Jetstream

2021 AND BEYOND

GLOBAL AEROSPACE

INSURE WITH CONFIDENCE

Letter from the CEO

"When things return to normal" seems to be the phrase most commonly uttered during meetings this past year. What normal now looks like is up for debate, but what the last 12 months have taught us is just how adaptable we all have been. It has been a challenging year and the pandemic is not yet over, but it has been remarkable to see the sheer resilience of the human race.

At Global, we are pleased to report that all of our offices are open and that we are back to travelling and visiting our clients. Whilst the future of work will most likely look like a hybrid of in-office and work-from-home time, the future of client relationships is still very much in-person.

The challenge of international travel is still causing headaches and I can attest to the fact that my phone is now littered with additional apps to allow me to travel confidently through various borders, and in some countries a separate app to allow a meal out in a restaurant. A unified approach to balancing safety with freedom of movement still seems some time off but it is paramount for international air travel, be it for business or leisure, to see a return to pre-pandemic levels.

In this edition of Jetstream, we are focusing on the future of aviation and are excited to see how the pace of change and evolution has not slowed. With the return of air travel, green aviation initiatives have been pushed to the fore and you will find articles on eVTOL (electric Vertical Take-Off and Landing) vehicles and the electrification of aircraft.

Of course, with innovation also comes the difficulty of the legal system keeping pace. Artificial intelligence is no exception and our guest author Suzanne McNulty, partner at Fitzpatrick & Hunt, examines the development of AI and the challenges it presents to product liability.

The human desire to travel to space has not been suppressed and we have seen successful "missions" for both Virgin Galactic and Blue Origin, but it is NASA themselves who are reimagining childhood dreams with their Artemis programme, which looks to send humans back to the moon and then on to Mars. Back on Earth, the insurance requirements have changed since the last moon landing and the solution that is integral for the success of Artemis is discussed.

In 2021 we also said farewell to Nick Brown, who is retired after 12 years as CEO and 17 years with the company. Nick was an inspiring leader of Global Aerospace and we wish him all the best for his future. In this edition, he reflects upon his 30-year career in the insurance industry and the unique relationships we develop with clients around the world. In case you are wondering, the answer to a question posed to Nick by a client is Sporty Spice—turn to the back cover to find out more! ◥

RACHEL BARRIE
CEO, Group Chief Executive

Sustainability/Urban Air Mobility Update:

eVTOL and Its Place in a Sustainable Aviation Ecosystem

An industry driven by innovation and advancement stands on the precipice of transformation, with two different but complementary elements at play.

The first is the development and adoption of cleaner fuels for existing aircraft and less carbon-intense ways of managing the existing aerospace infrastructure. There is widespread belief that the aviation industry, responsible for around 2% of global, human-made carbon emissions, needs to decarbonize. Global Aerospace's April edition of Insights focused on many of the significant initiatives in this area.

The second refers to the new breed of pioneers building an entirely new ecosystem, based on clean fuels and transformative operating models.

DEVELOPMENTS ACHIEVED in both areas will ultimately complement one another, keeping observers and investors guessing in the meantime about which innovations and operating models will ultimately prevail.

A New Paradigm

Estimates for the number of established start-up companies in the eVTOL (electric Vertical Take-Off and Landing) space run upwards from 300. Many of these entities are in advanced testing phases, with several having built multiple full-scale aircraft that have flown many thousands of hours.

FUNDING IS SEEMINGLY ABUNDANT, with some companies boasting valuations of over USD1 billion before a single commercial flight has been booked. Others have secured lucrative contracts with, and backing from, global leaders in cargo and passenger transportation.

Also referred to as UAM (Urban Air Mobility) and AAM (Advanced Air Mobility), these players envisage an entirely new operating model, brought about by

> *Automated traffic management systems that facilitate a high number of aircraft will require significant public and private investment.*

quieter, carbon-neutral aircraft. While cities around the world have done little to encourage helicopter activity, UAM companies are betting on their ability to develop networks of landing pads and charging stations in and around urban centers.

Public Acceptance

Successful development of these hubs, being commonly referred to as vertiports, will require the support of city officials, regulators and the communities in which they hope to operate.

MANY VISIONARIES TALK ABOUT ALLEVIATING TRAFFIC from cities by creating highways in the sky able to transport thousands of commuters and packages. It is perhaps difficult to imagine just how many aircraft will be required to make an impact on road traffic, especially as city populations swell.

> *Players envisiage an entirely new operating model, brought about by quieter, carbon-neutral aircraft.*

Other UAM proponents talk about democratizing aviation, where the cost of taking an electric aircraft from downtown locations to the local airport costs an amount similar to ground transportation. While this might ultimately be the case, it is more likely that package delivery will be the initial way in which the vast majority of people are able to benefit from the urbanization of aviation.

Rise of the Vertiport

ANOTHER CHALLENGE FACING INNOVATORS is the task of developing the ground infrastructure to support high-turnover operations. Not only will these terminals need to be at a scale capable of supporting the projected growth of operations, but they will also need to be in convenient, inner-city locations.

WHAT ISN'T IMMEDIATELY CLEAR is whether the charging stations and other facilities will be designed in a collaborative way amongst various operators,

or will follow the Tesla model of being unique to a particular company. City planners might look more favorably at green-lighting facilities that are developed with a cooperative approach that encourages competition and whose viability is not dependent on the success of one company.

Add to the equation the potential for commuter flights in personal flying vehicles and the ground infrastructure conundrum grows more complex.

Many UAM industry exponents cite noise as the main reason why helicopter flights have been driven out of urban settings over the recent decades. While safety was undoubtedly a serious consideration, the quiet nature of battery-powered aircraft is offered as a good reason why eVTOL aircraft should succeed where helicopters have struggled.

Autonomy, Automation and Regulation

THIS NEW GROUP OF AIRCRAFT has one thing in common in addition to their fuel source: the adoption of advanced flight management systems. Many rely heavily on automation, with some designed for fully autonomous or remotely piloted flight.

While the technology required for autonomous flight is in advanced stages of development and testing, the regulatory hurdles that will need to be overcome for adoption in a commercial setting will likely prompt most operators to start in an onboard-piloted configuration.

Similarly, automated traffic management systems that facilitate a high number of aircraft sharing urban skyways will require significant public and private investment, commitment and collaboration.

In Conclusion

WHILE THE CHALLENGE IS SIGNIFICANT, the next phase of aerospace infrastructure development, aimed at creating an entirely new system of passenger and cargo transportation, is well underway. Increasing public concern about climate change, coupled with governmental support of green initiatives, should help pave the way for innovation to flourish.

FOR THOSE AT THE FRONT LINE OF CREATING this new ecosystem, progress will no doubt seem glacial, as regulators around the world grapple with balancing safety management with supporting progress.

The aerospace industry has always been at the cutting edge of technology. It now has an opportunity to create solutions that will have an impact far beyond air travel. Transformation can be realized that will ensure the next era of development can continue aviation's legacy of connecting communities, but with greater reach than ever before and a lower environmental impact.

> *Estimates for the number of established start-up companies in the eVTOL space run upwards from 300.*

Safety Update: The Case for Reconsidering Unpriced Exposures

When people think of aircraft insurance, what typically comes to mind is cover for accidents, hard landings and the like. In fact, most "technical" pricing of aircraft insurance uses only operational statistics and basic exposure data points (aircraft values, passenger numbers, etc.) to determine equitable premiums.

However, aircraft insurance is also affected by a far-wider range of non-operational perils that are currently not accounted for in insurers' pricing. Could this be a burgeoning problem?

Pricing insurance on every conceivable peril would be needlessly complex and arduous. But issues arise when such unpriced exposures become more prevalent over time and consistently erode premium from the market, which has been geared toward setting premiums based on traditional operational losses.

The Evolving Perils Caused by Climate Change

CLIMATE CHANGE AFFECTS a wide range of covered perils for the entire insurance industry and aviation is no exception. Increased frequency of extreme weather events has the potential to erode premium from the market more consistently today and in the future than it has in the past.

One clear manifestation of this evolving peril that we have seen in the past 12 months is the increase in aircraft damage caused by severe hailstorms.

Historically, major hailstorm events affecting multiple aircraft on the ground have rarely exceeded USD10 million in total for aircraft physical damage claims. The Nashville, TN area tornado in March 2020 alone is estimated to have caused over USD100 million in aircraft damage at area airports. Hailstorm claims for 2021 are anticipated to exceed USD100 million spread over multiple events throughout the world with some heavy losses to airline aircraft in the United States. No doubt this figure is partly inflated because of more parked aircraft in the wake of the pandemic but the trend is identifiable nonetheless.

Expert Insights on Weather Changes

We investigated the science around changing weather patterns with the help of Paul D. Williams, professor of atmospheric science at the University of Reading in the U.K. Professor Williams says, "There is emerging scientific evidence that climate change will increase hailstorm severity across most of the world, even in regions such as North America where overall hailstorm frequency is projected to decrease. Although significant uncertainties remain, we can see clear trends and patterns that

support the hypothesis of more severe hail events, with correspondingly higher losses associated with them."

THIS ISSUE IS NOT, of course, constrained to the aircraft insurance space. Ask any property underwriter if they believe they have fully priced or accounted for the increase in frequency and severity of weather events such as flooding, hurricanes and wildfires in recent years and the answer is likely to be a resounding "No."

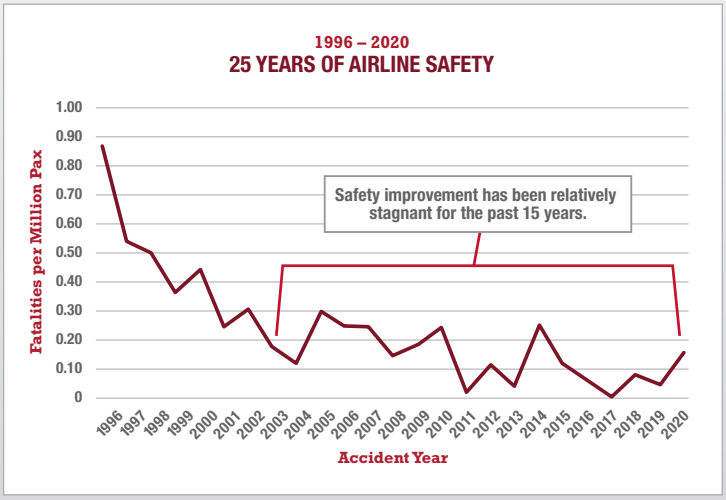
So, it becomes imperative for insurers to ask themselves if they are technically pricing their products on issues that are current and growing rather than on the data that has been used historically.

But this is not the only new and emerging pricing trend that aviation insurers should be focusing on. We also need to understand the fundamentals of the expected frequency and severity of claims in light of changes in safety data.

The Safety Improvement Plateau

AIR TRAVEL CONTINUES TO BE THE SAFEST FORM of long-distance transport. In 2018, the fatal accident rate was equivalent to one fatal accident every 4.2 million flights (IATA).

Technological, human and cultural change factors have all led to this staggering improvement in a relatively short time frame, and the focus on continuous improvement in this area is rightly unrelenting.

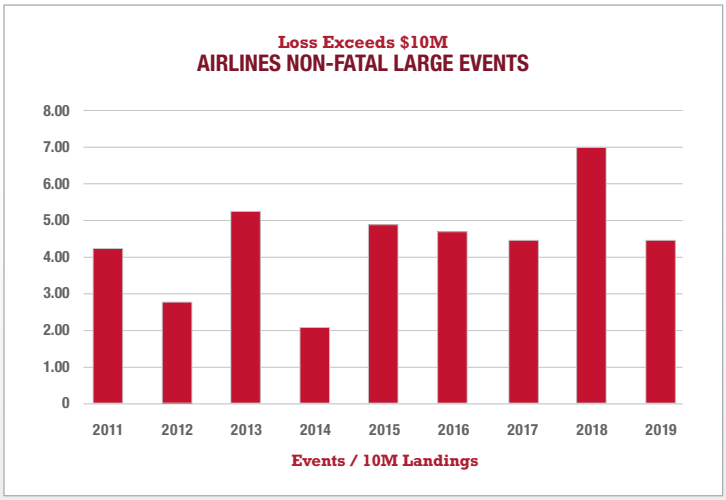


HOWEVER, IN THE PAST 15 YEARS, there has been a plateau in these improving statistics. Admittedly, when you reach these very low incident rates, the statistical relevance of the 15-year picture could be questioned given the impact a single fatal accident can have on the numbers or trend.

But why is this long-term trend of interest to aviation insurers? Rightly or wrongly, insurers have been accustomed to using the assumption in their technical pricing that aircraft accidents and/or fatal losses are decreasing in frequency over time.

This projected drop in frequency helps to offset trends around rising claims costs. These higher costs manifest themselves through increased passenger liability awards and by increased aircraft damage repair costs, such as repairing composite materials.

PLATEAUING SAFETY ALONG WITH RISING CLAIMS COSTS can also be seen in the chart below, which shows the number of large events in the airline sector in recent years.



Is It Time to Challenge Long-Held Assumptions?

IMPROVEMENTS IN AVIATION SAFETY have been marked, and they are a credit to all industry stakeholders. No doubt safety advances will continue, but they are likely to be less significant, at least statistically speaking. This reality, coupled with evolving climate change, suggests perhaps the time is now to refresh some widely held assumptions. Safety culture and continuous improvement will always be at the forefront of the industry's mind. But for aviation insurance products to remain relevant for all, we must acknowledge the leveling off of safety data and incorporate new and emerging perils into our pricing.

After all, insurers also should be focused on improvement to—and relevance for—the insurance products we supply to our clients.

Space Update:
Risk Sharing in the New Space Era

The U.S. has big plans. It wants to send humans back to the moon and eventually further on to Mars. This starts with landing the first woman and first person of colour on the moon within the next few years.

NASA Artemis Missions

THE APTLY NAMED ARTEMIS is NASA's designation for this new project following the last manned lunar program, Apollo. The Artemis I mission will be an unmanned journey to orbit the moon and this will be followed by the Artemis II manned mission. As a first step to carry out these missions, NASA has employed a number of major contractors to design and build the Space Launch System (SLS) rocket alongside the Orion crew capsule as the next generation of space vehicle to carry people back to the moon and beyond.

SLS will be the most powerful rocket NASA has ever built and Orion crew capsule the most sophisticated spacecraft. This will be one of the most innovative, complex systems the greatest engineering minds have put together.

It Really Is Rocket Science

NASA AND ITS CONTRACTORS have extensive experience with complex missions and are working to mitigate the risks associated with the mission. This includes the engineering design of the systems, assembly, integration and testing of hardware, as well as the training of operational personnel. Nevertheless, any space project comes with risk let alone such a sophisticated one carrying people to the moon and back safely. We all know space projects are "hard."

Risk and Insurance

The difference between the Apollo missions five decades ago and the Artemis missions that will be carried out over the next decade is the scrutiny of public spending on such risky projects. This means public bodies such as NASA want to transfer more risk onto the commercial companies with whom they contract.

IN RECENT TIMES, liability risks on U.S. national space programs have been borne by the contractor(s) under their products liability insurance up to the policy limit, above which Public Law 85-804 indemnity would be granted by the U.S. government for each contractor.

For insurers, this has become an issue on such hazardous, multiple-contract programs where the insurers would be liable for hundreds of millions, or even billions, of dollars for each contractor. As a result, the potential accumulations on a single risk could be immense and the cost of such insurance could affect the feasibility of participation in such programs for the contractors.

A Smart Solution

Pooled limit policies are nothing new. In NASA's space shuttle commercial era, contractors could declare their interest in a mission and buy third-party liability cover with an aggregate limit across all contractors under that mission, with U.S. government indemnity payable above that limit. Currently, launches covered by the U.S. Commercial Space Launch Competitiveness Act (CSLCA) that are conducted under Federal Aviation Administration (FAA) licenses require the launch service operator to carry a specified insurance limit. The policy would also cover all contractual parties under the launch subject to cross-waivers of liability between the parties.

REALISING THE POTENTIAL RISK and accumulation problem for insurers for the SLS/Orion program, the six prime contractors (Aerojet Rocketdyne, Boeing, Jacobs Engineering, Lockheed Martin, Northrop Grumman and Teledyne) were able come together and work with Marsh and Global Aerospace to propose and encourage NASA to adopt this approach of risk sharing for the program.

After several years' work with NASA, the contractors were able to get approval for a single insurance policy

No one party has to take an untenable amount of risk and commercial entities can transfer their risk to their insurers.

to cover all contractors and subcontractors, as well as NASA and the U.S. government, with a combined single limit for each mission. Above this amount, and pursuant to Public Law 85-804, NASA has authorized the indemnification of the contractors for each mission. Just as in commercial missions, there are inter-party waivers applicable so as to prevent potentially complex inter-party claims.

Program Based Insurance Policies

This risk-sharing model has benefited all parties to date. No one party has to take an untenable amount of risk and commercial entities can transfer their risk to their insurers without concern as to the affordability of such insurance cover.

While the U.S. CSLCA is only applicable for launch activities, risks exist throughout the whole mission and not just the launch phase. As such, it seems sensible to have this sort of liability framework for whole missions.

WITH MORE COMMERCIALIZATION of complex national and international space projects, including the Lunar Gateway and the Human Landing System for the Artemis program, as well as the new commercial space station in low-Earth orbit, not many commercial companies will be able to participate unless they can transfer some risk.

These projects are essential to encourage scientific and technological innovation, create economic opportunity and to inspire a new generation. To be able to support such projects, we would advocate a collaborative risk and liability approach for all space programs as demonstrated in the SLS/Orion program.

Insurtech:
Advancing the Industry Through Technology

InsureTech or InsurTech or insurtech—It seems the industry has not yet decided on the preferred spelling, but it is the latest insurance buzzword and similar in meaning to fintech.

As fintech is shorthand for "financial technology," insurtech refers to "insurance technology," and its use is changing insurance operations for the better in three key areas:

1. Improving efficiencies and lowering costs
2. Enabling the development of new products and the tapping of new markets
3. Enhancing the customer experience

THE ADOPTION OF INSURTECH has to be done gradually and thoughtfully, of course. And the goal of technology initiatives should not be to replace team members, but rather, to free them from mundane tasks and make better use of their skills and experience. But the potential insurtech has for improving insurance operations and interactions is unmistakable.

Increasing Efficiency to Lower Costs

IMPLEMENTING NEW TECHNOLOGY when and where it makes sense is essential to the ongoing ability to offer cost-effective insurance products. This is not a new concept, of course. Insurance, like every industry, has embraced new technology through the years, from the telephone and fax machine long ago to today's videoconferencing and virtual meetings.

What's next? Continuing advances in artificial intelligence (AI) and machine learning will help automate processes like reviewing, categorizing and digital filing of documents. One can envision a time in the not-too-distant future when a customer files a claim by uploading the necessary documentation and then a complex algorithm assesses the claim and authorizes payment with little human input. These advances, along with blockchain technology, will be used in automatic fraud detection.

THESE ARE JUST A FEW EXAMPLES. There surely are other efficiencies and cost savings to be gained through the use of insurtech. With all new technological advances, and especially in the connected online world in which we now live, we must keep ahead of those who would try and use these technologies criminally. We must keep ahead of those players and make sure at the forefront of all our improvements is the continued mitigation of cybersecurity risks.

Enabling New Products and Opening New Markets

At Global Aerospace, we pride ourselves on being at the forefront of supporting aviation innovations. Consequently, we serve a very diverse customer base with a wide range of needs. Insurtech has enabled and simplified the offering of tailor-made products that empower customers by giving them more control and choice.

ON-DEMAND PRODUCTS are one example. It's common today for aviation stakeholders to want insurance only for the period of time they are using an insurable product, such as with drone missions or aircraft rentals. Enabling a customer to quickly, easily and wisely choose coverage options and duration using insurtech is increasingly important.

Needless to say, "wisely" is the biggest challenge of the three. But with AI helping to guide customers in their selection so that they don't purchase the wrong level of coverage or overlook important coverages, a self-help approach is certainly achievable. And when it is achieved, new markets become available to insurers.

Enhancing the Customer Experience

BEYOND EFFICIENCY AND NEW PRODUCTS, insurtech has the potential to enhance the customer experience. The purchasing and using of insurance products often are perceived as confusing, time-consuming tasks. But insurtech can make these activities more intuitive and faster, and consequently, leave customers pleasantly surprised at the simplicity of these processes.

Continuing advances in artificial intelligence (AI) and machine learning are streamlining processes like reviewing, categorizing and digital filing of documents.

Such a result benefits both customers and insurers. Customers enjoy more stress-free interactions, and, as a result, insurers can expect an increase in customer loyalty and an expansion of their customer base.

Ultimately, today's insurtech advances are here to stay. What remains to be seen is how well insurers use them to their advantage and their customers' benefit.

AI Update:
Artificial Intelligence and Products Liability

With a simple voice command, Siri provides you traffic and weather updates; your "self-driving" car may take you to a doctor's appointment; a medical algorithm may assist in the interpretation of your chest X-ray; and a financial algorithm analyzes and makes recommendations affecting your finances.

ARTIFICIAL INTELLIGENCE (AI) SYSTEMS are capable of perceiving, learning and problem-solving with little to no human intervention.[1] Unlike conventional computer algorithms, AI systems can synthesize, store and analyze data to inform their decisions. Though AI can offer profound benefits to society, it also presents new risks and legal challenges in the realm of products liability. This novel issue poses the question: How is liability assessed when accidents occur not from human error or inherent defects, but from AI decisions?

AI and Damages

AI applications not only perform given tasks, but they also learn how to perform those tasks over time. This ability to learn means that AI behavior can be unpredictable despite the absence of flaws in its design and implementation.[2]

WHO, THEN, IS LIABLE FOR AI'S ACTIONS when its decisions surprise even its creator, and its behavior was not necessarily foreseeable as part of its original programming? As of today, the law does not provide a clear answer for it is difficult to draw a distinction between damages resulting from the AI's "free will" and that resulting from a genuine product defect.[3] Despite this lack of guidance, one can examine and apply the existing legal framework for products liability law to AI systems to anticipate how this area of law may develop.

Tort Liability for AI Under Existing Legal Theories

PRODUCT LIABILITY CLAIMS are primarily based on negligence and strict products liability, the application of which to AI requires an adaptive approach.

Fundamentally, product liability claims depend on whether AI qualifies as a "product." In Rodgers v. Christie (795 Fed. Appx. 878 (2020), plaintiff's son was murdered by a man who days before had been granted pretrial release by a New Jersey state court. Rodgers brought product liability claims against the foundation responsible for the Public Safety Assessment (PSA), a multifactor risk estimation model that formed part of the state's pretrial release system. The court held that the PSA did not qualify as a product, which it defined as "tangible personal property distributed commercially for use or consumption."[4] It noted that the AI in question was neither distributed commercially nor was it tangible personal property, reasoning that "'information, guidance, ideas, and recommendations' are not 'product[s].'"[5] The court therefore dismissed the product liability claims.

PLAINTIFFS BRINGING NEGLIGENCE CLAIMS bear the additional burden of addressing whether AI itself can be held to a "reasonable person" standard.[6] Applying the

"reasonable computer" standard to AI may be difficult due to the insufficient knowledge of AI's decision-making process. Also, because AI is not considered a "legal person," it arguably cannot be held independently liable for negligence.[7] One way that plaintiffs may navigate this issue is to argue for a vicarious liability scheme to hold an AI programmer liable for the actions of the AI.

FORESEEABILITY OF RISK is another key element in product liability claims. In most U.S. jurisdictions, a designer, manufacturer or seller is considered negligent if they fail to use reasonable care to prevent a *foreseeable* risk of harm. However, it may prove difficult to apply this test to AI, as a plaintiff would have to show that the defendant knew or should have known that there was a foreseeable risk of harm. This will depend on the relevant industry standards of care and whether the AI programming was appropriate in light of those standards.[8] Plaintiffs may have difficulty establishing this element because AI's adaptive nature makes it unpredictable.

This unpredictability also presents a challenge for plaintiffs' strict products liability claims. For instance, manufacturing defect claims require that the plaintiff show that the product was defective when it left the manufacturer's possession. But, due to AI's adaptive qualities and evolving independent decision-making capabilities, a plaintiff may have trouble proving that damage caused by AI was due to a defect that was present when it left the producer's hands.

STRICT LIABILITY FOR FAILURE-TO-WARN CLAIMS requires plaintiffs to prove that the producer failed to warn consumers of known or knowable risks. Because AI's evolutionary and independent nature may give rise to risks which are not known or knowable, the manufacturer/seller may not have known to provide certain warnings at all, making it challenging for plaintiffs to prevail on such claims.

Proving strict products liability based on design defect also presents challenges unless a plaintiff can show that the benefits provided by the disputed design were outweighed by the inherent risk of danger—the so-called "risk/benefit test," which is utilized in some jurisdictions.

Consideration of AI-related products liability claims requires the careful balancing of holding tortious actors liable and encouraging technological innovation. Some argue against the imposition of strict liability, given the chilling effect it would have on the advancement of technology.

Guidance for Producers

THOUGH AI-RELATED TORT LAW IS AN EMERGING FIELD still in its infancy, producers can take steps to mitigate risks. First, they can allocate liability throughout their supply chains and to customers through the use of proper indemnities, limitations of liability, and warranties in their contracts. Second, they should consider documenting AI's decision-making processes to show that their algorithms meet industry safety standards. Finally, producers should invest in AI testing campaigns and track real-world data to promote quality and safety and also conduct risk analyses.

> *Though AI can offer profound benefits to society, it also presents new risks and legal challenges in the realm of products liability.*

THOUGH AI OFFERS PROMISING SOLUTIONS for safety, efficiency and productivity, its proliferation will undoubtedly give rise to damages that may not be redressable through traditional tort law. As the law adapts to address AI-related products liability claims, a careful balance must be maintained between properly compensating victims and encouraging innovation.

[1] *https://www.investopedia.com/terms/a/artificial-intelligence-ai.asp*
[2] *https://link.springer.com/article/10.1007/s43545-020-00043-z#author-information*
[3] *https://is.muni.cz/el/law/podzim2017/MV735K/um/ai/Cerka_Grigiene_Sirbikyte_Liability_for_Damages_caused_by_AI.pdf page 386*
[4] *62 NO. 9 DRI For Def. 48; Rodgers v. Christie, 795 F. App'x 878 (3d Cir. 2020)*
[5] *Id.*
[6] *62 NO. 9 DRI For Def. 48, 50-52*
[7] *https://is.muni.cz/el/law/podzim2017/MV735K/um/ai/Cerka_Grigiene_Sirbikyte_Liability_for_Damages_caused_by_AI.pdf Page 383*
[8] *https://cms.law/en/gbr/publication/artificial-intelligence-who-is-liable-when-ai-fails-to-perform*

Text: Suzanne McNulty of Fitzpatrick & Hunt, Pagano, Aubert LLP

Don't Get Shocked:
Be Prepared for the Electric Aircraft Revolution

A shift to airplanes powered by electric motors via lithium-ion batteries is in motion. Just recently, a major aircraft engine manufacturer announced the first flight of its all-electric aircraft.

CURRENTLY, THE ADOPTION OF FULLY ELECTRIC AIRCRAFT is limited by battery technology. A 737-size jet, for example, would require a battery the size of the aircraft itself. As such, the technology exists to power only smaller airplanes. Even so, almost half of all air tickets sold globally in 2018 were for flights under 500 miles. Thus, even incorporating electric aircraft only for shorter flights could have an enormous impact.

Based on the rate of technological improvements in batteries, large, fully electric aircraft might reasonably be assumed to become available by the 2030s. And as we have seen, technology often advances far more quickly than anticipated, so these estimates ultimately may prove conservative. Remember, the first computer took up 1,800 square feet, weighed 50 tons and could do little more than add and subtract numbers!

AS THIS NEXT GENERATION OF AIRCRAFT becomes more common, claims professionals and other personnel in the aviation industry will need to become familiar with the unique challenges presented by electric aircraft.

With Change Comes Challenge

ELECTRIC-POWERED AIRCRAFT present risks that differ from those presented by current airplanes. From an underwriting perspective, the lack of historical data means that the cost of insuring these types of aircraft initially will be higher, and then decrease over time. Additionally, from a legal and public relations perspective, it is likely that the first incidents involving electric aircraft will be blamed on the new technology, rather than other potential causes. The legal theories for liability in matters involving electric aircraft likely will not change significantly. Nevertheless, insurers should be on notice that plaintiffs' attorneys inevitably will attribute initial incidents to design defects, relying on jurors' likely mistrust of this new technology to garner outsized verdicts. Gaining public trust and rebutting these arguments before judges and juries will take time and effort.

It's All About the Battery

THE BATTERIES THAT POWER the fully electric aircraft also present new challenges. Like electric cars, fully electric aircraft will use electric motors powered by lithium-ion batteries. These batteries have different maintenance requirements than current aircraft engines. For instance, lithium-ion batteries require charging, and their capacity for power diminishes over time. Thus, lithium-ion batteries will require more frequent replacement, and the depreciation of power will need to be monitored. One recent study found that the battery life of a fully electric aircraft could fall by as much as

> *It is likely that the first incidents involving electric aircraft will be blamed on the new technology, rather than other potential causes.*

25% in one year when operating four 55-mile flights daily. If this modeling proves accurate, airlines will have to account for the cost of monitoring and replacing batteries, and claims and underwriting professionals will have to look closely at the maintenance regime with a very different set of principles in mind.

A BATTERY MANAGEMENT SYSTEM (BMS) is critical to the maintenance of lithium-ion batteries. A BMS helps prevent fires or damage to the batteries, and tracks battery usage. Pilots and maintenance personnel must make sure a BMS is functioning and accurately reporting battery data. Data retention and data storage policies for data generated by the BMS also will need to be created and implemented. Further, personnel will need to be properly trained on these policies and made aware of the potential legal implications of failing to properly store or maintain this data.

Additionally, charging schedules for the batteries must be maintained. Will fully electric airplanes be able to get back into the air as quickly as their predecessors or will battery charging time prevent that? Will the batteries require charging over night or after every flight? Electric-powered engines offer instant acceleration, so perhaps that may translate into multiple shorter runways allowing more aircraft to take off in a shorter time period. But that, too, will require careful thought as to how airfields are managed—acknowledging that for many years to come both conventional and electric aircraft will be expected to share the airspace.

ALSO, AIRPORT AND LOCAL FIRE DEPARTMENTS will need to be trained on extinguishing electrical and battery fires, which are not tackled in the same manner as a jet-fuel fire. Finally, just like we change our personal smartphones every two or three years, will electric aircraft also have a shorter lifespan? Hopefully, it's not two or three years, but it will be interesting to see if they can compete with current airplane lifespans, which can be 40 or more years. The answers to these questions are not yet known and will be dictated by the capabilities of the batteries and other technological advancements.

THE INTRODUCTION OF THIS NEW TECHNOLOGY also means that new expert witnesses must be identified in anticipation of litigation. Experts in the areas of lithium-ion batteries, electric aircraft maintenance, and battery management software will be necessary to help resolve the complex claims scenarios that will inevitably emerge. Building industry trust with a deep bench of experts in these disciplines will become an immediate priority for those handling these types of claims.

Finally, attorneys and claims professionals will need to become familiar with the new technology. Having the right expert is important, but attorney and claims professional expertise is essential to the coordination of a strong defense.

Conclusion

THE MOVE TOWARD ELECTRIC AIRPLANES will bring new challenges. It will require a shift in aviation operations, claims strategy and litigation handling. As with any new technology, electric airplanes present challenges bred by unfamiliarity. Nevertheless, companies can use familiar strategies to handle the new challenges and, of course, any short-term challenges presented by fully electric airplanes pale in comparison to the long-term benefits for both the planet and the aviation industry.

Ultimately, if history tells us anything, it is that we should never bet against technological advancement. The future of aviation is bright. Time will tell how quickly it becomes the present!

Photos: Joby Aviation Aircraft (left); Kitty Hawk (right)

The International Language of Our Business

“So, Mr Brown, who is your favourite Spice Girl?” The question floored me because I was totally unprepared for it.

My young daughter was mad about the Spice Girls, but I had no idea that the pop quintet would be familiar to a group of middle-aged men 6,000 miles away in Taiwan, nor that they would consider the relative merits of the performers to be a suitable topic of discussion in a business meeting.

One of the things I have loved about being involved in aviation is the international nature of the industry, and with that comes the need to communicate with people from many different cultures and backgrounds. A shared interest can help oil the wheels of commerce.

As an Englishman abroad, for example, I am often expected to have an encyclopaedic knowledge of Premier League football. I have often disappointed on this score, but even a basic knowledge can be a lifesaver.

Shortly after the Iranian revolution, a loss adjuster from Lloyd’s Aviation Department was sent to Tehran to recover a spares inventory belonging to El Al. For obvious reasons, he was not specific about the nature of his mission and was viewed with suspicion by the authorities. Throughout his time there, he was overseen by a group of nervous, heavily armed and often hostile teenage boys. After a week, he noticed a poster on a wall and pointing to it, said to his guards “Manchester United!” It was enough to break the ice and completely change the atmosphere with these enthusiastic soccer fans.

My poor knowledge of English football is rarely a disadvantage in North America, of course, but I have often wished that I had some insider information on the latest scandal involving the Royal Family. (My advice: If in doubt, make something up—the truth is often stranger than fiction.)

Fortunately, there is a common language that unites us throughout our industry and in every corner of the globe, and that is our inextinguishable passion for aviation. However well we may understand the science, who is not still in awe of the miracle of flight? How many of us are indifferent to the latest innovation, the latest breakthrough in technology?

As I look forward to a change of pace in my life, I also reflect on the amazing people who have allowed me a glimpse into their aviation world: the pilot of the Jet Ranger as we crested the rim of a volcano in El Salvador; the guy from Eclipse bravely giving me control of the little jet 10,000 ft. above the New Mexico desert; the engineer demonstrating the 3D loom weaving carbon fibre fan blades; and yes, even the accountant outlining the reduction in costs per ASK in the latest quarter. In every case, their passion was not far from the surface and would be clearly understood by all of us.

So, it’s farewell from me, 12 years after I wrote my first piece as CEO in what was then “The Flyer.” I predict that the next 12 years will be full of surprises for both the aviation industry and its insurers. I predict that we will see the first woman on the moon and that many of us will have the chance to fly with electric, hydrogen or hybrid propulsion. I also predict that for all of us, our passion for aviation will be absolutely undiminished.

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