

WHITE PAPER:

Unmanned Aviation Risk Management, Accident Prevention and Insurance



An Overview of the Issues

Drones, also known as Unmanned Aircraft Systems (UAS) or Unmanned Aerial Vehicles (UAV)—all three terms will be used interchangeably in this paper— have become the subject of tremendous media interest, controversy and misunderstanding. They are already making a significant impact through commercial applications in a wide range of industries, and are touching the lives of more people every day.

Several industry sectors, including agriculture, energy and construction, have identified unique applications for drones. This expanding commercial use, together with potential humanitarian benefits (e.g., third world medicine delivery or search and rescue missions), will likely win over many of the naysayers. The use of drones as a way to manage risk in many industrial and commercial settings is just beginning. Fitted with highly efficient and smart payloads, UAVs can be the ultimate business tool, combining performance with safety. By replacing people on high ladders or rooftops, or eliminating the need for workers to be high above ground with electric cables or smoke stacks, UAVs can perform tasks with a level of safety far beyond traditional methods.

Investment in the sector is flowing from venture capitalists, angel investors, and numerous large companies. The Teal Group, an aerospace and defense analyst, estimates that the drone industry will be worth \$91 billion by 2024¹. Industry observers expect the gap in investment, technology and functionality to close between large military-grade drones and small commercial UAS over the next five years.

Privacy and safety, however, are emerging as the two chief concerns that the drone industry needs to address with government officials and the public. While the diverse benefits of drone operation are clear, managing and insuring against risk will be crucial to success for UAV manufacturers and operators.

REGULATION

On February 15, 2015, the Federal Aviation Administration (FAA) released its Notice of Proposed Rulemaking (NPRM), which sets out a framework for the regulation of drones weighing less than 55 pounds in the United States. Many in the industry welcome the proportionate approach the FAA is taking. However, those wishing to operate UAS in excess of 55 pounds, beyond visual line of sight (BVLOS) or over 500 feet above ground level argue that the FAA has not gone far enough to enable the U.S. to lead the way in this rapidly developing global sector.

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¹ Teal Group Corporation Market Study Press Release, July 17, 2014

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Nevertheless, the NPRM is a positive step in the right direction. As a provider of insurance, Global Aerospace welcomes regulation that will steer the UAS industry into an era of ever-safer operation. Clearly there is a need to push for integration of all types of UAS into the National Airspace System (NAS); but for the small unmanned systems addressed in the NPRM, the path to widespread use has been paved.

Before the proposed regulations become law (anticipated to take place in 2017), specific approval to operate a UAS for commercial or business purposes can be obtained from the FAA. This comes in the form of a Section 333 exemption under the FAA Modernization and Reform Act of 2012. Such approvals have been granted for many industry segments and diverse equipment platforms, usage and operating environments. A special section of the FAA's website (http://www.faa.gov/uas/legislative_programs/section_333/) provides details of how to apply for the exemption as well as records of approvals already granted and those currently under review. The FAA approvals granted to date have set the bar far higher than the NPRM proposes. For example, requirements have included all operators be licensed pilots.

IS THERE A GREEN LIGHT TO OPERATE?

There is now a clear roadmap toward widespread use of small drones. From our perspective at Global Aerospace, release of the NPRM appears to be a pivotal moment for a number of corporations and entities that had previously adopted a wait-and-see approach. As a result, we have observed an increase in inquiries regarding insurance for commercial drone operations.

Many of our customers have been manufacturing military-grade drones for decades. However, the proliferation of the small commercial drone has presented a new set of challenges, not least of which is the lack of available industry data. While commercial airliner and general aviation accidents are hard to predict using even the most sophisticated modeling tools, insurers at least have a good sense of the premium they need to charge to cover the likely loss activity in any given year. To a great extent, these predictions are based upon historic accident information along with evolving trends in the aerospace industry.

But with commercial UAVs, there is little data upon which to make similar predictions. Manufacturers are unlikely to acknowledge how many units crashed during test flights. Additionally, most models have not existed long enough for insurers to acquire an understanding of the particular features that could influence the likelihood of an accident or system failure. Another hurdle to address is the wide range of experience that drone operators (pilots) have when they start in the UAS business. Some have strong commercial or military aviation backgrounds, but most do not.

While the stakes are high, there are some inexpensive and easily attainable risk management solutions to help smaller UAS users operate safely. Then, along with emerging safety standards and proven safe operations, stable insurance ratings will become possible.

TRAINING

One primary risk management tool is training. Without an understanding of the hazards involved, UAV operators will never be able to operate safely. The NPRM indicated that

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operators would have to pass an aeronautical knowledge test. It is likely that this will include the need to demonstrate an understanding of aeronautical charts, meteorology, aerodynamics and more.

Training for all levels of drone operation is becoming widely available, from an online course for approximately \$200 offered by organizations including the Unmanned Safety Institute (unmannedsafetyinstitute.org), to custom training for a corporation's team of operators. Some insurance providers already require operators to undertake some type of formal training. As the regulations become fully developed, expect training to become mandatory by insurers.

The quality of the operating manual and after-sales support available to buyers varies enormously. Some are out-of-the-box ready; others require the owner to assemble parts before taking to the air. Some come with in-depth, easily understandable manuals; most do not. A poorly translated manual plus an inexperienced, untrained operator is a formula for disaster. Important information, such as the relative battery deterioration in cold weather, is missing from many instruction manuals.

A number of manufacturers provide training courses for their buyers. At Global Aerospace, we applaud the manufacturers who are taking a proactive position on training. Unfortunately, many manufacturers seem more intent on selling products than supporting their customer base. But it is our perspective that the UAS manufacturers who take an integrated approach to both sales and safety will achieve the greatest long-term success.

SAFETY MANAGEMENT FOR UAVS

Safety documents such as pre-flight checklists, logbooks and a Standard Operating Procedure (SOP) are established components of manned aviation at all levels. These documents come under the general heading of a Safety Management System (SMS). Of concern is the fact that parallel SMS standards have not been integrated into many small UAV operations.

At Global Aerospace, the belief in the importance of SMS documents as a risk mitigation tool led us to commission a SOP manual from the Unmanned Safety Institute. We are making this manual available to all Global Aerospace UAS customers.

This SOP covers issues that will affect UAV operators, including:

- Interaction between the operator and observer
- Weather and environmental issues
- Maintaining a safe distance from the UAS
- Ensuring airworthiness of a drone
- Pre-flight and post-flight checks

Safety should be the top priority of any aviation enterprise, manned or unmanned. Developing an SOP for the crew and all those involved in drone operations is an excellent way to promote a strong safety culture.

MAINTENANCE

An additional factor for which there is currently no standard or widely accepted practice is maintenance. The FAA's NPRM outlined the need for UAS to be maintained in a suitable condition for safe operations. Comment was invited on the maintenance and inspection

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proposals, and we may yet see a requirement for mandated periodic inspections by approved facilities. Regardless of how the final rules are drafted, the responsibility will fall on the operator to ensure the drone is inspected prior to each flight and is in a suitable condition for safe operation.

ENVIRONMENTAL HAZARDS

One of the greatest hazards in a UAV operation is the ability to operate in close proximity to people. The NPRM outlined the need for drones to avoid flying over people not directly involved in the operation. Common sense, together with the safety culture already discussed, should prevail on this point. Video footage taken by a drone soaring over a wedding party or a concert venue may produce some good imagery; but the risk is simply too great. The failure rate of small drones is still too high to take such chances where the risk of serious injury exists.

Many start-up technology companies are working on solutions for these UAV-related risks. Geo-fencing, or the ability to build technology into the software to prevent a drone from flying in restricted airspace, will soon be available to the mass market. Some manufacturers are already integrating it into their products. This technology can prevent flights near airports, government facilities and critical infrastructure as well as congested areas. While further development of the technology is needed, the intention to assimilate these risk mitigation features into UAS products is gaining momentum.

PRIVACY ISSUES

The final key UAS risk factor to consider is respecting people's privacy. Using drones in a responsible and ethical manner will ultimately lead to a lower risk profile as well as greater public acceptance of this controversial new technology. Simple precautions can be taken to avoid breaching an individual's reasonable expectation of privacy. These could include gaining the person's consent to being filmed and taking care not to publish any images or material captured without their consent.

Insurance for Unmanned Aviation

As with any aerospace operation, insurance is an integral part of risk management. It is there to provide financial compensation when the safety management system has failed to prevent an accident or a loss has been suffered due to an unforeseen event.

While the regulatory situation continues to evolve and change, the subject of insurance is increasingly important within the UAS community. Owners and operators, as well as manufacturers and other service providers, are all interested in insurability and the cost of premiums.

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Many in the UAS industry are looking to insurance carriers to be the driving force and ultimate arbiter of the various risk management initiatives currently in development. Adoption of smart technology, including the geo-fencing referred to earlier, electronic logbooks, real-time data recorders (commonly referred to as black boxes), and other risk mitigation technology may prove to be the critical piece of the safety assurance puzzle. Insurance providers have an important role to play in supporting the development of these technologies; but it will be the market that decides which of them ultimately prevails.

Common questions that come up regarding UAV insurance include:

- Do I need insurance for my drone?
- How much does UAS insurance cost?
- Do I need to be approved by the FAA to obtain UAS insurance?
- What would commercial UAV insurance cover?

MANDATED MINIMUM INSURANCE

The FAA's NPRM made no mention of insurance requirements.

It could be argued that small drone operators may be less inclined to buy insurance, and that a requirement for liability coverage as part of the certification process would be a sensible approach. Regardless of mandated minimums, any commercial UAV operator should assume that their customers and partners will eventually require them to certify that they are insured. In any event, we anticipate that most professional drone operators will purchase insurance for legal liability and to protect their assets. As the use of drones becomes more common, so will the requirement for appropriate levels of insurance.

While federally mandated minimum insurance requirements for aviation are negligible in the US, it can be reasonably expected that the eventual rule may contain requirements for some level of third party insurance.

THE INSURANCE MARKET FOR DRONES

Aviation insurance carriers in the U.S. that are active in the UAS sector offer different solutions and levels of coverage. Some, such as Global Aerospace, have drone-specific policies and coverage.

The insurability of an operation depends upon a number of factors including:

- Choice of platform
- Experience of the operators
- Intended use

Perhaps most of all, insurers assess the likelihood of an accident involving people, as that is where the possibility of expensive litigation and indemnity payments exists.

If liability limits higher than a few million dollars are required, the insurance marketplace is reduced to just a handful of available carriers. The higher the limit, the more questions about safety and operating procedures will be asked. An inexperienced wedding videographer, for example, will struggle to get more than a million dollars in limit if indeed he or she can find coverage at all.

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Insurers routinely mandate higher safety standards than those set by the FAA for traditional aviation risks. It can thus be expected that merely meeting the safety requirements outlined in the NPRM may not be enough to satisfy some insurers.

INSURANCE WITHOUT FAA APPROVAL

Lack of FAA approval in the U.S. is not proving to be a barrier to obtaining insurance. Of critical importance is the professionalism of the UAS operation requesting insurance cover. Has a Standard Operating Procedure been developed? Are the pilots trained and experienced? Is a spotter employed for all flights? Is a safe distance always maintained from persons and property? All these factors will play into insurability and pricing, regardless of FAA approval.

Considering these factors, an operator can expect the investment required to apply for a Section 333 exemption will be partially recouped by reduced insurance premiums once they obtain approval. Not only will the choice of carriers increase, but also the availability of higher limits. Additionally, coverage options are likely to expand and the underwriting process becomes simpler with a Section 333 exemption.

WHY BUY UAS INSURANCE?

Most general commercial insurance policies exclude aviation exposures, including those for drone operators, manufacturers, dealers or service providers.

Aviation is a litigious environment. Drone operators may not consider what they are doing to be dangerous (some don't even consider it to be aviation) but operators of UAVs could be exposed to legal action if damage is sustained to property or injury to persons.

This is where professional providers of insurance are so crucial. In the aftermath of an accident, UAS operators will need the support of a trusted insurance provider. Liability insurance doesn't represent a big cost when considering that the livelihood and reputation of the insured parties are at stake.

THE BENEFITS OF WORKING WITH A UAS INSURANCE SPECIALIST

While some non-aviation general liability carriers may now be considering the expansion of existing policies to include drone liability, it is our position at Global Aerospace that a UAS-specific insurance policy, with the ability to include physical damage and expanded coverage, is a far better route to take. Insurance providers who offer aviation-specific claims management are better able to offer the customized UAS insurance solutions that operators will need in the months and years ahead.

We anticipate that the need for physical damage coverage, as well as the added benefit of a tailored aviation policy, will lead most entities to seek insurance from one of the specialists.

FINDING AN INSURANCE BROKER

Once the need for insurance has been established, drone operators should contact either their existing insurance broker or one of the many aviation insurance brokers (some of whom are beginning to specialize in unmanned aviation risk). They will assess exposure, make recommendations for appropriate coverage and limits, and invite quotes from various insurance carriers.

WHAT WILL A UAS INSURANCE POLICY TYPICALLY COVER?

Aviation insurance falls into two basic categories: 1) legal liability and physical damage (otherwise known as hull) for the owner/operator; 2) and product liability for the manufacturer.

An operator should consider legal liability insurance as a minimum. This covers the cost to property repair or injury to persons. Additional coverage may include personal injury (invasion of privacy), non-owned (if you crash someone else's drone), medical expenses, premises liability and war perils such as damage sustained from a malicious act.

Additionally, coverage is available against physical damage to the UAS system itself. This covers the cost to repair equipment, or cover the total loss of either the platform, payload or ground equipment.

For the manufacturer or service provider (e.g., training facility, consultant, dealer, software designer), product liability is available. This would provide coverage in the event the insured product is considered to have caused or contributed to a loss. (It would not cover claims that fall under a warranty scenario.) It is important to note that even if a UAV operation is just getting started and is not yet commercially viable as a business, it still risks exposure in the event of an incident, and should have the appropriate insurance coverage.

Looking Ahead

Everyone involved in the UAS industry and within the larger aviation community is a stakeholder in the safe, responsible and sustained growth of UAS operations. The technology exists to help support this growth, along with emerging regulations and a supportive insurance market. Manufacturers and operators will ultimately play the biggest role in public acceptance of drones. Regulation will follow, and with it, increased confidence and comfort with UAVs as everyday tools of commerce and industry. A culture of responsible flying will be the key to ensuring the sustained development of drones in the U.S. It will result in a safer shared airspace while helping to reduce insurance costs.

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About Global Aerospace

As a leading provider of aerospace insurance serving a worldwide portfolio of clients engaged in every aspect of the aviation and space industries, Global Aerospace is already providing insurance and risk management support for unmanned aircraft operations. A 90-year history of innovation and leadership in aerospace insurance give the company the experienced insight into emerging, new technologies and associated risks.

Global Aerospace is headquartered in London, with offices in Canada, Cologne, Paris, Zurich and throughout the United States. Across the world, the company employs over 350 people and is backed by a pool of high quality insurance underwriters representing the most respected names in the business.

Policies are issued by one or more member companies of the Global Aerospace Pool. American Alternative Insurance Corporation, Tokio Marine America Insurance Company, Mitsui Sumitomo Insurance Company of America, National Indemnity Company, National Indemnity Company of the South, Central States Indemnity Company of Omaha, American Commerce Insurance Company.

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Chris Proudlove began his career in aviation insurance in 1990 and has been with Global Aerospace since 2005. In his current role as Senior Vice President, Manager Northeast Regional Office & Complex Risks, Mr. Proudlove is a widely recognized expert regarding insurance initiatives and products for unmanned aviation.

