

Unmanned Aerial Systems/Drones – Regulation, Liability, and Insurance Requirements

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■ Foreword

There has been a proliferation in the private and commercial use of unmanned aerial systems, also known as drones. The applicable laws and regulations of such use are being developed concurrently at the federal, state, and local levels. But when the inevitable damage or injuries result from a UAS, a key question will be who is responsible and liable for damages? When flying things crash, UAS users will want protection and any injured parties will seek compensation.

Providing policyholder protection for UAS-related issues is an important and valid role for property/casualty insurance that NAMIC members would like to meet, but major law and regulatory gaps exist in federal/state/local jurisdictions, privacy, trespass, negligence, reckless endangerment, assault, and cyber-related issues. NAMIC members want to provide comprehensive policyholder protection, but many serious questions are unanswered about UAS regulations and civil liability. As long as the regulation of drones is unclear or incomplete, insurers cannot provide the appropriate insurance coverage.

As UAS regulations and civil liability standards evolve, NAMIC will work to ensure that these regulations provide the necessary clarity and breadth that its members need to provide policyholder protection. As these legal and regulatory gaps are addressed, NAMIC will be active in ensuring that its members can be in the business of providing effective protection and compensation.

■ Introduction

The recent proliferation of UASs has been nothing short of phenomenal, and the addition of video systems and other increasingly lightweight payloads are continually increasing the range of UAS uses and capabilities.

The operational and technical capabilities of UASs have quickly outpaced regulatory efforts, and perhaps the most complex issue is the emergence of more, and more extensive, commercial use of UASs. Businesses large and small – including insurers – are actively exploring the myriad developing UAS capabilities and how these capabilities can be effectively integrated into business operations. The Federal Aviation Administration **estimates** 7,500 commercial UASs will be viable soon and is working with a wide range of businesses to better understand the potential universe of commercial UASs.

In addition to the potential use of UASs by insurers, policyholder use and coverage of commercial UASs will be crucial for insurance companies to better understand. Some UAS experts believe that insurance – both for the UAS and for attendant liability – is the most critical issue for commercial UAS development. More UAS laws and regulations are being considered at both the federal and state levels, and required insurance coverage may well

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Emerging Issue



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NAMIC is the largest property/casualty insurance trade association in the country, serving regional and local mutual insurance companies on main streets across America as well as many of the country's largest national insurers. Our 1,400 member companies serve more than 135 million auto, home, and business policyholders, and write more than \$196 billion in annual premiums.

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be a key part of the eventual regulatory scheme for UASs. Other **experts** see UASs as the newest game changer for the insurance industry, suggesting insurance companies can capitalize on the use of drones because of their photo, video, data collection and sharing, and navigational capabilities.

All of these areas are developing quickly and dramatically. This paper attempts to draw a line for 2015 to define the current issues and challenges more clearly. There will be more commercial use of UASs, more detailed UAS regulation, and emerging interpretations of civil liability of UAS use, particularly in the commercial context. As this uncertainty is resolved, prudent UAS users will want to be adequately insured against loss and liability. Mechanical things in the sky have a nasty proclivity to sometimes fall in unexpected ways and places, and insurance professionals who understand the issues can gain tremendous opportunities to help their policyholders.

► What is an Unmanned Aerial System/Drone?

Small hand-held remotely piloted aerial systems – these personal flying machines – can range in size from minute helicopter-like devices the size of hummingbirds to larger fixed-wing aircraft. How small? The term “micro drone” commonly refers to UASs that weigh less than 50 pounds, but the Nano Drone measures only two inches across, and the tiny Robo-fly has a carbon fiber body weighing less than one ounce and a pair of flapping wings powered by electronic “muscles.” So-called “macro drones” are much larger – the size of small airplanes or helicopters.

UASs can be piloted or autonomous. Autonomous, unmanned air vehicle flight control systems are generally not hand-held and require computers to generate and correct the path of their flight, as well as to account for terrain obstructions, weather, and moving objects. Piloted systems require hardware, software, power systems, and connectivity to ensure that the UAS responds correctly and promptly to pilot commands. They may also require computers for control but are more often smaller and hand-held.

The dramatic rise in the popularity of UASs is due to the wide range of applications being developed. These are no longer just flying toys that simply buzz around the trees. Cameras for UASs are highly developed and increasing in sophistication and daily use. UAS users can produce **real-time maps** with a resolution up to 20 times greater than Google Earth. Advances in microprocessors, software, and cameras give an operator with \$1,200 worth of equipment the ability to acquire images that would have previously required the rental of helicopters at upward of \$600 per hour.

UASs were one of the most popular Christmas gifts in 2014, prompting the FAA to **issue** a holiday bulletin and video advising on their use. Amazon is **reportedly** selling more than 10,000 UASs a month, and **Best Buy** expanded its selection from one last year to eight different models in stores – and five more online – to meet rising demand. Formerly the province of the military, this democratization of UASs has resulted in uncertainty about what UASs are and how they can be appropriately used. The power of UASs to hold and deliver packages of increasing sizes and weights is also growing. One company **claims** a 132-pound lift capacity with the promise of payloads of up to 880 pounds. Numerous models and versions are available, or becoming available, with the three largest manufacturers in 2014 being French manufacturer Parrot, China-based DJI Innovations, and 3D Robotics in the United States.

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A Teal Group 2014 [study](#) calculated the UAS market at 89 percent military and 11 percent civil for the decade, with the numbers shifting to 86 percent military and 14 percent civil by the end of its 10-year forecast. [Fortune](#) magazine reports that the global market for nonmilitary drones has already ballooned into a \$2.5 billion industry, growing by more than 15 percent annually.

And that's under the current law. One of the biggest potential markets for commercial drones – the United States – isn't even fully open for business yet. The FAA asserts that civil UAS markets will continue to grow, even with the current regulatory constraints. As these constraints are resolved, commercial use of UASs will expand rapidly and the demands for more UAS and ancillary services will also grow quickly.

► Proposed Commercial UAS Uses

Many experts agree that there are tremendous opportunities in the rapidly expanding field of commercial UASs, and each commercial use has its own range of specific questions of liability and insurability. The potential commercial uses of UASs are continually expanded by technical advances and imagination.

One year ago, Amazon CEO Jeff Bezos made headlines by suggesting that to-be-developed Amazon Prime drones could make autonomous deliveries in as few as 30 minutes. This was followed by [reports](#) of Google using a fixed-wing aircraft to deliver packages, including chocolate bars, dog treats, and cattle vaccines, to farmers in the Australian outback. DHL announced a regular drone delivery service of medications and other goods to a small island off the coast of Germany. On the lighter side, a United Kingdom Domino's franchise delivered two pizzas using a UAS, and a [Minnesota brewery](#) was testing a new drone delivery system to airlift frosty cases of beer to fishermen holed up in ice shacks on Mille Lacs Lake.



► Spotlight on Precision Agriculture

In 2013, the Association of Unmanned Vehicle Systems International, a trade group that represents producers and users of UASs, published "[The Economic Impact of Unmanned Aircraft Systems Integration in the United States](#)," detailing its findings of the economic benefit of UAS integration. Experts participating in the study concluded that the commercial agriculture market for UASs is "by far the largest segment, dwarfing all others."

UASs can significantly aid commercial agriculture, land management, and conservation efforts by assessing crops, mapping flood zones, and providing invaluable data for land and soil management. Farmers are using UASs to monitor crop growth, which in turn enables modern farm machinery to deliver exactly the right amount and type of fertilizer. UASs are already being used for agriculture in a slew of countries, including Canada, Australia, Japan, and Brazil. In France, where the technology is widely used, farmers say drones boost revenues by approximately \$65 per hectare. Other possibilities include UAS-supplied images of pastures and feedlots that indicate whether any of the animals are sick or of growing crops that indicate whether the crops would benefit from chemical application.

The AUVSI predicts that 80 percent of the projected commercial market for drones will be for agricultural uses. Once FAA rules for commercial use are completed, the AUVSI expects more than 100,000 jobs to be created and nearly half a billion dollars in tax revenue to be generated collectively by 2025, much of it from agriculture. According to AUVSI, Iowa alone could see 1,200 more jobs and an economic impact topping \$950 million in the next decade.

A large number of property/casualty insurance companies are farm mutuals that insure farm property; buildings and personal property used in the processing of agricultural products; residences, including household and personal effects; churches; schools; and community buildings and such property as may be properly contained therein. If commercial UAS use proceeds, these farm mutual insurance companies could benefit greatly from a more complete understanding of permissible agricultural use of UASs.

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The following are some additional examples:

- Movies and videography;
- News gathering and reporting;
- Real estate – promotional videos and photos;
- Pipeline/hydro-transmission line inspection – including difficult-to-access areas of refineries and production facilities;
- Railroad and highway maintenance – access and view dangerous conditions from a safe distance, even in harsh weather and extreme conditions, and;
- Construction – highly detailed elevation views, detailed and exact distances with CAD-quality drawings for any photographed structure.

Popular opinion, however, may not be as favorable toward commercial UAS use. A December 2014 [poll](#) reported that only 21 percent of the more than 1,000 Americans surveyed were in favor of commercial UAS use. In focused questions, those surveyed were more receptive to UAS uses such as performing dangerous safety inspections or mapping and monitoring wildlife, but opposed to uses such as taking aerial photographs or videos and delivering small packages. Three-quarters of the persons surveyed were concerned that private operators using UASs could pose a danger to aircraft and people on the ground. Almost 90 percent of persons surveyed were concerned that private operators could use UASs in ways that violate other people's privacy.

► Legal Issues for Commercial UAS Use
Although new FAA regulations for small UASs have been proposed, commercial use of UASs is not permitted under current law, as the FAA fulfills its **statutory mandate** "to develop a plan for the safe integration of civil unmanned aircraft systems into the National Airspace." While the FAA develops this plan, almost every state legislature,



as well as numerous municipalities, has introduced bills and resolutions addressing UAS issues. While certain aspects of proposed UAS laws and regulations are new, most UAS-related laws and regulations are variations on both well-settled and emerging legal issues of federalism, property rights, privacy, and tort liability.

The Government Accountability Office [proposed](#) in 2008 that the United States develop a clear and common understanding of what is required to safely and routinely operate UASs in the National Airspace System. Congress specifically called for UASs' integration into the NAS by September 2015 when it enacted the FAA Modernization and Reform Act of 2012.

In the interim, the FAA has stitched together patchwork guidelines and interpretations upon which the agency bases its jurisdiction and enforcement. All unmanned aircraft, according to the FAA, are aircraft within the definitions found in statute under title 49 of U.S. Code, section 40102(a)(6) and title 14 of the Code of Federal Regulations section 1.1. Section 40102(a)(6) defines an aircraft as "any contrivance invented, used, or designed to navigate or fly in the air" and FAA's regulations (14 C.F.R. § 1.1.) define an aircraft as "a device that is used or intended to be used for flight in the air."

Because an unmanned aircraft is a contrivance or device that is invented, used, and designed to fly in the air, the FAA position remains that an unmanned aircraft is an aircraft based on the unambiguous language in the FAA's statute and regulations. The agency further concludes that because all civil aircraft are subject to FAA regulation under law: 49 U.S.C. § 44701, UASs are subject to FAA regulation.

The FAA previously made the distinction between UASs used for recreational purposes and those used for commercial purposes. Section 336 of the FAA Modernization and Reform Act of 2012 established a "special rule for model aircraft," specifically prohibiting the FAA from promulgating "any rule or regulation regarding a model aircraft, or an aircraft being developed as a model aircraft" if the following statutory requirements are met:

- The aircraft is flown strictly for hobby or recreational use;
- The aircraft is operated in accordance with a community-based set of [safety guidelines](#);
- The aircraft is less than 55 pounds;
- The aircraft is operated in a manner that does not interfere with and gives way to any manned aircraft; and
- The aircraft is not flown within five miles of an airport.

In June 2014, the FAA provided its [interpretation](#) that "any operation not conducted strictly for hobby or recreation purposes could not be operated under the special rule for model aircraft. Clearly, commercial operations would not be hobby or recreation flights." The FAA specified that flights in furtherance of a business, or incidental to a person's business, would not be a hobby or recreation flight.

Section 333 of the FAA Modernization and Reform Act of 2012 grants the

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secretary of Transportation and, therefore, the FAA authority to determine:

1. If an unmanned aircraft system, as a result of its size, weight, speed, operational capability, proximity to airports and populated areas, and operation within visual line-of-sight does not create a hazard to users of the NAS or the public or pose a threat to national security; and
2. Whether a certificate of waiver, certificate of authorization, or airworthiness certification under 49 USC § 44704 is required for the operation of unmanned aircraft systems identified under paragraph (1).

An exemption may be granted after a **two-step process**. First, the FAA must determine that the UAS does not pose a risk to those operating in the NAS, the general public, or national security, and it can be safely operated without an airworthiness certificate. The FAA will then use its existing exemption authority to grant relief from FAA regulations that may apply. Once an exemption is granted, the applicant must apply for a civil certificate of waiver or authorization permitting the operator to conduct the proposed operation.

The FAA determined that UAS operations conducted for purposes other than hobby or recreation are subject to FAA regulations. In petitioning for the relief afforded under Section 333, UAS operators must seek exemption from regulations applicable to the specific circumstances of their operations with which they believe they are unable to comply. The FAA **published** detailed guidance to people who are interested in submitting a petition for exemption to the FAA to operate UASs in the NAS.

► Prior Exemptions Granted by the FAA

In June 2014, seven aerial photo and video production companies obtained FAA regulatory **exemptions** to allow the film and television industry to use UASs. In December 2014, the FAA **granted** five regulatory exemptions to fly UASs to perform operations for aerial surveying, construction site monitoring, and oil rig flare stack inspections. The FAA granted two more exemptions in January 2015, including **one** for a “system carrying a geo-referenced still camera to conduct photogrammetry and crop scouting in order to perform precision agriculture” below 400 feet. The FAA has approved a request from State Farm for drone use. Other insurance companies, including Erie Insurance and USAA, have applied for, but not yet received, FAA exemptions for the use of UASs. The FAA is expected to address these insurance company applications in 2015. A detailed list of pending exemption requests made to the FAA can be found on the agency's **website**.

In January 2015, CNN **announced** that it had signed an agreement with the FAA to explore the use of drones in newsgathering and reporting. CNN said it has officially "entered into a Cooperative Research and Development Agreement" with the FAA to use UASs to improve storytelling. The cooperation arrangement will reportedly integrate efforts from CNN's existing research partnership with the Georgia Tech Research Institute. That coordination among CNN, GTRI, and the FAA has already begun.

This Cooperative Research and Development Agreement¹ is not an exemption, as described above, but rather an agreement that the FAA will share facilities, equipment, services, intellectual property, personnel resources, and other cooperation with private industry, academia, or state/local government agencies to implement or develop an

idea, prototype, process, or product for direct application to the civil aviation community and/or indirect application for commercial exploitation. This agreement is not referenced or included on the FAA website and the text of the agreement is not generally available.

The rules also may address the ability of state and local authorities to regulate drones, including a possible “preemption clause” in draft rules to assert precedence over other laws. States and municipalities are now considering limitations on UASs. The FAA is charged with ensuring the safe and efficient use of U.S. airspace, and this authority generally preempts any state or local government from enacting a statute or regulation concerning matters such as airspace regulation.

According to the **FAA**, a state law or regulation that prohibits or limits the operation of an aircraft, sets standards for airworthiness, or establishes pilot requirements generally would be preempted by FAA regulations. But state and local governments do retain authority to restrict the use of certain aircraft, including UASs, by the state or local police or by a state department or university.

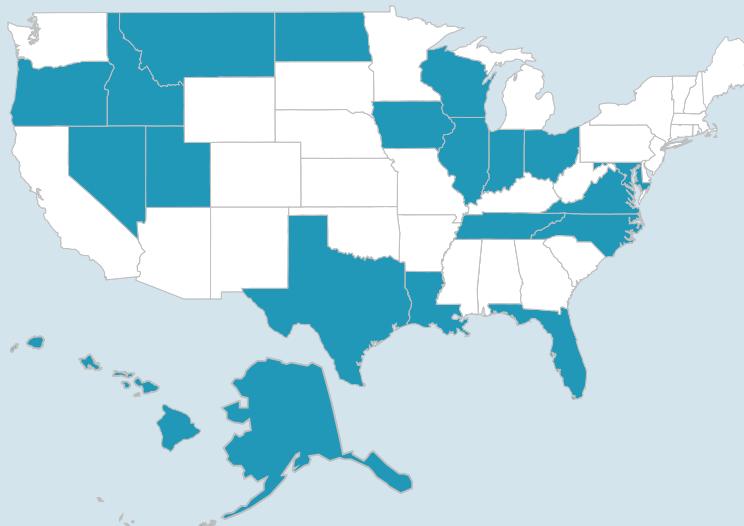
According to the **National Conference of State Legislatures**, 20 states have enacted laws addressing UAS issues, including defining what a UAS is; how they can be used by law enforcement or other state agencies; how they can be used by the general public; regulations for their use in hunting game; and the FAA test sites. In 2013, 43 states introduced 130 bills and resolutions addressing UAS issues. At the end of the year, 13 states had enacted 16 new laws, and 11 states had adopted 16 resolutions. In 2014, 35 states considered UAS bills and resolutions, 10 of which enacted new laws.

Some **industry experts** think that insurability of unmanned aircraft

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► States with Enacted Laws Addressing UAS Issues

Alaska
Florida
Hawaii
Idaho
Illinois
Indiana
Iowa
Louisiana
Maryland
Montana
Nevada
North Carolina
North Dakota
Ohio
Oregon
Tennessee
Texas
Utah
Virginia
Wisconsin



Source: National Conference of State Legislatures

is the “gorilla in the room.” While FAA integration is a significant event, insurability is a necessary event before businesses can successfully use UASs in the NAS because no business is going to want to absorb the risk of liability concerns. Insurability will determine which sectors of the UAS market will grow and which will die, and side industries, such as the creation of maintenance certification and UAS registries, will then be developed to support this insurance segment.

Recreational Use versus Commercial Use
As noted, the FAA allows recreational or hobby use of UASs and set limitations on UAS commercial use. The [FAA](#) defines “hobby” as a “pursuit outside one’s regular occupation engaged in especially for relaxation” and recreation as “refreshment of strength and spirits after work; a means of refreshment or diversion.” UAS use in furtherance of a business, or incidental to a person’s business, incidental to, and within the scope of a business are not considered by the FAA to be a hobby or recreation flight.

More than the simple joy of flight, the development of UAS capabilities has been in connection with the delivery of a message or package or to collect data. So for the FAA, using a UAS to deliver a beer to a friend at his pool may be a permissible hobby use, but the FAA said it will **not tolerate** commercial delivery of beer to ice fishermen. With respect to collecting data, the FAA **will permit** using a UAS to view “a field to determine whether crops need water when they are grown for personal enjoyment” but previously stated that it would not allow a farmer to use a UAS to determine “whether crops need to be watered that are grown as part of commercial farming operation.”

Whether a policyholder is insured for commercial loss of a UAS or any damage or liability from the commercial UAS use may depend on whether the policy may be limited by law or regulation. The application of policy coverage also needs to be considered. Insurance policies may specifically exclude operations

in violation of law or regulations, so the language of policies should be reviewed to determine coverage. It is also important to note that the FAA limits on commercial UAS use exist only in **Notices of Interpretation**, which may or may not be covered, depending on the language in policies.

With respect to recreational UAS insurance and experience, it may be helpful to consider the Academy of Model Aeronautics Liability **Insurance Program** for Site Owners. In its 2012 **report**, the academy noted that roughly 35 liability claims are reported annually – approximately 20 are property damage and 15 are bodily injury claims. The AMA stated that the injury claims reported are mostly minor, but on very rare occasion the injury is severe, resulting in a settlement involving a large amount of money. From 2001 until 2012, the AMA and its insurance company reported paying out approximately \$5 million, mostly to settle injury claims.

Regulation of Commercial Use of UASs
It has been the position of the FAA since 2007 that UAS commercial operations are only authorized on a case-by-case basis. As previously noted, in the 2012 FAA reauthorization legislation, Congress told the FAA to come up with a plan for the “safe integration” of UASs, and the agency is developing regulations, policies, and standards that will cover a wide variety of UAS users, including commercial.

At the same time, insurance companies are already exploring ways to use UASs commercially. As previously noted, property/casualty insurance companies have applied to the FAA for exemptions from the prohibition of commercial use of UASs for data collection purposes. Specifically, insurance companies have said that they want to use drones to:

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- Perform risk assessment/management, loss prevention, and underwriting, including roof inspections;
- Inspect areas that are inaccessible by ground more safely and quickly;
- Collect images after loss and casualty events/catastrophes; and,
- Expedite payments to customers.

It is not difficult to imagine additional data collection and analysis uses of UASs for property/casualty insurance companies. UASs can access areas and locations that would otherwise involve exceptional risks for personnel, and the data collected can be critical in assessing how to continue the operation. It is all but certain that the depth and breadth of property/casualty insurance company use of UASs will develop and expand, particularly as attendant image capture and analysis programs develop and proliferate.

► FAA Proposed Regulations for Small UASs

In February 2015, the FAA proposed regulations to allow the operation of small UASs in the NAS. The proposed changes would allow for more operation of UASs, certification of their operators, registration, and display of registration markings. Specifically, the rules would allow for small commercial UASs, including business, academic, and research and development flights that are hampered by the current regulatory framework, to operate in the NAS.

These proposed rules are only one part of federal UAS regulation. Section 332(a) of the FAA Modernization and Reform Act of 2012 requires the secretary of Transportation to develop a comprehensive plan to safely accelerate the integration of commercial UASs into the NAS. These rules are part of that plan for small UAS operations that the FAA determined would pose the least amount of risk. The FAA will continue working on integrating other UAS operations that

pose greater amounts of risk, which will be addressed in subsequent rulemakings.

Until the rules are adopted, FAA exemptions for small UAS use will still be required. The proposed rules would not abolish the certificate of waiver or authorization system, and the existing exemption process will be required for UAS operations that fall outside the parameters of the rules. UASs that are not within the definition of "small" or that otherwise do not comply with the final regulations will be prohibited from commercial use and will have to seek a certificate of waiver or authorization in order to engage in commercial use.

The FAA proposed rules reassert FAA jurisdiction over small UAS, noting that the operation of a small UAS still involves the operation of an aircraft, as FAA's statute defines an "aircraft" as "any contrivance invented, used, or designed to navigate or fly in the air." 49 U.S.C. 40102(a)(6). Because a small unmanned aircraft is a contrivance that is invented, used, and designed to fly in the air, a small unmanned aircraft is an aircraft for purposes of the FAA's statutes. Because a small UAS involves the operation of an "aircraft," FAA maintains that this triggers the FAA's registration and certification statutory requirements.

The FAA states that the proposed rules are designed to mitigate risk associated with small UAS operations in a way that would provide an equivalent level of safety with the least amount of burden to business. In general, the proposed rules are a minimally burdensome, well-reasoned, and productive first step in enabling small commercial UAS use, and it would reduce the potential for undue hazard to other aircrafts, people, or property. The proposed rules request comments on a significant range of issues and will likely be revised – perhaps substantially – before they are adopted.

As the FAA faces the daunting task of developing regulations for larger and more complex UAS operation in the NAS, the proposed small UAS rules may require even further tweaking.

There are constituencies that will not be satisfied with the proposed rules. Amazon and other companies that want to use UAS for deliveries will be disappointed that external loads are not permitted. The prohibition of operating over any persons not directly involved in the operation will impede small UASs in more populated areas. Farmers and other businesses involved in large areas may be limited by the requirements of visual line-of-sight. Commercial airlines and other aviators may certainly be concerned with the wider and less controlled use of UASs in the NAS.

There are numerous practical considerations of the proposed rules that will also have to be worked out. The proposed requirement that small UASs may not operate over any persons not directly involved in the operation has been criticized as impractical. The FAA ceiling of 500 feet for small UASs – but no floor – will also be of great consternation to property owners who may be told that national airspace exists one millimeter over their lawns or patios. Clearly, further development is necessary.

While the proposed FAA rules would begin to reduce the more significant barriers for drone insurance at the federal level, NAMIC remains concerned about the developing regulatory, commercial, and practical considerations of providing the greatest level of protection for policyholders, including the use of drones in policyholder servicing. There is a more detailed discussion of the relevant insurance specific issues of small UAS use later in this document. NAMIC is committed to working with our members and the federal, state, and local regulators to promote responsible UAS development

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► What the Proposed Rules Provide

Small

The proposed rules would define a small unmanned aircraft as an unmanned aircraft weighing less than 55 pounds, including everything that is onboard the aircraft. The rules do not apply to air carrier operations, i.e. transporting persons or property by air for compensation, or external loads, i.e., a load that is carried, or extends, outside the aircraft fuselage and may be “jettisonable.” FAA airworthiness certification is not required.

Purpose

These rules eliminates the recreational versus commercial use distinction that the FAA has applied to UASs in the past. This proposed framework would allow small UAS operations for many different non-recreational purposes without requiring airworthiness certification, exemption, or a certificate of waiver or authorization.

Operations

Small unmanned aircraft may not operate over any persons not directly involved in the operation, can only operate during daylight, can go no faster than 100 mph, can go no higher than 500 feet, and must have FAA Aircraft Registration and required aircraft markings – the same requirements that apply to all other aircraft.

Operator

Under the proposed rules, the person who manipulates the flight controls of a small UAS would be defined as an “operator.” A small UAS operator would be required to pass an aeronautical knowledge test and obtain an unmanned aircraft operator certificate with a small-UAS rating from the FAA before operating a small UAS. The FAA would also require recurrent knowledge tests every 24 months.

Visual line-of-sight

The unmanned aircraft must remain within visual line-of-sight of the operator or an additional visual observer working with the operator.

Right of Way

The proposed FAA rules direct the small-UAS operator to give right of way to all manned aircraft in such a manner that the manned aircraft is never presented with a see-and-avoid decision or the impression that it must maneuver to avoid the small UAS. The small-UAS operator must always consider the safety of people, first and foremost, over the value of any equipment, even if it means the loss of the UAS.

that protects aircraft, people, businesses, and property.

► UAS Risks and Insurance – Some Legal and Operational Considerations

An understanding of insurance must begin with the concept of risk. The effective response to risk combines two elements: efforts or expenditures to lessen the risk, and the purchase of insurance against whatever risk remains. Proactive risk management involves carefully analyzing a situation to determine the major risks and then taking steps to minimize potential damage. That is what the FAA is trying to do – primarily, to minimize risk and damage to the NAS and other aircraft, which is the FAA's primary role – and secondarily, to minimize risk and damage as well as to protect individuals and property on the ground.

Reactive risk management refers to a situation in which there is a reaction to problems after they happen. At that time, either the victim or damaged party can bear the injury of loss, mitigated perhaps by insurance coverage, or some or all of the liability for the injury or loss can be transferred to another party, who may also have insurance coverage.

Whether the party injured by a UAS or a third party causing the damage is covered by their own insurance will depend on the terms of the specific insurance contract, which generally have not considered the likelihood and extent of UASs, and may exclude aircraft coverage. This is a factor that the insurance industry is working to manage and define, as UAS use becomes less prohibited under law.

Reactive UAS risk management also depends greatly on whether laws and regulations clearly operate to transfer liability, including liability for damage by drones, by drone pilots and facilities

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operators, or by people who hijack drones or interfere with drone controls under defined tort standards, including product liability and negligence.

A broader question, influencing all areas of this consideration, is when and how law and regulation will transfer liability to another party. Until standards of UAS liability are better defined, it will be extremely difficult for insurance companies to understand and provide for UAS risks and liability. The question of liability seems fairly clear if a drone crashes into person or property, but:

- What if the operator was acting under FAA direction to take evasive action to avoid another aircraft?
- What if the radio signals from the other aircraft interfered with the controls, which resulted in the crash?
- What if the drone dives directly in front of a car, which then swerves into a tree?
- What if the radio signals from the drone controller interferes with an electronic railroad switch and sends the 5:04 to Newark onto the track used by the 5:09 from Boston?

There are even more basic questions of whether third-party liability will even exist, raising the attendant questions of whether the injured party or the third party has insurance coverage. Consider that the FAA says that the national airspace extends to the ground, even on private property, and that the FAA has set no minimum height at which that drone must fly.

- Can a drone fly in national airspace 400 feet, 100 feet, 25 feet, or 2 feet over private property without trespassing? If so, does the drone have to avoid people and property, or is there some requirement to keep the NAS clear of obstacles and avoid aircraft in national airspace? In a person's back yard?
- If a person feels threatened by a drone in his or her yard, can he or she hit it

with a baseball bat? How about in a neighbor's yard? A public park? Would a driver have to swerve to avoid hitting a drone on the highway?

- Can states preclude UAS flights on state roads, or is that national airspace?
- What is the liability for a drone that – intentionally or accidentally – electronically records email or security passwords or takes photos of children at a pool?
- What standards apply to determine what is reasonable operation of a UAS? What is careless operation? What is negligent operation? What constitutes recklessness?
- The FAA says that it "understands and accepts" that a person flying a UAS "may lose sight of the unmanned aircraft for brief moments of the operation." If that UAS hits a person in that brief moment, is this assault, negligence, or merely conduct that the FAA has deemed "understandable and acceptable?"

These are but a sampling of the critical questions of law, regulation, and liability that must be answered for insurance companies to provide the wide variety of property/casualty insurance policies necessary to protect policyholders and those injured or damaged by UASs. As the regulators develop UAS rules, they will appropriately focus on proactive risk management. It will be the responsibility of the insurance industry to work with the development of these rules to raise and address the reactive risk management insurance issues needed for UAS insurance to develop as well.

The scope of UAS safety and privacy extends far beyond the role of the FAA to protect the safety of the NAS. This was clearly recognized in President Obama's February 2015 executive order directing the Department of Commerce through the National Telecommunications and Information Administration in consultation with other interested

agencies to develop a framework regarding privacy, accountability, and transparency for commercial and private UAS use.

This is certainly a positive step, but it raises the question of whether combined efforts of the FAA and Commerce Department are sufficient to provide comprehensive regulations and enforcement for the myriad of commercial UAS uses, as well as the liability and compensation for the losses and damages that may result. Privacy, trespass, negligence, and recklessness are just some of the related issues that are the province of state and local law and judicial interpretations.

There are numerous and unpredictable questions that will result from commercial UAS operations that will probably come before state or local government authorities and courts, particularly when it comes to liability and insurance coverage. As the FAA and Commerce Department appropriately resolve UAS issues under their respective federal jurisdictions, it will be important to appreciate and consider that many if not most interpretation and enforcement of UAS standards will likely end up at other authorities.

There are inherent risks in the operation of UASs, which are amplified and exacerbated with the proliferation of their numbers, uses, and increasing capabilities. The requisite combination of an aircraft, control hardware, control software, and a communication link – in addition to potentially hazardous payloads – makes risk assessment, management, and coverage extremely complex. It also directly impacts the development of regulations and legal liability of UAS owners and operators.

UAS insurance policies will define the extent and limitations of UAS coverage, with policy agreements contractually

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specifying that extent and limitations of coverage, as well as exclusions, restrictions, and prohibitions. This must be based on the work of underwriters to define the range of UAS-related risks – their likelihood and severity – to adequately price and offer UAS liability insurance. This information, however, does not exist for UASs. A November 2014 [study](#) of UAS liability and insurance in Europe – where commercial UAS use has been permitted for years – concluded that there is no reliable data on UAS incidents or accidents either in public form or from commercial sources, and that the lack of this information means that the assessment of damage caused by UASs remains a theoretical exercise.

The existence and extent of insurance coverage for recreational and commercial use of UASs in the United States are not very clear. While various Internet sites purport to be or link to insurance companies that offer UAS insurance in various capacities, the actual coverage available is uncertain. The existing regulatory schemes in place for UASs in Europe and Asia include requirements that operators and users obtain and retain adequate insurance coverage. Insurance requirements may be part of the more extensive UAS regulatory proposals expected from the FAA.

The standard commercial general liability policy that most businesses purchase covers bodily injury and property damage caused by an “occurrence,” which it defines as “an accident, including continuous or repeated exposure to the same generally harmful conditions.” As a rule, however, most, if not all, such commercial general liability policies have exclusions for damage caused by the operation of aircraft. Commercial property insurance policies also have various forms of aircraft exclusions, including policies that may specifically exclude coverage while a UAS is off the ground.

Most homeowners’ insurance policies also exclude coverage for aircraft, with the exception of “model or hobby aircraft not used or designed to carry people or cargo.” If a UAS has an attached camera or other equipment/payload, coverage could possibly be denied because the attachment may be considered cargo.

Like airlines and aircraft manufacturers, UAS manufacturers and operators may need to be covered by specialized liability policies. It appears that some UAS coverage, if available, may be currently written on an aircraft liability form. This covers bodily injury and property damage to third parties and may include physical damage coverage for the UAS. It is underwritten based on the UAS type, the frequency and purpose of use, the operator experience, the revenue from use, and the limits purchased. Some insurers have reported providing UAS liability coverage through an endorsement to existing commercial liability policies, with no additional charge. Privacy-related liability may be addressed by existing E&O/cyber liability policy, although this may also be less than certain. For UASs valued at less than \$5,000, the UAS itself is often not insured.

With the exception of small UASs that are fully compliant with the new proposed FAA rules when they become effective, the FAA and some state regulations currently prohibit the commercial use of UASs, and the breadth of the interpretation of “commercial” is very broad. The FAA position is that a farmer using a UAS to look at his own garden is a recreational user, but that same farmer using a UAS to view crops he intends to sell is a commercial user. Similarly, the FAA has taken the position that reckless recreational UAS use is a violation of FAA rules.

These factors are important as property/casualty insurance policies – commercial or otherwise – may often include a

criminal act exclusion that excludes coverage for bodily injury caused by, or reasonably expected to result from, a criminal act or omission of the insured. The criminal act exclusion generally applies regardless of whether the insured person is actually charged with or convicted of a crime. The exclusion can include a criminal act committed by or at the direction of any insured. There are also state statutes that prohibit insurance payment for illegal activities.

Insurance companies that make decisions to provide or not provide UAS-related coverage have specific areas of concern. Liability could exist for insurance company directors and officers who decide to provide UAS coverage that is in known conflict with laws or regulations, or fails to consider laws or regulations in deciding to provide such coverage.

While laws and regulations for UAS and attendant tort liability are in flux, insurance agents asked to provide UAS coverage will have to engage in proper due diligence to ensure coverage in fact exists and that there are no exclusions that could inadvertently negate coverage. The agent would then be required to specifically advise the insured in writing which exposures arising out of UAS use will not be covered to mitigate the agent’s E&O exposure. If the agent is mistaken as to law or fact and tells the insured that coverage exists for certain exposures, the agent may face a lawsuit regarding the uncovered liability, potentially triggering his or her E&O insurance.

In making decisions concerning underwriting UAS risks and paying claims related to UASs, insurers must identify and fully understand the application of the specific torts, as well as state and federal laws that could permit UAS use and/or generate lawsuits or fines against a UAS. Effective policy language is then needed to include or exclude specific use and liability. The following

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is an overview of just some of the major issues related to the legal and operational considerations of property/casualty insurance coverage for UASs.

It has been **estimated** that underwriters now insure only 3 percent of UAS applicants. Insurers that are considering offering UAS coverage have to deal not only with regulatory and commercial law uncertainty, but also the substantial risks of UAS operational failure, which are exacerbated by the continually emerging technology implications subject to unknown and varied vulnerabilities. UAS insurance policies can cover the UAS itself, safety risks, privacy exposure, and cyber security liability; all of which have very short histories on which to assess risk levels and general aviation, model aviation, and even ultralights experience to consider and extrapolate. While there are myriad approaches to considering each question, this section will attempt to address some of the major legal issues.

1. Loss of, or Damage to, the UAS

Inherent in the acronym UAS is the fact that it is an unmanned aerial “system” composed of (1) the flying aircraft, (2) any camera, video, or other payload, (3) the hardware and software that control the aircraft, and (4) the communication hardware and software links that connect the other parts of the system. For systems with relatively lower cost, insurance may not make sense. Larger systems, which can have a value in the tens or even hundreds of thousands of dollars, may reach a level where “hull” insurance may be worthwhile. UAS physical damage coverage will apply to loss or damage to the UAS and associated equipment on an agreed value basis. It is not likely, however, that a UAS of higher cost that is worth insuring will be for recreational use only. As noted above, the FAA currently prohibits commercial UAS use without FAA approval, and insurance policies may specifically exclude operations in violation of laws or regulations.

To illustrate the complexity of insuring a UAS, consider automotive insurance coverage. Insurers consider the manufacturer, model, and value of the vehicle as well as the operator’s gender, age, driving record, and other factors. Accepted underwriting standards are considered, with relevant minimum and state regulatory coverage requirements, to determine how to price and provide a policy.

With UASs, the relevant pools are too small, and the actuarial classes and policyholder risk matrices are not particularly relevant.

UAS coverage may have to be looked at anew. UAS insurance contracts may specify matters as simple as whether the UAS is insured both in the air and on the ground, and as complex as defining the permissible operations of the UAS covered under the policy. It has been said that UASs exist for missions that are too “dull, dirty, or dangerous.” Insuring a UAS may include understanding just how dirty and dangerous the work for which the UAS will be used and how the operations will be conducted to minimize unknown and unacceptable risk. Pricing a policy for a FAA-certified pilot to take pictures with a UAS over a wheat field will likely entail less risk than for insuring Uncle Ernie spotting bluefish at a populated ocean resort.

Existing property/casualty insurance policies may exclude or limit coverage for improper or reckless use, and there may be few, if any, relevant standards for gauging proper or appropriate use that are applicable to a UAS. Existing, more general property/casualty insurance policies may also contain specific aircraft exclusions, and analogous aviation standards may or may not be applicable to any UAS policies.

When a UAS crashes or is lost, any responsibility for the loss by the



► Protections Against Drone Intrusion

Fear and loathing of drone use has spawned a number of businesses offering protection against drones, and a French company is developing a drone that will intercept and drag a net to stop other drones. Still other companies are reportedly developing communications interference systems to block the remote controls that direct drones. And yet another company offers systems that can “hear” a UAS and provide alerts to its proximity. One organization offers to register an address online and inform drone manufacturers that drones are not wanted near the registrant’s business or home.

manufacturer or software provider will be more difficult, if not impossible, to establish. The legal and practical ability of an insurer to pursue reimbursements for UAS manufacturer defects or product liability is murky. It can be complicated by the possibility of damage to the system resulting from a failure.

In considering UAS coverage, there is also an interesting and unresolved question of UASs and state and local trespass laws. To understand the risk of loss or damage to a quarter-million-dollar UAS,

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it would be prudent to understand the local rights of land owners to prevent or impede UASs from being on, over, or near their property. **Deer Trail, Colo.**, decided not to offer hunting licenses for shooting down drones that might fly into the hamlet's airspace, but local interpretations of the extent of property owners' rights to take action against UASs for trespass, invasion of privacy, and nuisance may impact the physical risk to UAS loss or damage and insurance risk.

2. Regulatory Liability

Insurance coverage for a UAS, and any liability for the operation of a UAS, can be limited or prohibited by law or regulation, as well as the terms of the insurance policy. Operation in violation of law or regulation may void or limit the application and coverage of policies under state contract or insurance law or pursuant to the terms of the policy.

With respect to recreational UAS use, the FAA's authority to "take enforcement action against anyone who operates a [drone] or model aircraft in a careless or reckless manner" was affirmed in November 2014 by the National Transportation Safety Board. The NTSB directed an administrative law judge to decide whether the aircraft was operated carelessly or recklessly, but confirmed the authority of the FAA to issue an assessment order and fine the operator \$10,000 for reckless operation of an unmanned aircraft.

The FAA has proposed regulations for small UASs, but it **maintains** that all other commercial UAS operations are not in a regulatory "gray area" and that the FAA "is responsible for the safety of U.S. airspace from the ground up." The FAA asserts that it has a number of enforcement tools available, including a verbal warning, a warning letter, and an order to stop the operation. The FAA has **reportedly** looked for companies offering commercial UAS services and warned

them to stop doing so, in some cases threatening "enforcement action."

Recall, however, that the FAA determination and **definition** of commercial vs. hobby UAS use are through a Notice of Interpretation with Request for Comment, rather than statute or regulations that the FAA is still drafting. There are many issues concerning UAS use and FAA authority that has not been codified in law or promulgated in federal regulations, raising numerous questions of the enforcement authority of the FAA in this regard and the impact of the notice on insurance coverage provisions.

State UAS laws have also been enacted, and additional UAS provisions are being considered. A number of states prohibit using a UAS to electronically survey persons or the private property of another without permission. Texas law enumerates lawful uses for unmanned aircraft, including their use in oil pipeline safety and rig protection. In North Carolina it is a crime to fish or hunt with a UAS, harass hunters or fisherman with a UAS, or distribute images obtained with a UAS.

Exactly how these state laws will work when the FAA finalizes its rules remains to be determined. But, UAS use raises a number of issues concerning the respective "airspace" rights of private

landowners, local authorities, and the federal government.

3. *Trespass and Privacy Liability Considerations*

The Congressional Research Service has deemed privacy the most contentious UAS issue. Property/casualty insurance policies, particularly for commercial UASs, may include, or specifically exclude, coverage for and indemnification of tortious liability, including civil actions for trespass and privacy violations. Property lines are not always clear, and a shift of wind could inadvertently blow a UAS over a property line. These issues and the attendant liability and coverage depend highly on legal concepts of property and airspace that are evolving with UAS use.

On Feb. 15, 2015, President Barack Obama issued the presidential memorandum "**Promoting Economic Competitiveness While Safeguarding Privacy, Civil Rights, and Civil Liberties in Domestic Use of Unmanned Aircraft Systems**" that explicitly recognizes that UASs "may play a transformative role in fields as diverse as urban infrastructure management, farming, public safety, coastal security, military training, search and rescue, and disaster response." The president ordered the federal government to ensure that the integration of UASs into the NAS will consider economic competitiveness and public safety as well as the privacy, civil rights, and civil liberties concerns these systems may raise.

Trespass in airspace requires the property owner to have possessory rights to the airspace allegedly violated by the UAS. To constitute an actionable trespass, an intrusion has to subtract from the owners use of the airspace above his property that he can actually use. With respect to privacy, in a public place, there is no right to be alone nor is there any privacy invasion if a photograph is taken in a public place.

In 1587, matters were simple and clear under the common law – the owner of a piece of land also owned everything above and beneath it, *Cujus solum ejus est usque ad coelum* – from heaven to hell.

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Then modern law came and muddied it all up. In 1946, the U.S. Supreme Court determined that Congress had declared a public right of transit in navigable airspace and national sovereignty in that airspace. The court declined, however, to draw a clear line as to where that airspace over a property began. In the almost 70 years that have passed since that decision, that clear line remains undrawn.

Congress did declare a public right through “navigable airspace,” and defined that space as minimum safe operating altitudes including airspace needed for takeoffs and landings. Now that many readily available UASs can take off and land on coffee tables, the forthcoming FAA UAS regulations will require the FAA to make some official determination that its jurisdiction is either from the ground up or from some point in the air down. This determination will not only be critical to define federal and state UAS jurisdictions, as well as personal rights, but will also directly impact liability of UAS operators for trespass, privacy issues, and cybersecurity.

An FAA designation of UAS navigable airspace will generally inhibit, if not preclude, allegations that a UAS in that airspace trespassed on private property or violated privacy. Should the FAA define UAS “navigable airspace” as “from the ground up,” the FAA may practically eliminate private property limits – as well as state jurisdiction – on UASs.

There is a bill proposed in California that would define trespass as the "knowing entry upon the land of another also to include operation of an unmanned aerial vehicle below the navigable airspace overlaying the property." That means flying a drone over private property – below what the FAA deems “navigable airspace” – could at some point constitute trespassing in California. The problem is that there may be no airspace below FAA jurisdiction. FAA officials have reportedly

taken the position that national airspace extends down to the ground – that the FAA considers the air one millimeter above a person’s lawn or patio – to be the NAS subject to federal government regulation. FAA officials admit that this is not ideal, but that’s what the laws say and that’s what the rules say.

With respect to privacy, the FAA has in the past **opined** that it is not taking specific views on whether or how the federal government should regulate privacy or the scope of data that can be collected by manned or unmanned aircraft. Numerous federal and state legislative proposals regarding UAS and privacy have been made, however. The **Preserving American Privacy Act** would prohibit UASs from capturing data in “highly offensive” ways; the **Drone Aircraft Privacy and Transparency Act** would require UAS operators to submit a “data collection statement” to the FAA.

President Obama issued an executive order on Feb. 14, 2015, establishing transparent principles for the federal government's use of UASs in the NAS and to promote the responsible use of this technology in the private and commercial sectors. The order primarily addresses government use of UASs. It also creates a "multi-stakeholder engagement process to develop and communicate best practices for privacy, accountability, and transparency issues regarding commercial and private UAS use in the NAS" to include stakeholders from the private sector. Insurance should certainly be a consideration with respect to accountability, and NAMIC will request that the National Telecommunications and Information Administration include insurance issues in the agenda of the process.

4. Cyber

A commercial UAS that is not used for delivery of goods will likely be involved in the collection, storage, and

transmission of electronic data. Owners and operators of these commercial UASs should seek liability coverage for the collection, storage, or transmission of protected private and business data, and claims resulting from actions such as libel, slander, invasion of privacy, and misappropriation. A UAS collecting or storing information can lose, irretrievably corrupt, inappropriately transmit, or have its data hacked/stolen by third parties resulting in liability.

Cybersecurity and data breach exposures simply did not exist when commercial general liability policy forms were developed. Policyholders have attempted to interpret existing policy provisions to provide coverage for such exposures, and insurers have developed various exclusions to bar coverage for cybersecurity exposures. The insurance industry has also developed specialized cyber insurance policies that provide coverage for, among other things, liability arising out of data breaches. Lawyers advise that policyholders relying on commercial general liability for cyber coverage may be using a bad risk-management technique and should initiate a thorough review of their policies to see which cyber events are covered and which aren’t.

5. Personal Injury/Property Damage

The law – through statute, regulation, or judicial decision – will generally seek to constrain and direct human action and social behavior by considering the risks posed to people and property, and the law has a long history of managing the risks of things falling out of the sky. Statutes and regulations will attempt to provide strict liability standards for certain injuries or damages from a UAS, but with rapidly evolving technology and very limited experience and expertise, there will undoubtedly be a wider range of practical and legal questions that will have to be addressed under common law

claims, with judges making decisions on duty, breach, causation, and damages.

What is the extent of the duties of a UAS operator to not present foreseeable risk to others? When is UAS operation unreasonable in light of those risks? What damages or injuries from a UAS are foreseeable as a natural consequence of UAS operation? After an accident, what determines the extent of operator error versus equipment failure, versus software malfunctions, versus communications problems? As noted, a [study](#) of UAS liability and insurance in Europe concluded that the lack of reliable data on UAS incidents or accidents means the assessment of damage caused by UASs remains a theoretical exercise.

Then there is the concept of negligence per se, which results from the violation of a law meant to protect the public, such as a speed limit or building code. Unlike ordinary negligence, a plaintiff alleging negligence per se need not prove that a reasonable person should have acted differently – the conduct is automatically considered negligent – and the focus of a lawsuit will be whether it proximately caused damage to the plaintiff. Some courts may apply FAA interpretations and state regulations to establish negligence per se and some may not. In the most relevant example, one court may deem commercial UAS operation as negligence per se in violation of the FAA notice, while another court may require plaintiffs to prove duty, breach, causation, and damages.

While certain legal questions exist surrounding UAS damage and injury, there is no question that the potential liability for harm from even the smallest UAS can be significant, if not catastrophic. It has been [reported](#) that Congress is already getting pushback from private and commercial pilots who worry about collisions. The FAA receives reports nearly every day about drones sighted flying

near manned aircraft or airports. Mark Baker, president of the Aircraft Owners and Pilots Association, which represents private pilots, said online videos show that "operators are flying near airports, in the clouds, and in congested airspace." He called such actions reckless and said they will inevitably lead to a collision.

The MIT International Center for Air Transportation [concluded](#) that it is the responsibility of the FAA to ensure the safety of UAS operations in the NAS. FAA Order 8040.4 specifies that a risk management process should be applied to all high-consequence decisions by the FAA, which includes the incorporation of a new class of aircraft in the NAS. Published in support of Order 8040.4, the FAA System Safety Handbook provides general guidance to FAA personnel and contractors on implementing a risk management process, but it does not supersede existing regulations.

■ Conclusion

No less an authority than [Lloyd's](#) has opined that insurers must play a role in developing standards of good practice for operating UASs, particularly where there is a lack of regulatory specification. To facilitate the ongoing development of commercial operation of UASs for their own use and for policyholder use, insurers will look to cover responsible operators. "By requiring proof from the insured of a safety and privacy conscious mind-set, insurers can help protect against cases of misuse, which at the formative stage of the market could set back UAS acceptance considerably," according to Lloyd's. By applying business sense and hazard expertise, insurers will be critical to earning the trust of the public, regulators, and opinion leaders in a UAS field, where both risks and opportunities will continue to be defined.

When damage or injuries result from a UAS, a key question will be who is responsible and liable for damages.

NAMIC member companies want to provide comprehensive policyholder protection, but many serious questions continue to go unanswered about UAS regulations and civil liability. If the regulation of drones remains unclear and incomplete, it will be very difficult for insurers to meet policyholder needs.

The FAA's recently proposed small UAS regulations would eliminate the need for the vast majority of the FAA exemption requirements that have hampered reasonable commercial use of drones by NAMIC members and policyholders. The proposed rules also offer important UAS operational requirements and performance standards that further define responsibility and standards of care that can facilitate greater property/casualty coverage. The proposed rules request comment on further developments in this area, and NAMIC is ready with its 1,400 members nationally to propose even more comprehensive enhancements.

There will always be risks in the commercial use of drones, and property/casualty insurance will be a critical consideration. The proposed FAA rules eliminate some of the more significant barriers for drone insurance at the federal level, but responsible insurance coverage for this emerging area will require more development of federal, state, and local regulations, as well as related standards of liability, negligence, and property rights.

NAMIC is committed to working with its members and federal, state, and local regulators to promote responsible UAS development that protects aircraft, people, businesses, and property. As UAS regulations and civil liability standards evolve, NAMIC will work to ensure that these regulations provide the necessary clarity and breadth that its members need to provide policyholder protection. As these legal and regulatory gaps are addressed, NAMIC wants to ensure

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that its members can be in the business of providing effective protection and compensation.

■ Endnote

¹ Designated under federal law, a CRADA is intended to speed the commercialization of technology, optimize resources, and protect the private company involved. A CRADA allows both parties to keep research results confidential for up to five years. Private corporations participating in a CRADA are allowed to file patents, and they retain patent rights on inventions developed by the CRADA. The government gets a license to the patents.

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