlines need to implement innovative programs of risk management and become safer and less vulnerable to the "unlimited liability" regime of the Montreal Convention. This new regime may also influence the set-up of a new scheme of interaction between manufacturers and airlines, a new interaction that may even lead insurers to re-negotiate the terms of their contractual relationships with their respective clients within the air industry. The tendency to seek recovery from the manufacturer as the most favorable defendant may be facing a change, and even more with contributory negligence being the only defense of the air carrier.

In conclusion, although the Montreal Convention of 1999 is intended for air carriers, we perceive a different and changing position for aircraft manufacturers; having in mind this new panorama, the manufacturer sector of the air industry may need in turn to reinforce its standards of quality in production in order to consolidate its approaching favored status under the new Convention.

In respect to flight crews, we say that airline safety issues are not solely associated with September 11th. Safety can also be attained through more reasonable and sensitive interface designs in flight deck automation, designs that are more human-oriented. In our view, the idea that commercial airplanes could fly in the near future without the aid of air traffic controllers and substitute the data and information coming from ground controller's voice by data-link reception instead is by itself overwhelming; and even more astonishing is the notion of autonomous unmanned flights in a more distant future. In the middle of all these advances, we support the idea of a more comprehensive training for flight crews based on the operative range and understanding and even the "philosophy" of these new systems, so they will be offered the opportunity to become more familiarized with abnormal and unexpected responses from automated cockpit systems.

It seems that the "future" is not anymore the future, technology is already here and spreading in every facet of human life, and there is no reason to believe that aviation should be an exception.

We stand in favor of new technologies that contribute to safety and productivity, but we are to a certain degree distrustful of fully automated aircrafts that compromise the skilled pilot-in-command figure. The decision-making ability of the flight crews should not be substituted nor diminished by sophisticated systems, but instead complemented. The concept of "in command" must be present and preserved at all times, no matter how advanced the air navigation system in use may be; the human will always be kept in the cockpit and never be replaced by machines with the excuse of higher juicy earnings. This statement is based on the historical reality showing that the number of flight crew members has been gradually reduced through the years; we hope that this tendency had reached a full stop.

The aviation industry is a dynamic industry with ups and downs; the interest of all the involved parties must be balanced since all are indispensable parts of the whole. The interest and protection of the user is important, but it is also relevant the airlines' financial soundness; we don't perceive a balance like this in the Montreal Convention. The Convention places a burden on air carriers that will mean to a

certain degree greater risk on the carriers and a different and more challenging position for manufacturers.

On the other hand, it is not a fortunate position for manufacturers, being targeted and overburdened by plaintiffs seeking larger recoveries, and as we said, this situation may be changing, which is certainly beneficial for airlines, but not too beneficial when we learn that this burden is being only transferred to other parties.

In conclusion, the air carrier legal regime applicable in cases of liability is going to be subject to changes. In response to this new environment, the policies of risk management in air carriers will have to be rethought for the new legal and for the incoming new technical settings. On the other hand, we think it is convenient that the science of aeronautical engineering in the field of cockpit and avionics design seek the most adequate human-computer interface in order to help flight crews to deepen their understanding of automation. The result of this will hopefully be the enhancement of safety, and may diminish the likeliness of air accidents in which technology acts as a contributory factor. We support the increasing protection of passengers and the pursuit of a balance of interests between airlines, aircraft manufacturers and flight crews for the benefit of the overall aviation industry.

ANNEX

TEXT OF THE IATA AGREEMENT

"The undersigned carriers (hereinafter referred to as "the Carriers") hereby agree as follows: 1. Each of the Carriers shall, effective May 16, 1966, include the following in its conditions of carriage, including tariffs embodying conditions of carriage filed by it with any government. "The Carrier shall avail itself of the limitation of liability provided in the Convention for the Unification of Certain Rules Relating to International Carriage by Air signed at Warsaw October 12th, 1929, or provided in the said Convention as amended by the Protocol signed at the Hague September 28th, 1955. However, in accordance with Article 22(1) of said Convention, or said Convention as amended by said Protocol, the Carrier agrees that, as to all international transportation by the Carrier as defined in the said Convention which, or said Convention as amended by said Protocol, according to the Contract of Carriage, included a point in the United States of America as a point of origin, point of destination, or agreed stopping place (1) The limit of liability for each passenger for death, wounding, or other bodily injury shall be the sum of US $75,000 inclusive of legal fees and costs, except that, in case of a claim brought in a State where provision is made for separate award of legal fees and costs, the limit shall be the sum of US $58,000 exclusive of legal fees and costs. (2) The Carrier shall not, with respect to any claim arising out of the death, wounding, or other bodily injury of a passenger, avail itself of any defense under Article 20(1) of said Convention or said Convention as amended by said Protocol. Nothing herein shall be deemed to affect the rights and liabilities of the Carrier with regard to any claim brought by, on behalf of, or in respect of, any person who has wilfully caused damage which resulted in death, wounding, or other bodily injury of a passenger." 3. This Agreement shall be filed with the Civil Aeronautics Board of the United States for approval pursuant to Section 412 of the Federal Aviation Act of 1938, as amended, and filed with other

governments as required. The Agreement shall become effective upon approval by said Board pursuant to said Section 412."[112]

INTERCARRIER AGREEMENT ON PASSENGER LIABILITY EXPLANATORY NOTE[113]

The Intercarrier Agreement is an "umbrella accord"; the precise legal rights and responsibilities of the signatory carriers with respect to passengers will be spelled out in the applicable Conditions of Carriage and tariff filings. The carriers signatory to the Agreement undertake to waive such limitations of liability as are set out in the Warsaw Convention (1929), The Hague Protocol (1955), the Montreal Agreement of 1966, and/or limits they may have previously agreed to implement or were required by Governments to implement. Such waiver by a carrier may be made conditional on the law of the domicile of the passenger governing the calculation of the recoverable compensatory damages under the Intercarrier Agreement. But this is an option. Should a carrier wish to waive the limits of liability but not insist on the law of the domicile of the passenger governing the calculation of the recoverable compensatory damages, or not be so required by a governmental authority, it may rely on the law of the court to which the case is submitted. The Warsaw Convention system defences will remain available, in whole or in part, to the carriers signatory to the Agreement, unless a carrier decides to waive them or is so required by a governmental authority.

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[113] IATA, "Intercarrier Agreement on Passenger Liability" (2002), online: IATA <www.iata.org >.

INTERCARRIER AGREEMENT ON PASSENGER LIABILITY

WHEREAS: The Warsaw Convention system is of great benefit to international air transportation; and

NOTING THAT: The Convention's limits of liability, which have not been amended since 1955, are now grossly inadequate in most countries and that international airlines have previously acted together to increase them to the benefit of passengers;

The undersigned carriers agree

1. To take action to waive the limitation of liability on recoverable compensatory damages in Article 22 paragraph 1 of the Warsaw Convention* as to claims for death, wounding or other bodily injury of a passenger within the meaning of Article 17 of the Convention, so that recoverable compensatory damages may be determined and awarded by reference to the law of the domicile of the passenger.

2. To reserve all available defences pursuant to the provisions of the Convention; nevertheless, any carrier may waive any defence, including the waiver of any defence up to a specified monetary amount of recoverable compensatory damages, as circumstances may warrant.

3. To reserve their rights of recourse against any other person, including rights of contribution or indemnity, with respect to any sums paid by the carrier.

4. To encourage other airlines involved in the international carriage of passengers to apply the terms of this Agreement to such carriage.

5. To implement the provisions of this Agreement no later than 1 November 1996 or upon receipt of requisite government approvals, whichever is later.

6. That nothing in this Agreement shall affect the rights of the passenger or the claimant otherwise available under the Convention.

7. That this Agreement may be signed in any number of counterparts, all of which shall constitute one Agreement. Any carrier may become a party to this

Agreement by signing a counterpart hereof and depositing it with the Director General of the International Air Transport Association (IATA).

8. That any carrier party hereto may withdraw from this Agreement by giving twelve (12) months' written notice of withdrawal to the Director General of IATA and to the other carriers parties to the Agreement.

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