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The University of Louisiana Monroe

*Active Shooter*

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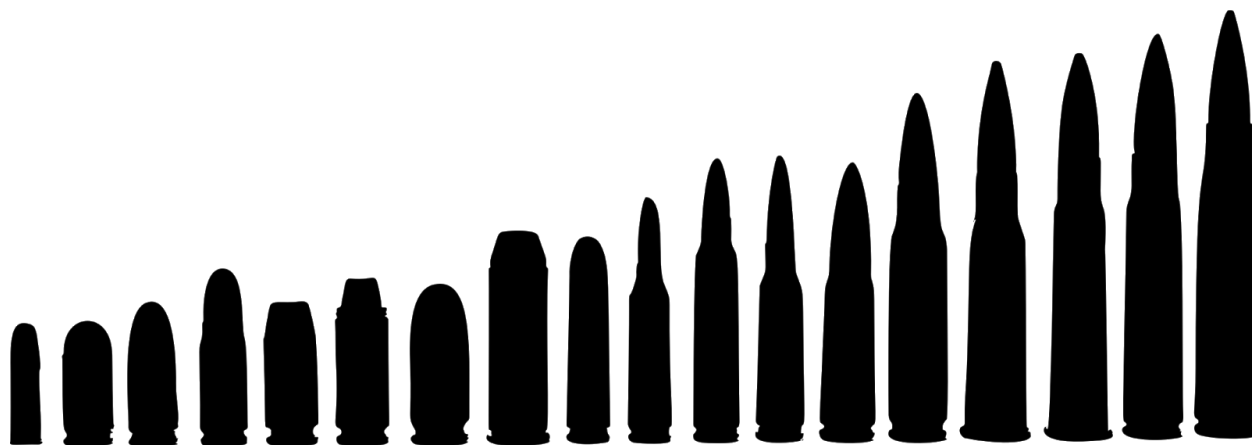
*Drones*

A Bulletproof Plan

Summer Ho

University of Louisiana at Monroe

April 6, 2019



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## **I. INTRODUCTION**

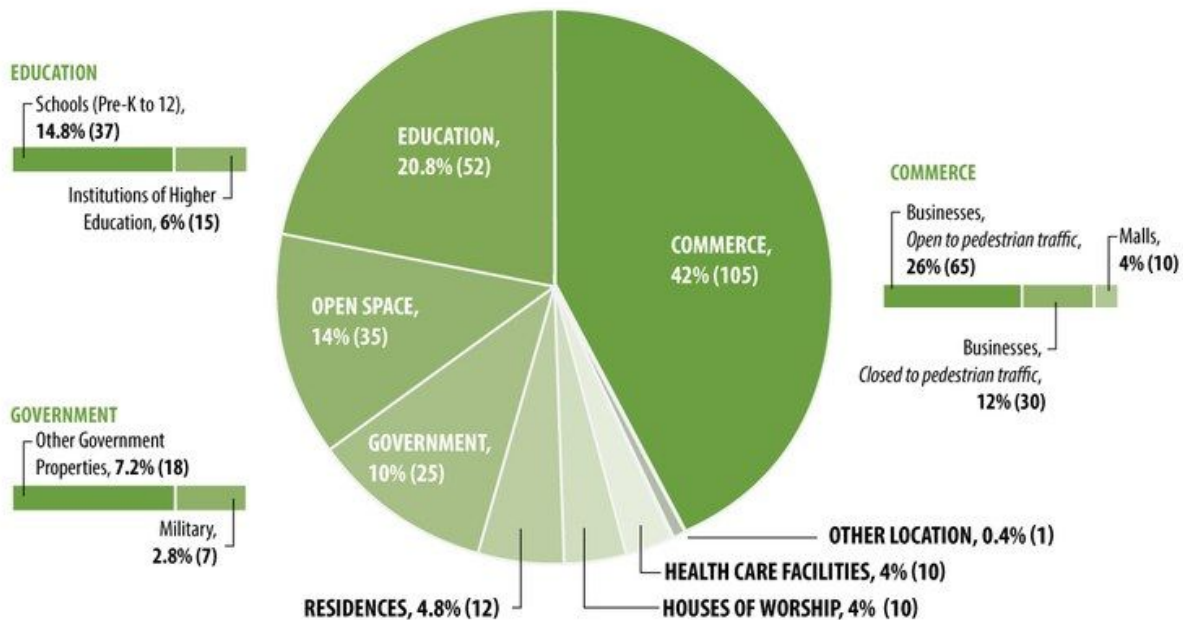
As ear splitting and heart wrenching screams pierce the air, people desperately scramble to escape their assailant(s) as a normal day quickly morphs into a living nightmare. The growing trend of active shootings, also known as active assailants, forces entities to reassess their incident response plans, reconsider alternative solutions, and review existing insurance policies. The Department of Homeland Security defines an active shooter as “an individual actively engaged in killing or attempting to kill people in a confined and populated area; in most cases, active shooters use firearms. . . [with] no pattern or method to their selection of victims.” As bullets ricochet across the room, their impact affects not just victims but reverberates throughout the entire community, insurance industry, and nation as well. In order to combat such attacks, organizations should implement risk control measures while purchasing proper coverage to supplement the overall defense against assailants. This signifies a dire need for the wholesale, specialty, and surplus lines as active shootings yield various implications, opportunities, and threats for the industry.

## **II. STATISTICS & SOCIAL SYMPTOMS**

From 2000 to 2017, the Federal Bureau of Investigation (FBI) recorded approximately 250 incidents with 2,217 casualties (799 deaths and 1,418 injuries). Additionally, the FBI further breaks down the likelihood of a shooting according to location categories: commerce (42%), education (20.8%), open space (14%), government (10%), residences (4.8%), houses of worship (4%), health care facilities (4%), and other (0.4%). From these categories, more notable and specific places include businesses open to pedestrian traffic (26%) and schools that teach Pre-K to 12th grade (14.8%). Alarming, a majority of these incidents started increasing around 2010

and continually skyrocketed up until this day. Analysts and researchers require more time to determine if the statistical phenomenon signifies an unnerving concern or mere fluctuation.

### Quick Look: 250 Active Shooter Incidents in the United States From 2000 to 2017 Location Categories



As a result, actuaries must take into consideration the dynamic statistics and miniscule dataset when calculating insurance risks and premiums. Psychologists attribute this deadly epidemic to multiple negative social forces such as the following: “financial and healthcare fears, a declining belief in the American dream, racism and other hate crime, a distrust of the government and [the President of the United States], global terrorism, and constant war” (Bonn). Furthermore, even though technological advancements and globalization benefit society as a whole, it also seems to inadvertently disrupt and cripple people’s psychological being. Social media provokes depression, anxiety, low self esteem, cyberbullying, and other negative symptoms. These factors trigger sentiments of alienation, contempt, and powerlessness within humans that ultimately lead to the worst case scenario: mass murder.

### III. PRESENT POLICIES

An active shooting will set into motion different insurance products such as workers' compensation, general liability, property, and terrorism. Workers' compensation will cover employees' injuries (including death) that result from a job related accident or occupational disease. General liability will handle third party injuries and other relevant costs such as attorney fees, court expenses, and claims settlements. Property will pay for physical damages or destruction to covered buildings and their contents. Finally, the Terrorism Risk Insurance Act (TRIA) could technically though unlikely apply if the United States declares the shooting as an act of terrorism. Nevertheless, due to the generally unfamiliar nuances of an active shooting, ordinary policies would not typically specify what does or does not qualify for coverage. For example, how much liability should an entity remain responsible for in even allowing an assailant on the premises in the first place? This involves the already complicated topic of concealed weapons and gun laws that differ depending on the state. The sensitive situation causes differences in opinions within the industry concerning negligence and fault basis. Should the blame fall upon an individual violating the law or the entity lacking sufficient security? Additionally, though a policy may cover an incident, it might not suffice due to the enormous losses involved with active shootings. This results in inadequate coverage and could detrimentally affect the organization's capability to operate normally. For instance, policyholders will "often find their general liability policies fall short of the cascade of bills and victims' need typically following a violent incident" (McGowan Program Administrators). Moreover, during the court proceedings of a claim, many plaintiff attorneys will utilize reptile tactics to persuade the juries to award higher liability awards. This approach emphasizes on how the juries as a

whole will collectively suffer, and for once, this statement stands for itself as appropriate and fitting since active shootings tend to devastate communities. Meanwhile, though active shootings do not usually involve major property damages, many parties will choose to completely demolish and reconstruct the building. An average property coverage does not account for this decision and will not include any teardown and remodel clause. Multiple entities will pursue this route due to the emotional distress associated with a building and the overwhelming urge to “take down and rebuild a facility better designed for possible future attacks” (Heisler). The industry must realize that carriers wrote most of the existent and standard policies before mass shootings turned into a commonplace tragedy. Essentially, insureds should review their present policies and reassess any coverage gaps, exclusions, and uncertainties.

#### **IV. INDUSTRY IMPLICATIONS**

Nonetheless, as active shootings drastically rise in frequency, policies must change accordingly as the demand increases for new and appropriate insurance coverage. The product development would require insurers to analyze data trends, identify possible exposures, design and price the product, ensure the compliance of laws, and review any related regulations. These events classify as insurable because of the accidental, random, and uncontrollable characteristics. Undoubtedly, the admitted market would not place business for this type of specialized exposure, because they must submit rate and form information, fulfill stringent capital requirements, pay for significant expenses, and abide by strict regulations. Overall, these restrictions hinder the standard market’s adaptability and flexibility in dealing with this exposure. Hence, the non-admitted market seem more suitable in handling this complex subject. Active shooting fits this market and categorizes as a unique risk due to evaluation difficulties and a lack of previous

loss experiences. In which case, the non-standard market outshines the standard one, because the state's rate and form regulation do not restrain their underwriting decisions. Coverage would not exist for certain lines of business and risks if not for the surplus lines. The exposure implies new business to write, more premiums to collect, and further opportunities to explore. However, it also leads to unstable variables to evaluate, more policies to maintain, and additional threats to consider. Regardless, the positives outweigh the negatives as society desperately needs coverage.

## **V. OPPORTUNITIES**

Even though feasibility and volatility concerns permeate this exposure, active shootings also provide multiple opportunities for the surplus lines in areas such as efficiency, investment, and diversity.

### **A. Efficiency**

The uncharted territory will assist underwriters, brokers, and other parties in honing their intelligence on the exposure. In particular, an underwriter plays a quintessential role in risk mitigation, subject knowledge, distribution channel, administrative systems, and client education. An underwriter will then work together with a broker “in helping sales understand how and why certain product features help or hinder risk mitigation and may influence the final product design” (Kersten & Johnson). This subsequently creates a positive effect as both parties will strength their internal partnership. The insured can also enlist the assistance of an external company such as Deloitte. This consulting firm “assists insurance organizations in the architecture of their insurance products and associated pricing, streamlining underwriting processes, and enabling better and faster insights through underwriting systems transformations (Deloitte). Ultimately, the client will then benefit from more customizable and negotiable terms

as an unintended side effect of unpredictable risk factors. In a time sensitive industry such as insurance, any insurer who can swiftly develop an innovative and responsive product will immediately stand out from other competitors. Along the way, the non-admitted market will accordingly adapt its underwriting guidelines and risk appetite. All of these aspects will ignite much needed competition and efficiency within the surplus lines industry.

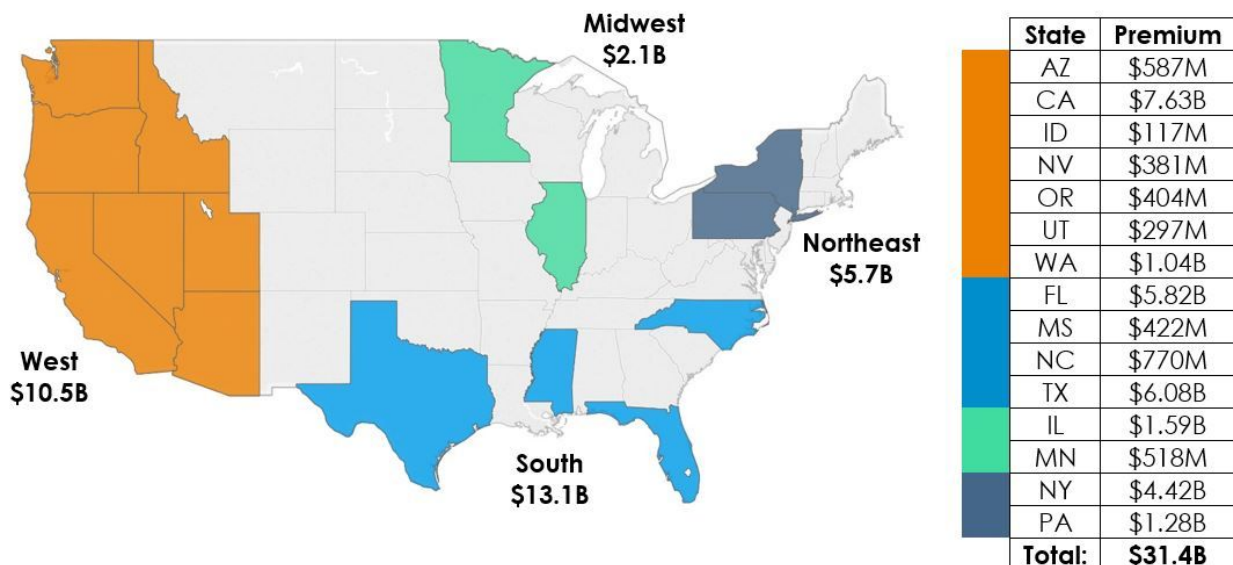
## **B. Investment**

Presently, most of society assumes that the insurance industry operates on an admitted basis and merely provides auto, home, and life coverage. In actuality, companies “must invest premiums received conservatively in order to [prepare] a reserve of liquid assets on hand to pay out those claims” (Hayes). This investment relates to the active shooting trend and how the shock loss still remains improbable and infrequent in comparison to other common exposures such as car accidents, cyber attacks, and property theft. This constitutes a longer tail, which refers to the given period from when an insured pays the premium until the first claim. It fundamentally enables the company to depend more on investment income and riskier stocks instead of stable bonds. The investment income will offset underwriting expenses, yield a higher return on equity, and contribute to a larger dividend payout for stockholders. Consequently, investors will notice the attractive market conditions and invest more funds into the industry. Besides the sheer earning potential, investors will also revel in the industry’s rapid expansion, diversified portfolios, risk consciousness, and statistical approach. Actuaries and mathematicians utilize a “complex algorithm to predict how much money they need in a give account to make the payout work, and they use investor money to help them store up their cash reserves” (NuWire). This all relates back to the marketplace willingness to underwrite risks as the increase in capital

correlates to an increase in capacity and surplus. It financially authorizes companies to write more policies, thereby generating more premium.

**C. Diversity**

Recently, the Surplus Lines Stamping Office of Texas (SLTX) conducted a mid-year analysis and apparently, the “excess and surplus lines premiums recorded by the 15 managing service offices. . . increased by 9.4%.” As a \$1.4 billion industry, specialty lines continue to flourish as premiums “exhibited a 67% increase over the past seven years” (SLTX).



This exploration of active shooting exposures will also empower the surplus lines to widen their realm of influence by diversifying and interacting with different industries. As of now, the non-admitted market already delves into insuring areas such as commercial, construction, distribution, education, energy, entertainment, environmental, healthcare, hospitality, manufacturing, real estate, transportation, and others. A policy with appropriate coverage will reassure businesses and allow them to take more risks. These endeavors will inevitably require the assistance of actuaries, finance, law enforcement, legislators, marketing, programmers, and

other entities. The collaboration will eventually produce a ripple effect and hopefully rectify the misconception surrounding the insurance industry.

## **VI. THREATS**

Even though multiple opportunities arise from this exposure, active shootings also provoke various threats for the wholesale industry in terms of reputation, catastrophic costs, and sensitive subjects.

### **A. Reputation**

Irregardless of the benefits, insurers should stay aware of the unavoidable threats, emotional intensity, and public involvement that accompanies active shootings as the tragedy truly embodies the term “the shot heard around the world.” To illustrate this idea, reminisce to when Cuthbert Heath, an underwriter for Lloyd’s of London, entered the insurance hall of fame by playing a crucial role in the San Francisco earthquake of 1906. During that time, the federal government could not provide disaster or relief funds for victims. In response to this, Heath “instructed his San Franciscan agent to ‘pay all of [the] policyholders in full, irrespective of the terms of their policies’” (Lloyd’s). The resulting claims cost over \$50 million and translates into approximately \$1 billion in the present time. In spite of these monetary losses, Lloyd’s gained far more in terms of market expansion into the United States and a solidified reputation for paying valid claims. To maintain a reputable image, an insurer should treat each active shooting incident with extreme care, because the media will not hesitate to wreak havoc upon them. For an industry built upon reputation and trust, companies cannot figuratively and literally afford to lose business. Thus, though insurers cannot realistically emulate Heath and his gregarious acts, they should at least understand the delicate nature and inherent morality behind active shootings.

## **B. Catastrophic Costs**

According to the Washington Post, gun violence infiltrates and ripples “through the economy in the form of lost wages, medical bills, higher taxes for law enforcement, and lower property values” (Singletary). Researchers estimate a loss of \$229 billion per year as active shootings make up a part of this overall number. By definition, active shootings differ from gun violence, but this staggering statistic showcases the catastrophic costs that insurance companies could potentially shoulder. Meanwhile, from a typical individual’s perspective, his or her health insurance could not possibly cover all of the medical expenses and therapy counseling required after an attack. The traumatic experience permanently imprints upon people’s minds as they morbidly come face to face with death. Additionally, active shootings decrease property values, tourism, and economic activity. For instance, even if travelers fantasized of visiting Paris, “tourism [actually] dropped by 3 million people last year in the wake of those 2015 terror attacks in the city” (Cigainero). Though this extreme example differs from active shootings, it verifies the fact that people consciously avoid afflicted areas after terrorist and/or violent attacks. This consequence forces entities to strive towards stimulating the economy, reassessing emergency response plans, and mending the public’s shattered trust.

## **C. Sensitive Subjects**

Besides monetary loss, active shootings also inflict other damages upon society as these incidences incite controversial debates over gun control, mental health, and racism. Parties with differing views tend to clash when discussing firearms and regulations. While one side worries about the public’s security, the other party strongly upholds the Second Amendment of the United States Constitution that states “A well regulated Militia, being necessary to the security of

a free State, the right of the people to keep and bear Arms, shall not be infringed” (Cornell). Another taboo topic revolves around mental health, the root cause of many active shootings. Most assailants “demonstrated ‘concerning behaviors’ and experienced a variety of stressors (e.g. financial strain, problems at work, marital difficulties, conflicts with family, etc.) observed or known by others in the time leading up to the shooting” (Pierre). These individuals struggle with anxiety, depression, suicidal thoughts, and other disorders that alter their psyche and rationality. Finally, the last and most uncomfortable subject lies within centuries of racism and stereotypes. In all honesty, people fear African Americans and people of color. The media vilifies this race as criminals’ mugshots and police brutality plague social media and this nation. Ironically, “according to data compiled by Mother Jones magazine, which looked at mass shootings in the United States since 1982, white people -- almost exclusively white men -- committed some 64% of the shootings” (Ford). This contrasts the stereotypical belief that mainly black men commit shootings, and it also reveals the low percentages within Asian and Latino races. Essentially, these sensitive subjects silence society as people twiddle their thumbs and avert their eyes to adversity. Coincidentally, the insurance industry must challenge these social stigmas as underwriters and brokers will someday question their own morality in binding business.

## **VII. CURRENT COVERAGE**

Currently, some carriers and insurers carry coverage for active shootings. In particular, insurance policies can cover business interruption, crisis management, funeral costs, litigation, medical expenses, physical damage, and others (Moorcraft). Furthermore, brokers should carefully watch out for employee, mental anguish, terrorism, and vehicle exclusions. Grey areas

also exist due to the insurer's duty to defend and the insured's negligence. As of now, only McGowan Program Administrators and Thompson Insurance, Inc. discuss and/or offer active shooting coverage. Product developers "originally designed [these coverages] for educational institutes like public and private schools and universities because of the abundance of information available to underwrite the risk" (O'Connor). Actuaries must decide affordable and appropriate premiums by considering the number of students or employees, demographic location, square feet, and loss history. After the product release, both companies started receiving inquiries about whether this coverage could extend to other lines of business as well. In the future, active shooting will unquestionably and saddeningly replace the trending cyber risks.

## **VIII. CONCLUSION**

The active shooting trend proliferates as mathematical statistics and psychological research explain the science behind it. In response to this, policies will undergo multiple changes to accommodate the frequency of risks, diversity of coverages, and ambiguity of proceedings. Insureds and insurers should remain up to date with present policies and acknowledge the implications this exposure holds over the industry. While opportunities such as efficiency, investment, and diversity will accompany this journey, the surplus lines must also battle threats such as reputation, catastrophic costs, and sensitive subjects. While current coverage does exist, it most definitely does not suffice as drastic demand overwhelms the scarce supply. In conclusion, everyone must equip his or her battle gear in preparation for the long war against the emerging risk of active shootings. Only then can the insurance industry don a bulletproof plan.

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# **Drones: A Technological Revolution**

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# Introduction

Imagine in the future being able to order anything from food to medicine and within a few hours a drone delivers it right to your location. This is the future of drones and it's going to change the way society perceives convenience. Drones have the potential to transform, disrupt and innovate a large number of industries, even the insurance industry. Today, companies are using drones to substitute traditional methods and innovate their current operations because they require minimal human interaction and reduce the need for safety infrastructures. Drones also present new opportunities for the non-admitted market from new business to the optimization of operations. This research was written for the Wholesale & Specialty Insurance Association in order to bring awareness and give insurance professionals a new perspective on the emerging technology of drones.

## What is a Drone?

To begin, drones have many variations to their name. Multiple publications refer to drones as either Unmanned Aerial Systems (UAS) or Unmanned Aerial Vehicles (UAV), they are relatively the same. This research will use drones and UAVs interchangeably. Drones are essentially aircrafts without a human pilot aboard. They use aerodynamic forces to provide the aircraft lift, like a helicopter, but utilize multiple rotor blades. Drones can also be retrofitted with different attachments such as cameras and sensors.<sup>[1]</sup> In addition, they can also operate with various degrees of autonomy, either under remote control by a human operator or autonomously by onboard computers that connect through communication links to ground operators.<sup>[6]</sup>

## Current State of the Drone Market

Multiple reports about the drone industry from Goldman Sachs to PwC have estimated the value of the global market is between \$100- \$127 billion. <sup>[2][3]</sup> At 70% of the market, the U.S military is the largest segment that utilizes drones and the consumer market is the second largest, at 17%. Last, but not least, the commercial segment makes up 13% of the

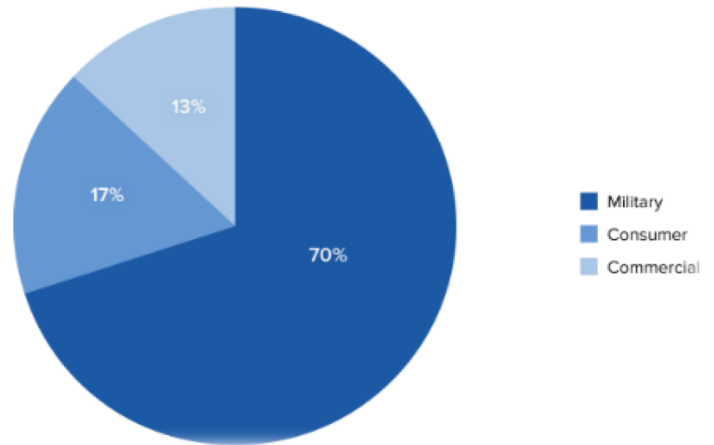


Figure 1: Drone Market by Segment Source: Toptal

market, but it is also the fastest growing segment. <sup>[4]</sup> Another interesting aspect about the drone market is that the largest manufacturer of drones is SZ DJI Technology Co., a Chinese-based company. In terms of market share, DJI has 70-75% of the drone manufacturing industry. <sup>[1]</sup> Most manufacturing occurs in China and they are leading the innovation. The current industries impacted by UAVs are: Infrastructure, Transport, Insurance, Media & Entertainment, Telecommunication, Agriculture, Security, and Mining. <sup>[3]</sup>

## UAV “Drone” Insurance

UAV insurance falls under the category of aviation insurance and it is also one of the fastest growing coverages. <sup>[6]</sup> The consumer market is the largest UAV insurance buyer and is also relatively cheap for consumers. UAV Coverages can range from hourly, per job, per day, or on an annual basis. <sup>[5]</sup> Companies like AIG Aerospace, State Farm, Old Republic Aerospace, Allianz, Global Aerospace, QBE, USSIC, USAIG, LAU, and XL Catlin are the leading providers of UAV insurance.

UAV policies are written in one of two ways: Named Pilots Only or with an Open Pilot Warranty.<sup>[16]</sup> Large UAV operations will benefit from Open Pilot Warranty policies if there are multiple pilots. Commercial UAV insurance is relatively easy to obtain, but the amount of policies and varying coverages can be confusing for businesses. The general advice is to contact an aviation-specific insurance broker in order to obtain commercial UAV insurance, since aviation insurance providers use brokers to quote, sell and service their policies.<sup>[16]</sup> Contacting a local agency in regards to commercial UAV insurance can lead to “too many cooks in the kitchen”, leading to inadequate coverage and fees. An aviation insurance broker would be able to locate the best company for any given operation based on desired coverage and needs.<sup>[16]</sup>

## **Composition of UAV Policies**

### **I. Liability**

Liability is the main coverage offered for UAV policies. Liability coverage also needs to be purchased prior to any other type of coverage and is the foundation of UAV insurance policies. Limits can start at \$500,000 and can be negotiated as high as \$10,000,000 per occurrence, which is not uncommon.<sup>[14]</sup>

### **II. Hull**

After liability, hull coverage is another aspect firms should consider. The purpose of hull coverage is to protect the business from financial burden from any physical damage. The coverage is quoted on an “Agreed Value” basis.<sup>[14]</sup> This means that the owner, the broker and the insurance provider have to agree upon the value and quote the drone based on that valuation.

Usually if the drone is totaled, the insurer will cut a check for the insured value of the drone minus any applicable deductibles, which range from 5% and 10% of the insured value depending on the policy.<sup>[14]</sup> Some providers will adjust the value of the aircraft to reflect the

current market price. Therefore, its important to have the stated value equal to the current market price of the UAV and insureds focus on the value of their drone to make sure they are not overpaying for coverage. <sup>[14]</sup>

### **III. Payload**

The third option to consider is payload coverage. For example, if the UAV is equipped with expensive cameras or sensors, then its reasonable to purchase payload coverage. This coverage is similar to hull coverage but is solely designed for payload equipment. Insureds should not put together the value of the payload in with the hull coverage, these items should be scheduled separately. Insureds should also consider Non-Owned Payload Coverage as well, insuring payload equipment not owned by them. <sup>[14]</sup>

### **IV. Ground Equipment Coverage**

Ground Equipment coverage is exactly what is sounds like, coverage for ground stations, laptops, tablets, cases, controllers, and other equipment associated with the insured UAV. Ground coverage has similar rates and deductibles to hull and payload coverage. <sup>[14]</sup>

### **V. Non-Owned Coverages**

Non-Owned coverages include:

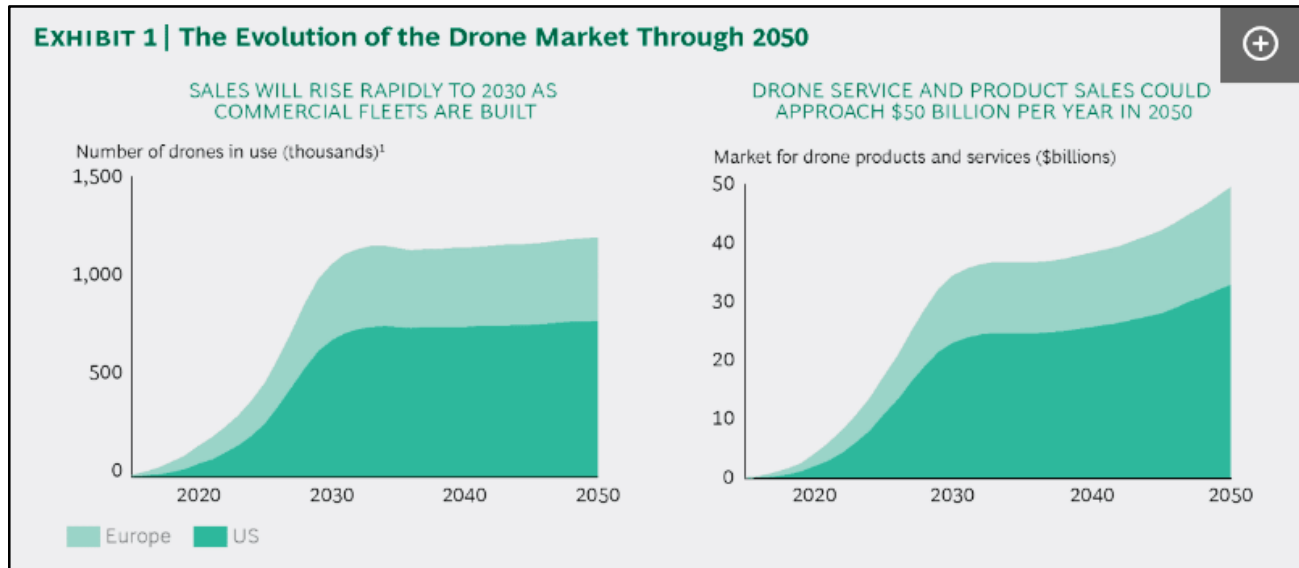
- Non-Owned UAV Liability coverage
- Non-Owned UAV Hull coverage
- Non-Owned Payload coverage

These coverages are crucial for companies that fly UAVs and payloads that are not owned by the policyholder. They are also designed for businesses that lease UAVs by the Named Insured.

The non-admitted market stands to benefit from commercial UAVs if insurers and brokers can offer specialized coverages that effectively tailor to the client, functionality, and equipment of the drone. <sup>[14]</sup>

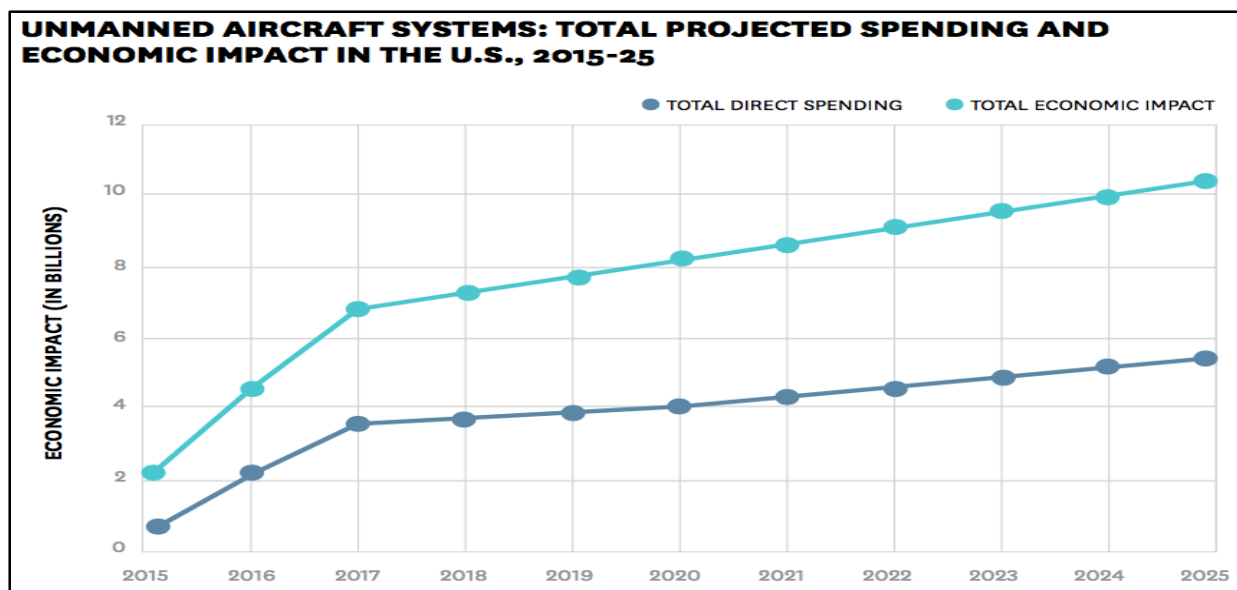
# Implications

## The Evolution of the Drone Market



**Figure 2:** Evolution of the Drone Market. **Source:** BCG Analysis

Over the past 5 years, multiple reports have surfaced regarding the impact of drones on the economy. The most significant reports published come from AIG, Boston Consulting Group, Goldman Sachs and PwC. In **Figure 2**, *Boston Consulting Group* has estimated the number of commercial fleets in the U.S will reach 700,000 by 2050, while the market for services and product sales will reach a \$30 billion market. <sup>[7]</sup> Based on BCG’s research, commercial drones will be the main driver of the drone market within the next 20 years. Commercial drones will also carry a huge price tag and it is estimated that the average cost of a commercial drone is \$100,000. <sup>[4]</sup> Another report by AIG in **Figure 3**, projects total direct spending will reach \$5 billion by 2025. AIG also estimates that the technology could impact the U.S. economy by \$10 billion in the near future. <sup>[6]</sup> Both reports project a bullish outlook on the drone industry in the near future.



*Figure 3: Total Projected Spending & Economic Impact in the U.S* Source: AIG

Therefore, the clear implication is that the production of drones is increasing every year and the economic impact by 2025 will be in the billions. With increased market adoption and progressive regulations, commercial UAVs are a promising technology for the non-admitted markets to insure.

## Opportunities

### Insurance Opportunities

#### I. Risk Monitoring

Within the risk monitoring sector drones will enable insurers to monitor natural disasters such as floods, hurricanes, and natural disaster sites. Insurance companies working with governments can monitor forces of nature and alert the local population if an emergency occurs, preventing casualties. Drones will also help mitigate the economic consequences of natural disasters by assessing areas of high risk, particularly disaster prone areas. <sup>[3]</sup>

## **II. Risk Assessment**

Within the risk assessment area of insurance, drones can provide support to the underwriting processes of property & casualty insurers. P&C insurers will use drones to gather information about an object or site to record its initial state before a policy is issued. <sup>[3]</sup> The information drones gather can also be combined with data that has been accumulated from traditional ways, improving the efficiency of the assessment process and scoring model precision, according to PwC. <sup>[3]</sup> Improving the risk assessment will allow insurers to calculate insurance premiums, leading to an improvement in customer satisfaction.

## **III. Claims Management & Fraud Prevention**

The Insurance Information Institute estimates fraud comprises around 10% of property & casualty insurance losses and loss adjustment expenses every year, which amounts to \$32bn each year. <sup>[3]</sup> With the help of drones, insurers can capture the initial state of the property or object and cross-reference the condition after a reported incident. Drones can also create 3D models of property, allowing insurers to assess damages faster, economically and accurately. The models will also provide indisputable documentation to mitigate the risk of fraud. <sup>[3]</sup> Ultimately this will have the effect of reducing fraudulent claims within the insurance industry.

## **IV. Increased Business Volume**

Consumers and businesses flying UAVs already purchase insurance—from liability coverage to coverage for the drone itself. Manufacturers of drones get product liability insurance and commercial UAVs need high limits of coverage. Once regulations become commercially friendly, more businesses will operate drones and also purchase coverage. In the future it's possible that UAV insurance, like car insurance, will be legally required. At the moment drone

insurance is not legally required but in the future regulations could change. Insurers stand to benefit from the demand of insurance for UAVs.

## **Infrastructure**

### **I. Investment Monitoring**

Drones provide real-time awareness of construction allowing developers to inspect the development of their projects without being at the site. They even assist the pre-construction phase by improving the speed and quality of the design process, utilizing high resolution cameras to create 3D modeling, and providing data to investors about the property. In the post-construction phase they also assist with work assessment, environmental verification, and reporting.<sup>[3]</sup> Companies also utilize drones to assess damages before construction begins to make sure they are OSHA compliant, mitigating construction from being halted. Therefore, construction projects and insurers will benefit from the efficiency that drones provide.

### **II. Maintenance**

Maintenance inspection is another field in which drones are being used within infrastructure management. Drones have revolutionized infrastructure management by eliminating in-person inspections that are slow, costly, and yield poor quality results.<sup>[3]</sup> Although some inspections are required by certified personnel, in many cases they can be performed by drones with the right equipment. UAVs can also discover defects quickly with the help of image processing, which insurers can analyze in order to make more effective decisions.<sup>[3]</sup>

### **III. Asset Inventory**

Stocktaking and inventory management is another way drones are being used. Large warehouses filled with inventory have to be regularly recorded. UAVs are more cost-effective in doing inventory assessments because stocktaking can be dangerous, time consuming, and labor intensive. Inherently, this will also increase workplace safety in hazardous areas that require inspections.<sup>[3]</sup> Therefore, it is implicated that drones will help lower the amount of worker's compensation claims, saving insurers money.

## **Obstacles & Threats**

### **Federal Aviation Association**

One of the main obstacles to commercial UAVs is the FAA. The FAA authorizes commercial drone use on a case-by-case basis. Activities that are defined as commercial use include:<sup>[8]</sup>

- Selling photos or videos taken from a drone.
- Using drones to provide contract services, such as factory inspection.
- Using drones to provide professional services, such as security or telecommunications.
- Professional real estate or wedding photography.
- Professional cinema photography for a film or television production.
- Providing contract services for mapping or land surveys.

The goal of the FAA is to integrate UAVs safely into US airspace but their progression has been rather slow. Evidently, the production of drones is increasing and the FAA could hinder the drone industry if they do not establish new regulations on pace with production. The current laws for commercial drones are called Part 107 Guidelines.<sup>[8]</sup> Part 107 was established in June 21, 2016, nearly 1000 days ago, and since then the FAA has yet to establish progressive regulations for businesses.

Two requirements for drones are they must weigh under 55lbs, including the payload, and must obtain a drone pilot license. For commercial purposes, 55lbs seems limited and the drone pilot license requires you to take a test that doesn't assess the ability of the pilot's skills. Therefore, businesses using 3<sup>rd</sup> party drone operators can't determine if their pilots can effectively navigate without liability.

## Terrorism

If you are not familiar with Venezuela's political affairs, there is an authoritarian government ruled by Nicolas Maduro. On August 4th 2018, two drones detonated explosives near Nicolás Maduro, when he was addressing the Bolivarian National Guard. <sup>[9]</sup> Although the two assassination attempts failed, it was clear that these drones were intended to fly into Maduro and detonate. Regardless of who orchestrated the attack, it has become a reality that explosives or weapons can be attached to consumer UAVs to commit terrorism.



Figure 4: UAV equipped with a rifle source Source: Pinterest

Terrorism facilitated by drones is one of the largest threats to the industry and to insurers.

## Cybersecurity Threats

Like autonomous cars, autonomous drones could also be subject to cybersecurity hacks. For example, a hacker could remotely hack into the communication links of a drone and steal the entire unit along with the data stored in the UAV, creating a data susceptibility threat. Another scenario is that a hacker could steal a drone while it's operating and commit a crime with it. UAV

insurance providers should consider these threats and focus on how susceptible the communication frequencies are between drones and the controller.

Another cybersecurity threat is that drones can obtain our financial information. WKBW News reported on drones that were retrofitted with financial information stealing equipment. [13] Our society is moving so fast that it is now possible to hack people from the air. All these threats should be looked into and taken into account when developing insurance programs for UAVs.

## **Drone Accidents and Crashes**

As drone production increases, the amount of accidents and crashes will also increase. Accidents plague every industry and occur more frequently than society perceives. According to Global Aerospace, *“At least 75% of accidents are directly attributable to pilot error caused by the operator’s poor knowledge of the system or inappropriate flight response.”* There are also accidents due to battery failure or low-charged batteries. There are so many factors that can lead to an accident and that is why the threat is in the operator's hands. Operators and insurance providers need establish risk management procedures to mitigate these accidents for their clients. [15]

## **Market Adoption**

According to the CEO of a French drone software company, Delair. The CEO, De Largade, perceives that market adoption is an obstacle to the UAV industry. *“Our clients are big corporations, and they’re the ones who can sometimes be the most resistant to change.”* [12] De Largade implied that corporations will not want to use UAVs, not because of regulations, but because of the risks associated with implementing drones into their operations. Some businesses will see the risks of utilizing UAVs while other businesses will see the technological reward.

Another aspect on adoption is that the aircraft technology is evolving at a significantly quicker rate than the operating industry, thus it can be hard for businesses to determine which UAVs are more suitable than others.<sup>[15]</sup> The FAA's lack of progression creates poor market adoption and corporations do not want to implement technology that is in a grey area of regulatory change.

## Summary

Nearly every aspect of the economy will start to see the impact of drones in the near future. Companies around the world are always looking to innovate and drones can help with change. The \$127 billion drone market consists of production, sales and valued added services. Companies utilizing drones are a part of the technological revolution and will benefit themselves by creating new jobs and economic activity.

Commercial UAV insurance is also evolving and insurers in this space are poised to benefit from the amount of new business and the change to their operations. Almost every industry will be affected by drones and its important for companies to asses where drones can innovate their operations.

Technological change is taking place all around us in this day and age, but new technologies can sometimes have unintended consequences. The technology of drones has been around for awhile but as of recently have begun to enter the business world. Inevitably, every new technology will have unintended consequences, and I believe that it is important to assess potential unintended consequences. Focusing on the opportunities is just as important as focusing on the potential threats in risk management. Therefore, insurance professionals should be impartial to new technologies in order to see the opportunities and threats. Drones have yet to scratch the surface but in the near future they could be essential to our livelihoods and economy, faster than we can imagine.

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