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Airspace Ownership Controversies in the United States: A Concise History

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Ownership and control of airspace has long been a controversial, confusing, and difficult area of study within aviation law. Throughout the twentieth century, there was copious debate surrounding the rights of property owners and the authority of aviation regulatory agencies to govern airspace. The invention of the airplane and a burgeoning concern about aerial trespass vigorously fueled that debate. In the contemporary context, airspace ownership questions center primarily on debates over low-altitude airspace and subsequent legal remedies available for improper use, illegal entrance, or unwanted occupation of that airspace. This review examines the history of airspace ownership controversies in the United States through an analysis of legal cases, scholarly debates, academic journal articles, and primary sources. The purpose of this paper is to assist aviation scholarly and industry personnel in forming a better understanding of the historical and contemporary debates that have surrounded the question of airspace rights. It is a particularly meaningful time to review this area of aviation legal history because the advent of novel aviation technologies—namely, drones, Urban Air Mobility (UAM), and Advanced Air Mobility (AAM) air taxis—is creating an industry ripe for new airspace ownership and control controversies in the coming decades.

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> "When aircrafts become so numerous… their frequent passing will cease to be a novelty and if the presence of planes is so constant as to amount to a nuisance, the present day friendly attitude may unfortunately turn to one of open hostility."
>
> – John A. Eubank, 1930

Introduction

There is a myriad of interactions among airplanes, aviation industry personnel, and the law. Consequently, the aviation industry provides scholars with numerous thought-provoking legal questions. One of these legal questions is an intriguing sub-topic of property law and, in some cases, constitutional law: To what extent do property owners actually own the airspace above their land? This question, and its variations and progenies, have been the cause of controversy for over a century. They have served as the catalyst for copious debate surrounding the rights of property owners and the authority of aviation regulatory agencies. The invention of the airplane and a burgeoning concern about aerial trespass vigorously fueled that debate.

In the contemporary context, airspace ownership questions center primarily on debates over low-altitude airspace, namely, the vertical extent of one's control of property and subsequent legal remedies available for improper use, illegal entrance, or unwanted occupation of that airspace. For decades, many law review articles have been published addressing the topic, and many cases have been argued in various courts. There is ample literature and case law to review and voluminous perspectives to consider. Rule (2012) notably commented, "It is unsurprising that courts and legal scholars have long struggled to formulate rules to govern its [airspace] use" (p. 6).

It is a particularly meaningful time to review this area of aviation legal history. The advent of novel aviation technologies, drones, and electric air taxis for Urban Air Mobility (UAM) and Advanced Air Mobility (AAM) operations, for instance, has created an industry ripe for new airspace ownership controversies in the coming decades. UAM is best described as "a system for air passenger and cargo transportation within an urban area, inclusive of small package delivery and other urban unmanned aerial services" (Andritsos et al., 2022, p. 3). AAM extends the concept of UAM operations to include non-urban areas. It also may be used to describe the broader integration of other disruptive aviation technologies to airspace systems for the purpose of "transport[ing] people and things to locations that are not traditionally – or regularly – served by the current modes of air transportation" (Andritsos et al., 2022, p. 5). As one legal scholar has observed, "UAM operations implicate important property-related questions—on and above the ground… Whether local authorities will oversee the highways—literally, the airspace—needed for UAM above their geographic boundaries is unclear, however" (Ravich, 2020, p. 677).

No matter which side of future airspace controversies one may find themselves on, the importance of understanding the historical context surrounding low-altitude airspace ownership uncertainty cannot be understated. This paper examines the history of airspace ownership controversies in the United States (U.S.) in the format of a literature review, aiming to provide historical context about past and current airspace control legal issues. The purpose of this paper is to assist aviation scholarly and industry personnel in forming a better understanding of the debate that has surrounded the question of airspace rights. Legal cases, scholarly debates, academic journal articles, and primary sources were analyzed to provide the reader with context surrounding airspace ownership issues. One need not be a legal scholar to comprehend the issues and historical turning points addressed in this paper, nor be familiar with the entirety of aviation, constitutional, or property law. There is a certain complexity to many of the legal concepts addressed in this paper, but they are presented in a clear, accessible manner. Part I of the literature review begins with the origin of airspace law and covers salient airspace ownership controversies through the 1946 seminal case on the subject, *United States v. Causby*. Part II of the review covers *Causby* and the subsequent major legal rulings and developments that rely upon the *Causby* precedent. Part III of the review provides an analysis of recent airspace ownership controversies, cases, and published academic literature and relates the historical analysis provided in parts I and II to issues of emerging aviation technologies.

I

The Ancient Maxim

Most early airspace ownership controversies originated with an ancient maxim of English common law (Ball, 1928; Rule, 2012). The maxim reads, "*Cujust est solum eius est usque ad coelum et ad inferos*," which, when translated from Latin, means, "'He who owns the soil owns everything above and below, from heaven to hell'" (Rhyne, 1944, p. 94; Lashbrook, 1946, p. 143). Much of early American jurisprudence—that is, the legal system itself—was constructed via common law doctrines derived from England (Banner, 2008). This *ad coelum* doctrine, as it will be referred to for the remainder of this paper, was no exception (Donohue, 2021). Ball (1928) identifies Cino da Pistoia as the doctrine's pronouncer in the early fourteenth century. Lashbrook (1946) asserts the doctrine was a component of the Justinian Code around 1200 AD. Donohue (2021) maintains that Franciscus Accursius established the concept in *Glossa Ordinaria*, and even then, the idea was "far from a novel concept" (p. 1). There appear to be conflicting answers to the question of where and when the doctrine originated. Preceding its integration with the common law, the doctrine was conceived in Roman law and even appeared in the famous Napoleonic Code (Eubank, 1930; Klein, 1959). Wherever its true origins, one fact is certain: The doctrine was integrated into English and American common law throughout the 17th, 18th, and 19th centuries (Lashbrook, 1946; Rule, 2012; Donohue, 2021).

Essentially, under the *ad coelum* doctrine's rule, a property owner's rights and ownership of land extends beyond merely the surface of that property to the vertical airspace above the property, all the way to the heavens, and below it, to hell (Rhyne, 1944; Lashbrook, 1946; Thrope, 1947; Rule, 2015). Under this concept, property owners own *all* of the airspace above their property. Such a doctrine, of course, presented a problem for the aviation industry as aircraft must frequently traverse the airspace above the properties of private landowners while

flying to their destinations. If applied in the literal sense, an intrusion into a private landowner's airspace would be a trespass (Cummings, 1953). Fast forward to the 1900s, "courts in the United States were applying it [the doctrine] to find trespass for even minor intrusions into neighboring airspace" (Rule, 2012, p. 427).

One example occurred in 1902 when the Iowa Supreme Court ruled that extending an arm into another's property was, in fact, a trespass, and damages may be recovered for this unlawful intrusion (*Hannabalson v. Sessions*, 1902). The court cited the *ad coelum* doctrine, reasoning, "[i]t is one of the oldest rules of property known to the law that the title of the owner of the soil extends, not only downward to the center of the earth, but upward *usque ad coelum*" (*Hannabalson v. Sessions*, 1902, p. 3).

Four years later, New York's Court of Appeals ruled the actions of a telephone company that had strung a wire above a landowner's private property constituted a trespass because "Unless the principle of *usque ad coelum* is abandoned any physical, exclusive and permanent occupation of space above land is an occupation of the land itself and a disseisin of the owner to that extent" (*Butler v. Frontier Tel. Co.*, 1906, p. 5).

These court opinions, along with similar decisions from other courts, cemented the *ad coelum* doctrine's place in American jurisprudence. Not only was the doctrine rooted in American common law but there was now also legal precedent—opinions issued by courts—that validated its principle of absolute ownership of the airspace above private property. From the perspective of private property owners, the *ad coelum* doctrine bolstered their rights. From the perspective of a budding domestic aviation industry, however, the doctrine (and the legal precedents that relied upon it) created a serious dilemma.

Powered Flight Presents a Problem

The invention of the powered airplane was a critical turning point in the history of airspace ownership law. The emergence of powered flight technology provided exciting opportunities for an industry still in its infancy but was not without controversy (Whitnah, 1966). As Ball (1928) observed, "The advent of the aeronaut has created the possibility of a number of unprecedented factual situations to confront our courts" (p. 1). Consequently, the expansion of U.S. civil aviation in the 1920s created important legal questions about airspace ownership and aerial trespass.

"Ownership of air space is certain to become a question of great importance in the future as air transportation increases in volume," identified the *New York Times* (1929, p. 1), citing an aviation legal scholar of the day. Indeed, the key problem for the emerging aviation industry was that, if literally applied, the *ad coelum* doctrine would produce a court decision that would hold any flight over land, no matter the altitude of the flight, as a trespass (Kingsley & Mangham, 1932). Thus, it appeared a technical common law property rule had the potential to "ground the incipient aircraft industry" (Banner, 2008, p. 9). Yet it was not certain that such potential would become a reality. In forthcoming aerial trespass cases, it would still be up to the courts to decide whether the *ad coelum* doctrine of *total* airspace ownership was valid. Thus, the arrival of

powered flying machines combined with the resulting problem of aerial trespass required thoughtful attention.

Some scholars concluded, in hindsight, that a strict application of the *ad coelum* doctrine's endless airspace ownership theory could not survive the advent of the airplane (Rhyne, 1944; Klein, 1959; Anderson, 1961). Still, there remained important questions about low-altitude airspace ownership.

At that time, there was a consensus that an airplane passing through low-altitude airspace over private property would be committing an aerial trespass. This view was embraced by many. For example, in 1919, a U.S. Senator introduced a bill that would allow property owners to collect damages in the event of an aerial trespass by airplane, recognizing a property owner's right to control the airspace above their land (Eubank, 1930). A group of lawyers decided during a moot court exercise that airplanes flying over private property were, in fact, trespassing. A New Jersey judge even placed a large warning sign on the top of his roof, alerting aviators not to overfly his property (Banner, 2008).

Yet some remained unconvinced. In 1930, one "expert on aeronautical law" told a class of students at New York University: "[T]he extent of the superincumbent airspace subject to the exercise of the landowners' rights has, for obvious reasons, never been exactly defined in the course of judicial expression" (New York Times, 1930, p. 20). More clearly stated, it was this expert's opinion that "a property owner does not control the rights to the navigable airspace above his land holdings" (New York Times, 1930, p. 20). Others believed the doctrine was "obsolete," had "no modern application," and should "be disregarded" (Eubank, 1930, p. 87). Another lawyer thought the New Jersey judge's warning sign was "funny enough to include in his compilation of amusing anecdotes for lawyers to tell to juries" (Banner, 2008, p. 12).

Even if the doctrine was not to be applied literally, it remained the perspective of many legal scholars throughout this period that airplanes might still be committing aerial trespass (Reeves, 1909; Banner, 2008). One particularly illustrative perspective came from aviation legal scholar John A. Eubank (1930) when he stressed the importance of this burgeoning issue:

> Today no one objects to the occasional airplane that passes over his property. This is true no matter how soured one may be toward his fellow men. In fact, the passing of an aircraft usually arouses curiosity and sufficient excitement to cause the whole family to stumble over the house cat and out the back door to wave a friendly greeting to the aeronaut in flight. When aircrafts become so numerous, however, their frequent passing will cease to be a novelty, and if the presence of planes is so constant as to amount to a nuisance, the present day friendly attitude may unfortunately turn to one of open hostility (p. 82–83).

History shows us that Eubank's concern was legitimate. Throughout the 1930s, many people held openly hostile attitudes toward airplanes traversing the skies above their property. Even though by 1937, according to one scholar, "no one…seriously advocat[ed] a literal interpretation" of the *ad coelum* doctrine (Hackley, 1937, p. 775), there was still a belief that a property owner could at least control *some* of the airspace above their land in certain

circumstances. A series of trespass lawsuits against aircraft operators commenced. The first prominent ruling resulting from these lawsuits came from the Massachusetts Supreme Court in 1930 (Garland, 1937). More rulings would follow, and some would contradict others.

Another airspace problem encountered throughout this period was the issue of inconsistent state laws governing the use of airspace. An imperative question that arose as the development of airplane technology flourished was whether the issue of airspace control should be turned over to the federal government or divided amongst the states. Air travel was, to be sure, very much an example of interstate commerce. Because airplanes, and the aeronauts that flew them, would often cross state lines, it certainly would have made sense for that interstate activity to be controlled by the federal government. After all, the power to regulate commerce, according to the U.S. Constitution, rested primarily with the federal government. But at this moment, and until a Supreme Court ruling a couple of decades later, the federal government's authority to regulate aviation "was not at all clear" (Banner, 2008, p. 103–104). The alternative to such uncertainty was for the states to take it upon themselves to address the issue of airspace ownership and sovereignty (Banner, 2008).

That is exactly what some states did. In 1921, a Uniform State Law for Aeronautics (USLA) was drafted and approved by the National Conference of Commissioners on Uniform State Laws (Rhyne, 1944). The law included many provisions, but the sections about airspace and aerial trespass were the "most important parts" (Banner, 2008, p. 126).

"The ownership of the space above the lands and waters of this state is declared to be vested in the several owners of the surface beneath, subject to the right of flight described in Section 4" (Uniform State Law for Aeronautics, 1922, p. 6). The "right of flight" exception in Section 4 of the USLA provided that:

> Flight in aircraft over the lands and waters of this state is lawful unless at such a low altitude as to interfere with the then existing use to which the land or water or the space over the land or water is put by the owner, or unless so conducted as to be eminently [sic] dangerous to persons or property lawfully on the land or water beneath (Uniform State Law for Aeronautics, 1922, p. 6).

The airspace provisions of the USLA were spiritedly debated (Rhyne, 1944). By 1930, 12 states had adopted the USLA and "declared their sovereignty in the airspace over the lands and waters" (Eubank, 1930, p. 79). By 1944, 23 states had enacted the airspace provisions contained within the USLA (Rhyne, 1944). Covering the complete history of state airspace laws enacted throughout the early twentieth century is well outside the scope of this paper. Doing so would betray the concise historical narrative this review aims to provide. If interested, though, one will find a detailed history and analysis in Banner (2008). Still, it is important to identify and acknowledge the roles that states and their airspace laws played in early twentieth-century airspace ownership controversies. One will see that in early court opinions about airspace ownership and trespass issues, state laws governing airspace ownership were a focal point in the legal reasoning used by courts.

Early Theories of Airspace Ownership

As courts began to decide the issues of airspace ownership and aerial trespass, a few common trends in how courts went about deciding the issue began to emerge. Rhyne (1944) identified five theories of airspace ownership based on these court decisions:

> (1) The landowner owns all the air space above his property without limit in extent.
> (2) The Landowner Owns the Air Space Above His Property to an Unlimited Extent Subject to an "Easement" or "Privilege" of Flight in the Public.
> (3) The Landowner Owns the Air Space Above His Property Up to Such Height as is Fixed by Statute with Flights Under That Height "Trespasses."
> (4) The Landowner Owns the Air Space Up as Far as it is Possible for Him to Take Effective Possession but Beyond the "Possible Effective Possession Zone" There Is No Ownership in Air Space.
> (5) The Landowner Owns Only the Air Space He Actually Occupies and Can Only Object to Such Uses of the Air Space Over His Property As Does Actual Damage (p. 155–161).

The first theory, as one may immediately recognize, is representative of the *ad coelum* doctrine (Rhyne, 1944). Theories four and five become increasingly more complex as additional requirements are added for a property owner to possess any right to the airspace above their land. These theories were all derived by Rhyne (1944) from court decisions in early twentieth-century aerial trespass cases, several of which are discussed next.

Disagreement Amongst the Courts

Unsurprisingly, different courts interpreted the aerial trespass issue in dissimilar ways. There are four salient 1930s cases worth detailing in this review to illustrate the ways in which the court opinions diverged from one another.

Mr. and Mrs. Smith had become annoyed with the "'loud, penetrating, piercing, unpleasant and incessant noise'" created by airplanes flying in and out of the airport adjacent to their property, owned by New England Aircraft Company (Logan, 1930, p. 316). They sued the airport owners, arguing that because the aircraft was flying so low over their property, they had committed a trespass, and the flights were a nuisance. A trial court disagreed with the nuisance argument but found the trespass issue to be a "question of law" that had to be decided by a higher court (Logan, 1930, p. 317). The case was appealed to the Massachusetts Supreme Court.

Interestingly, as observed by Logan (1930), the Smiths "did not contend for an unlimited application of the" *ad coelum* doctrine in their arguments to the court (p. 317). Instead, they asserted that flights taking place between 100 feet and 1,000 feet constituted a trespass. This was significant because such an argument meant they had "abandoned the doctrine of the maxim in so far as it is limitless in application" (Logan, 1930, p. 318). Essentially, the Smiths were not attempting to argue that they owned all the airspace above their property extending to the heavens. New England Aircraft Company fervently disagreed with the Smiths' 100 to 1,000 feet argument and even went so far as to argue the *ad coelum* doctrine was "not law" and "had never

been applied or intended to be applied to such heights as were involved in this case" (Logan, 1930, p. 318).

The court unanimously disagreed with the New England Aircraft Company (Banner, 2008). In *Smith v. New England Aircraft Co.* (1930), the court determined that "under settled principles of law," the low-altitude flights over the Smiths' property were a trespass (p. 530). However, the court's conclusion was not that simple. The court determined, in accordance with interpretations of state and federal law, that flights above 500 feet over private property were not a trespass. This was representative of the third theory of airspace ownership identified by Rhyne (1944)—flights below an altitude established by law (in this case, 500 feet) are a trespass. That, according to Logan (1930) and Banner (2008), created even more questions—none of which were answered by the *Smith* court. According to Rhyne (1944), an altitude established by a statute was meant to serve as a safety rule and not "have any application to air space rights" (p. 159).

Perhaps even more confusing: While it appeared the court had ruled in favor of the Smiths by stating there had been a trespass, no evidence of actual damages was presented; so, the Smiths were not entitled to a legal order prohibiting future low-altitude flights over their private property (Banner, 2008). In other words, the Smiths did, in fact, own some of the airspace above their property but did not win their case. In short, *Smith* was a significant airspace ownership controversy because it highlighted the confusing, conflicting, and unsettled aspects of the aerial trespass question.

Meanwhile, in Richmond Heights, Ohio, another airspace controversy was developing, a case that Banner (2008) argues was "[t]he most important aerial trespass case of the 1930s" (p. 175). In 1929, the Curtiss Airports Corporation purchased 272 acres of property across from 135 acres of private property owned by the Swetlands. The company intended to construct an airport on its recently purchased property (*Swetland v. Curtiss Airports Corp.*, 1932). This plan was not well received by the Swetlands. The couple sued Curtiss Airports Corporation hoping to prevent the company from building an airport on its property. From their perspective, if Curtiss Airports Corporation were to build an airport so close to their own property, it "would destroy their property for residential purposes" (*Swetland v. Curtiss Airports Corp.*, 1932, p. 202). The first judge to hear the case, Judge Hahn, disagreed with the Swetlands' argument that Curtiss Airports Corporation should not be allowed to build an airport on its property. "They [the Swetlands]," wrote Judge Hahn, "must now yield to change and progress of the times" (*Swetland v. Curtiss Airports Corp.*, 1930, p. 934).

Separately, the Swetlands also argued, like the Smiths had in their case, that "airplanes were trespassing by flying over their land" (Banner, 2008, p. 177). Judge Hahn agreed with this argument. He had reviewed the lengthy history of the *ad coelum* doctrine, cases such as *Hannabalson v. Sessions* and *Butler v. Frontier Telephone Co.*, and scholarly commentary on the doctrine's validity. He noted a court had never conducted an in-depth analysis of the *ad coelum* doctrine's meaning, and "there is much doubt whether a strict and careful translation of the maxim would leave it so broad in its signification as to include the higher altitudes of space" (*Swetland v. Curtiss Airports Corp.*, 1930, p. 938). But he would not need to rely upon the *ad coelum* doctrine because, as pointed out by Banner (2008), "[b]oth the United States and Ohio

had set five hundred feet as the minimum altitude for flight" (p. 177). He ultimately sided with the Swetlands, concluding that the takeoffs and landings conducted by the aircraft occurred below 500 feet, so they were a nuisance. Again, such as in *Smith*, the third theory of airspace ownership had been applied.

Judge Hahn's decision was appealed to the U.S. Court of Appeals for the Sixth Circuit. There, Judge Moorman, writing for the court, reached essentially the same conclusion: in the upper stratum of airspace, a property owner has no rights to prevent airplanes from traversing that airspace; but in the lower stratum of airspace, a property owner did possess an ownership right. Encroaching upon that ownership right would be an unlawful trespass or nuisance (*Swetland v. Curtiss Airports Corp.*, 1932; Banner, 2008).

Not all courts reached the same conclusion about the aerial trespass issue. Specifically, there were two cases that stood in stark contrast to the conclusions in *Smith* and *Swetland*. "What was meant by low flying?" questioned Georgia Supreme Court Justice Bell in 1934, "In the absence of any statement of the altitude or other circumstances, it does not show that the act amounted to a trespass" (*Thrasher v. City of Atlanta*, 1934, p. 531). The *act* referred to by Justice Bell was an allegation made by Clovis Thrasher that airport operations at a city-owned airport, Chandler Field, "constituted a nuisance, with resulting damage to the plaintiff [Thrasher]" (*Thrasher v. City of Atlanta*, 1934, p. 515). In the *Thrasher* case, the court concluded that airplanes flying over Thrasher's property at low altitudes were *not* trespassing. The court reasoned a pilot flying over private property is "merely a transient" and that "[s]o long as the space through which he moves is beyond the reasonable possibility of possession by the occupant below, he is in free territory" (*Thrasher v. City of Atlanta*, 1934, p. 530). The *Thrasher* case was representative of the fourth theory of airspace ownership identified by Rhyne (1944).

Two years later, the U.S. Court of Appeals for the Ninth Circuit went further. The court ruled that airplanes flying over private property were *not* trespassing. In *Hinman v. Pacific Air Transport* (1936)—a case with remarkably similar facts to the *Smith*, *Swetland*, and *Thrasher* cases—the court determined "[t]he air, like the sea, is by its nature incapable of private ownership, except in so far as one may actually use it" (p. 758). The court continued:

> We own so much of the space above the ground as we can occupy or make use of, in connection with the enjoyment of our land. This right is not fixed. It varies with our varying needs and is coextensive with them. The owner of land owns as much of the space above him as he uses, but only so long as he uses it. All that lies beyond belongs to the world (*Hinman v. Pacific Air Transport*, 1936, p. 758).

Mr. and Mrs. Hinman, the court concluded, had not occupied or been utilizing the airspace above them. Accordingly, the court found no aerial trespass above their property had been committed, even though the aircraft were often flying below 100 feet.

Thrasher and *Hinman* were the exceptions. "The other courts that had addressed the trespass question had all held… that extremely low overflights could constitute trespasses (although they disagreed on exactly how low)" (Banner, 2008, p. 239). In other words, the conflicting opinions created a mess. The Ninth Circuit's opinion in *Hinman* was appealed to the

U.S. Supreme Court in hope of finding some clarity. But the highest court in the land denied the petition to hear the case. Hackley (1937) believed the Supreme Court had "lost an excellent opportunity to express its views on a question three centuries old and yet, oddly enough, a question of considerable importance to modern aviation" (p. 773). That opportunity, however, would be recognized by the Supreme Court a short decade later with another airspace controversy originating on a chicken farm in North Carolina.

II

The Chicken Farm

Thomas Lee Causby was a chicken farmer. In 1934, he and his wife purchased a plot of land adjacent to Greensboro–High Point Airfield in North Carolina. The airport had, historically, little traffic. The aircraft that did utilize the airport "didn't make much noise and didn't need a long runway" (Banner, 2008, p. 227). By 1937, the Causbys had built a house for themselves and several "outbuildings" which were used to raise their chickens (Banner, 2008; *United States v. Causby et ux.,* 1946, p. 258). With approximately four hundred chickens and a farm producing enough income to support their family, the Causbys had established what Thomas viewed as a "'good business'" (Banner, 2008, p. 227). But the year 1942 brought trouble for the Causbys' successful chicken farm. Now that the U.S. had entered World War II, there was increasingly a need for the U.S. Army Air Forces (USAAF) to utilize airports for various military activities (Banner, 2008). In May 1942, the USAAF entered into a lease agreement to begin flying military aircraft—namely bomber, transport, and fighter aircraft—in and out of the airfield located just 2,220 feet from the Causbys' chicken farm (*United States v. Causby et ux.,* 1946, p. 258–259; Leavitt, 1947; Cahoon, 1990).

An unforeseen consequence of the USAAF lease agreement for Greensboro–High Point Airfield was the destruction of the Causbys' successful chicken farm business (Banner, 2008). Consider how bomber and fighter aircraft, among others, flying at low altitudes on approach into the airfield, immediately above the Causbys' chicken farm, would adversely affect the farm's operations. The aircraft came "close enough at times to appear barely to miss the tops of the trees and at times so close to the tops of the trees as to blow the old leaves off" (*United States v. Causby et ux.,* 1946, p. 258). As one might imagine, the noise created by these low passes was "startling" (*United States v. Causby et ux.,* 1946, p. 258). Resultantly, "[l]ife on the farm would never be the same" (Banner, 2008, p. 228).

Because of the noise created by these low flying military aircraft, the chickens became frightened and flew "into the walls from the fright" (*United States v. Causby et ux.,* 1946, p. 259). Tragically, for the chickens, such a flight into the wall was fatal. "As many as six to ten of their [the Causbys'] chickens were killed in one day" and "the total chickens lost in that manner was about 150" (*United States v. Causby et ux.,* 1946, p. 259). By this point, the Causbys' chicken farming business was all but physically destroyed. They ceased business operations and sold the surviving chickens "at a loss" (Banner, 2008, p. 229). What is more, the Causbys were "frequently deprived of their sleep" and had "become nervous and frightened" (*United States v. Causby et ux.,* 1946, p. 259; Cahoon, 1990). They felt as if they were living "in a state of constant uneasiness" and attributed their inability to sleep at night "to the noise of the planes

passing over their house and to the glare of their lights" (*Causby v. United States*, 1945, p. 350–351). Thomas and his wife were also worried that one of these airplanes would "crash into their house" (Banner, 2008, p. 228).

Like preceding airspace controversies, the situation on the Causbys' chicken farm was "a classic case of both trespass and nuisance" (Banner, 2008, p. 229). Yet unlike preceding airspace controversies, this time the trespasser and the origin of the nuisance was the federal *government.* This fact was particularly significant because it meant the legal theory used by the Causbys to sue the government would be fundamentally different from the theories used to argue and settle disputes between private parties (Banner, 2008). With the federal government as the defendant, this case had now raised an important question of constitutionality.

A Fifth Amendment Claim

The Takings Clause of the Fifth Amendment to the U.S. Constitution reads: "[N]or shall private property be taken for public use, without just compensation" (U.S. Const. amend. V). Justice John Paul Stephens palpably articulated the meaning of these words in a 2002 opinion: "When the government physically takes possession of an interest in property for some public purpose, it has a categorical duty to compensate the former owner" (*Tahoe-Sierra Preservation Council, Inc., et al. v. Tahoe Regional Planning Agency et al.*, 2002, p. 322, as cited in *United States v. Pewee Coal Co.*, 1951). For the Causbys, that the low-flying military aircraft over their property constituted a governmental taking of their property for public use was a plausible argument (Banner, 2008).

Whether the USAAF's low-flying military aircraft over the Causbys' chicken farm constituted a taking under the Fifth Amendment was left to the Court of Claims to determine. Banner (2008) identified the alleged damages suffered by the Causbys, according to the petition filed by their attorney: "The petition alleged that the value of the Causbys' land and buildings had been reduced from $6,035 to zero, and that the loss of the chicken farming business had cost them another $1,000" (p. 230). Four judges on the Court of Claims' panel would decide the validity of the Takings Clause argument. They decided in favor of the Causbys (*Causby v. United States*, 1945; Banner, 2008).

Judge Whitaker authored the 1945 opinion for the Court of Claims delivered in *Causby v. United States*. First, Judge Whitaker outlined how the government's actions constituted a trespass, citing the *ad coelum* doctrine, *Butler v. Frontier Telephone Co.*, and *Smith v. New England Aircraft Co.*, among other authorities:

> Under the old common law doctrine of *cujus est solum ejus est usque ad coelum et ad inferos* a landowner not only owns the surface of his land, but also owns all that lies beneath the surface even to the bowels of the earth and all the air space above it even unto the periphery of the sky. Under this doctrine any erection over the land of another, or any passage through the air space above it, is a trespass… However, especially since the days of airplanes, this common law doctrine has received substantial modification. But even so, there can be no doubt that today a landowner owns the air space above his land as completely as he does the land itself or the minerals beneath it, at least insofar as

> it is necessary for his full and complete enjoyment of the land itself (*Causby v. United States*, 1945, p. 352).

But importantly, the chief question that required an answer from the Court of Claims was not whether the government had trespassed on the Causbys' property, but whether its actions constituted a Fifth Amendment Takings Clause violation (Banner, 2008). Citing Supreme Court precedent, the Court of Claims concluded it had. For there to have been a taking, the trespass must have been "sufficiently frequent" or have "destroy[ed] the owner's use and enjoyment of his property" (*Causby v. United States*, 1945, p. 353). It was clear to Judge Whitaker, and the other three judges on the panel, that:

> [T]here [had] been frequent invasions of the air space above plaintiffs' land, and the evidence shows an intention to continue these invasions whenever the wind blows in a certain direction. As a result plaintiffs [the Causbys] have been deprived of the use of their property as a chicken farm (*Causby v. United States*, 1945, p. 353).

Despite winning the constitutional argument, the Causbys were not awarded their requested amount in damages. Instead of the $7,035 initially requested in their petition, the Court of Claims awarded $2,000 in damages to the chicken farmers (Banner, 2008; *Causby v. United States*, 1945). The government chose to appeal the decision of the Court of Claims to the Supreme Court, not because it had to pay the Causbys $2,000, but because the central holding of the opinion authored by Judge Whitaker meant the same logic could be used to initiate numerous "lawsuits from the neighbors of the hundreds of military air bases scattered throughout the United States" (Banner, 2008, p. 238).

Recall the earlier airspace ownership controversy in *Hinman v. Pacific Air Transport*, the case in which the U.S. Court of Appeals for the Ninth Circuit departed from other courts by holding that aerial trespass was not unlawful (*Hinman v. Pacific Air Transport*, 1936). The Court of Claims decision in *Causby v. United States* nearly a decade later, of course, stood in stark contrast with the Ninth Circuit's *Hinman* opinion and also the Georgia Supreme Court's opinion in *Thrasher*. This, along with the other opinions that conflicted with the *Hinman* and *Thrasher* holdings, created a split among judicial authorities. Such a split required an answer from the highest court in the land, the Supreme Court (Banner, 2008). Therefore, the Supreme Court granted the government's writ of certiorari, meaning it agreed to hear the case (*United States v. Causby*, 1946).

The Supreme Court's Opinion

Justice William O. Douglas delivered the opinion of the Supreme Court. Appointed to the Court in 1939 by President Franklin D. Roosevelt, Douglas was the longest continuously serving member of the Court—a thirty-six-year tenure (Domnarski, 2006). One of Douglas's law clerks wrote that he had "an uncanny knack of putting his finger on the essential issue of a confusing and difficult problem" and that his writing style was "easy" and "fluid" (Cohen, 1958, p. 6). Such characteristics are well illustrated within Douglas's landmark 1946 opinion in *United States v. Causby*. Airspace and the broader question of who owns the sky—as illustrated throughout this paper—was indeed a confusing and difficult problem.

The Court sided with the Causbys, holding that the government's actions constituted a taking under the Fifth Amendment (*United States v. Causby*, 1946). But like so many Supreme Court opinions, the complete opinion of the Court was far more complicated. The *Causby* plurality reached a series of important conclusions, authored by Justice Douglas.

First, Justice Douglas, writing for the Court, declared the *ad coelum* doctrine "has no place in the modern world" (*United States v. Causby et ux.,* 1946, p. 261). This was, clearly, significant as it officially and formally ended the notion that private property owners possessed a right to control, literally, all the vertical airspace within the bounds of their property lines. The Court noted that "[t]he air is a public highway, as Congress has declared" and that "[c]ommon sense revolts at the idea" postulated by the *ad coelum* doctrine (*United States v. Causby et ux.,* 1946, p. 261). Although, while this holding verified the understanding that the air was indeed a public highway, not to be subjected to private ownership, the key question of low-altitude ownership rights remained unanswered at this point in the opinion (Banner, 2008).

Second, the *Causby* plurality analyzed the reasoning that validated the Causbys' claim for compensation under the Takings Clause of the Fifth Amendment. That discussion centered on what constituted *navigable airspace*. Under the Air Commerce Act of 1926, as amended by the Civil Aeronautics Act of 1938, the federal government controlled navigable airspace (Civil Aeronautics Act, 1938). This was particularly significant. After all, if the government's aircraft had been operating in the navigable airspace, it would not have been possible for there to have been a taking of property, or so the government argued (*United States v. Causby et ux.,* 1946). Justice Douglas provided a scenario for one to consider that issue:

> The navigable airspace which Congress has placed in the public domain is "airspace above the minimum safe altitudes of flight prescribed by the Civil Aeronautics Authority." 49 U.S.C. § 180. If that agency prescribed 83 feet as the minimum safe altitude, then we would have presented the question of the validity of the regulation. But nothing of the sort has been done. The path of glide governs the method of operating—of landing or taking off. The altitude required for that operation is not the minimum safe altitude of flight which is the downward reach of the navigable airspace… Hence, the flights in question were not within the navigable airspace which Congress placed within the public domain (*United States v. Causby et ux.,* 1946, p. 263–264).

Through this paragraph, the Court illustrated the importance of how navigable airspace is defined. Justice Douglas goes on to explain "[t]he Civil Aeronautics Authority has, of course, the power to prescribe air traffic rules. But Congress has defined navigable airspace only in terms of one of them—the minimum safe altitudes of flight" (*United States v. Causby et ux.,* 1946, p. 264). Still, at this point in the opinion, Douglas had refrained from addressing the specific question to which so many hoped for an answer to—low-altitude airspace ownership (Banner, 2008).

Finally, Justice Douglass—to the dismay of his colleagues, who, according to Banner (2008), would have preferred the young justice not address the issue—turned to the question of low-altitude airspace ownership. Contending that most airspace is indeed a public highway,

Douglas wrote "it is obvious that if the landowner is to have full enjoyment of the land, he must have exclusive control of the immediate reaches of the enveloping atmosphere" (*United States v. Causby et ux.,* 1946, p. 264). Justice Douglas reasoned that if this were not the case, "buildings could not be erected, trees could not be planted, and even fences could not be run" (*United States v. Causby et ux.,* 1946, p. 264). Accordingly, relying upon *Hinman v. Pacific Air Transport,* he asserted "[t]he landowner owns at least as much of the space above the ground as he can occupy or use in connection with the land. [citation omitted] The fact that he does not occupy it in a physical sense—by the erection of buildings and the like—is not material" (*United States v. Causby et ux.,* 1946, p. 264). Justice Douglas continued:

> The superadjacent airspace [that is, the airspace *directly* above property] at this low altitude is so close to the land that continuous invasions of it affect the use of the surface of the land itself. We think that the landowner, as an incident to his ownership, has a claim to it and that invasions of it are in the same category as invasions of the surface (*United States v. Causby et ux.,* 1946, p. 265).

But how is *immediate reaches* defined? Where does the transition occur from airspace immediately above the land that may be *enjoyed* to the navigable airspace that is part of the public domain? "We need not determine at this time what those precise limits are" wrote Justice Douglas (*United States v. Causby et ux.,* 1946, p. 266). He noted that "[f]lights over private land are not a taking, unless they are so low and so frequent as to be a direct and immediate interference with the enjoyment of the land" (*United States v. Causby et ux.,* 1946, p. 266). Despite the ambiguity, in the view of Rule (2011) the Court had "made clear that landowners held enforceable property interests in the usable airspace above their parcels" (p. 282).

The Court noted that the factual record in the trial court supported a diminution in value: "For the findings of the Court of Claims plainly establish that there was a diminution in value of the property and that the frequent, low-level flights were the direct and immediate cause" (*United States v. Causby et ux.,* 1946, p. 266). The Court did conclude, however, that the damages awarded to the Causbys by the Court of Claims were not properly determined because the lower court had failed to provide a precise, or accurate, description of the specific property taken (*United States v. Causby et ux.,* 1946). Accordingly, the Court instructed the Court of Claims to "make the necessary findings in conformity with this opinion" (*United States v. Causby et ux.,* 1946, p. 268). Upon reassessment, the Court of Claims ultimately awarded a total of $1,435 in damages to the Causbys (Banner, 2008).

Not all justices were satisfied with Douglas's opinion. Two justices, Hugo Black and Harold Burton, dissented. The dissent, authored by Justice Black, argued that "[t]he concept of taking property as used in the Constitution has heretofore never been given so sweeping a meaning" (*United States v. Causby et ux.,* 1946, p. 270). In Justice Black's view:

> The future adjustment of the rights and remedies of property owners, which might be found necessary because of the flight of planes at safe altitudes, should, especially in view of the imminent expansion of air navigation, be left where I think the Constitution left it, with Congress (*United States v. Causby et ux.,* 1946, p. 271).

Congress, in Justice Black's opinion, had the full authority to control airspace—even airspace at lower altitudes above what constituted the minimum safe altitude defined by law (Field & Davis, 1996). Nevertheless, Justices Black and Burton were in the minority and Douglas's opinion was the controlling authority.

While there was, to be sure, technically an answer to whether low-altitude airspace ownership rights existed derived from *Causby*, there remained many ambiguities within Justice Douglas's opinion—especially as to the question of where specifically the line is drawn. Now, there were two zones of airspace: the upper zone and lower zone (Cummings, 1953). But even more significant, the Court had utilized the Constitution to reach its conclusion. Explained by Banner (2008):

> The Court was imposing a uniform nationwide rule, a rule that no state legislature and no state court had the power to change… Because the rule derived from the Constitution, no one had the power to change it in the future except the Supreme Court (p. 256).

Redefining Navigable Airspace

The significance of the term *navigable airspace*, and its definition, were strongly illustrated in the *Causby* opinion. In 1946, the definition of navigable airspace did not include any such provision for the glide paths of aircraft taking off or landing to be considered part of the navigable airspace that was controlled by the federal government—nay, as described previously, *navigable airspace* was merely defined as "'airspace above the minimum safe altitudes of flight prescribed by the Civil Aeronautics Authority [CAA] [citation omitted]'" (*United States v. Causby et ux.,* 1946, p. 256). For aircraft taking off and landing to be considered flying within the navigable airspace, the definition referenced by Justice Douglas would need to be changed.

There was also the issue of states' rights to regulate navigable airspace. Recall the airspace provisions of the Uniform State Law for Aeronautics that had been adopted by twenty-three states. Cooper (1948) reasoned that the *Causby* "opinion does not indicate what rights, if any, the subjacent State has in that part of the navigable airspace public domain lying over its surface territory" (p. 27). Concerned that "[i]f the Federal Government alone has sovereign rights in the navigable airspace… then the statutes of such States do not govern crimes committed or other wrongful acts occurring in the navigable airspace," Cooper (1948) suggested "these are serious questions – the answers to which should not be delayed" (p. 28).

Congress got to work. In 1958, the Federal Aviation Act was passed. This Act, among other things, abolished the CAA, created the Federal Aviation Agency, and redefined what constituted navigable airspace. Now, navigable airspace was defined as "airspace above the minimum altitudes of flight prescribed by regulations issued under this Act, and shall include airspace needed to insure safety in take-off and landing of aircraft" (Federal Aviation Act, 1958, p. 739).

Applying the *Causby* Conclusion

Beyond leading to a new definition of navigable airspace, the Supreme Court's opinion in *Causby* has been, as one may imagine, an important precedent in airspace law since 1946. A search of the NexisUni database at the time of this writing reveals that *Causby* has been cited in 894 court decisions, at all levels of the judiciary, including both federal and state courts.

Importantly, the notion that noise generated from low flying aircraft constituted a taking of property, as held in the Court's *Causby* opinion, was the first time such a conclusion had been reached (Thorpe, 1947). The consequences were significant. Subsequent airspace ownership cases now often involved suing government-owned airports under the same Takings Clause logic that had created a legal victory for the Causbys (Banner, 2008). One example of the application of the *Causby* logic was the case of *Ackerman v. Port of Seattle* in 1960. The Washington Supreme Court concluded in *Ackerman* that "continuing and frequent low flights over the appellants' [the Ackermans] land amount[ed] to a taking of an air easement for the purpose of flying airplanes over the land" (*Ackerman v. Port of Seattle*, 1960, p. 412).

Two years after *Ackerman*, another Supreme Court case, *Griggs v. Allegheny County*, also applied the *Causby* approach. The Court's opinion in *Griggs*—which too was written by Justice Douglas—reaffirmed *Causby's* central holding. This time, it was not the federal government that had committed a taking. Instead, it was a local government: Allegheny County, Pennsylvania. Applying the *Causby* logic, Justice Douglas, writing for the Court, concluded Allegheny County "was the promoter, owner, and lessor of the airport" and was "the one who took the air easement in the constitutional sense" (*Griggs v. Allegheny County*, 1962, p. 89).

More cases—*United States v. 15,909 Acres* (1958), *Bacon v. United States* (1961), *A.J. Hodges Industries, Inc. v. United States* (1966), *Speir v. United States* (1973), *Palisades Citizens Ass'n, Inc. v. Civil Aeronautics Board* (1969), *Lacey v. United States* (1979), and *Brown v. U.S.* (1996), and others—also applied the *Causby* precedent to instances with similar facts and questions. The Wisconsin Supreme Court recently examined the issue in *Brenner v. New Richmond Reg'l Airport Comm'n* (2012):

> We [the Wisconsin Supreme Court] conclude that a taking occurs in airplane overflight cases when government action results in aircraft flying over a landowner's property low enough and with sufficient frequency to have a direct and immediate effect on the use and enjoyment of the property (p. 325–326).

Later in that opinion, and after reviewing the precedent set by *Causby* and *Griggs*, the Wisconsin Supreme Court offered a readable summary of the present state of airspace ownership law. The summary may also serve as a clear description of the key takeaways from part II of this review:

> [F]lights that are not directly over a person's property cannot "take" the person's property. Flights that are *above* the government-defined minimum safe altitude of flight are very unlikely to take a person's property. But overflights that invade the person's superadjacent block of airspace, even takeoffs and landings, may constitute a taking for

which compensation is required (*Brenner v. New Richmond Reg'l Airport Comm'n*, 2012, p. 304).

III

In 2015, Austin and Bret Haughwout decided to post two videos to YouTube involving the use of a drone—or, in legalese, an *uncrewed aircraft system* (UAS). First, was a video that showed a handgun attached to a drone that was "firing several times" (*Huerta v. Haughwout*, 2016, p. 2). Second, was a video that showed a "flame-throwing contraption" attached to a drone being used to "spew[] intense streams of fire to scorch a turkey carcass" (*Huerta v. Haughwout*, 2016, p. 2). The videos "went 'viral'" and the FAA "opened an investigation" (*Huerta v. Haughwout*, 2016, p. 2). This recent case, *Huerta v. Haughwout*, was about whether the FAA had the authority to investigate the Haughwouts for their actions involving a drone in the videos uploaded to YouTube. The court concluded that it did (*Huerta v. Haughwout*, 2016). The Haughwouts' creative use of a drone is a strong example of how novel aviation technologies, such as drones, are complicating the civil aviation regulatory regime.

One of these complications is the issue of airspace rights. Although the key issue in the *Haughwout* case was not directly about airspace, Judge Meyer did briefly address the matter. "It appears from oral arguments as well as from the FAA's website" wrote Judge Meyer, "that the FAA believes it has regulatory sovereignty over every cubic inch of outdoor air in the United States (or at least over any airborne objects therein) [citation omitted]" (*Huerta v. Haughwout*, 2016, p. 8). Quoting the fundamental conclusion in *Causby* that "'[t]he landowner owns at least as much of the space above the ground as he can occupy or use in connection with the land,'" Judge Meyer wondered, "does it follow that this foundational principle must vanish or yield to FAA dictate the moment that a person sets any object aloft… no matter how high in the airspace outside one's home?" (*Huerta v. Haughwout*, 2016, p. 9). Mirroring the words of Justice Douglas in *Causby*, Judge Meyer conceded "[t]his case does not yet require an answer to that question" (*Huerta v. Haughwout*, 2016, p. 9). But Judge Meyer asserted that "the next generation of drones and similar flying contraptions will continue to challenge and shape the law that governs them" (*Huerta v. Haughwout*, 2016, p. 9). He then encouraged readers to "*see generally*" Banner (2008) (*Huerta v. Haughwout*, 2016, p. 9).

Airspace and Drones

The current airspace ownership legal landscape is best described by the Wisconsin Supreme Court in *Brenner*. However, while that description may be digestible for many, the *Brenner* opinion, along with the others—*Causby*, *Griggs*, etc.—is not as specific as some legal scholars, attorneys, or property owners might prefer. Consequently, there remains fiery debate about low-altitude airspace ownership. The advent of drones, and air taxis, is fueling that debate. A preponderance of recent academic literature supports this notion (Rule, 2012; Rule, 2015; Gustafson, 2017; Ravich, 2020; Miller, 2020; Donohue, 2021; Skorup, 2022a; Rule 2022).

Indeed, the *Haughwout* case is just one example of how novel technologies will "challenge and shape the law that governs them" (*Huerta v. Haughwout*, 2016, p. 9). As to the

question of drones and low-altitude airspace, the Court of Appeals of Michigan wrote in *Long Lake Twp. v. Maxon* (2021):

> Although the United States Supreme Court has rejected the ancient understanding that land ownership extended upwards forever, landowners are still entitled to ownership of some airspace above their properties, and intrusions into that airspace will constitute a trespass no different from an intrusion upon the land itself. [Citation omitted]. Drones fly below what is usually considered public or navigable airspace. Consequently, flying them at legal altitudes over another person's property without permission or a warrant would reasonably be expected to constitute a trespass. We do not decide whether nonpermissive drone overflights *are* trespassory, because we need not decide that issue" (p. 539–540).

Ambiguities remain to be explored in future cases. In 2020, the Government Accountability Office (GAO) recognized as much. The GAO explored the current legal issues surrounding low-altitude airspace in the context of drone operations. GAO (2020) identified several unresolved areas consistent with the preponderance of academic literature, including:

> Whether Congress may use its power under the U.S. Constitution's Commerce Clause to regulate all UAS operations, including non-commercial, non-interstate, *low-altitude operations* [emphasis added] over private property, and if so, whether Congress has authorized FAA to regulate all such operations in FMRA or other legislation (p. 4).

And:

> What impact possible Fifth Amendment-protected property rights held by landowners in the airspace within the "immediate reaches" above their property, as recognized by the U.S. Supreme Court in *United States v. Causby* and other legal precedents, may have on federal, state, local, and tribal authority over low-altitude UAS operations (p. 4).

As to the question of what constitutes navigable airspace for UAS operations, according to GAO (2020), the Department of Transportation's (DOT) perspective is "'for the purposes of the definition of the term navigable airspace, zero feet ('the blades of grass') is the minimum altitude of flight for UAS'" (p. 6), a position also held by the FAA. Moreover, the FAA's position is its authority to regulate air commerce—a term not constrained by the definition of navigable airspace—gives the agency full authority to regulate drones at low altitudes (GAO, 2020).

In contrast to the FAA's perspective, GAO (2020) also found "some state and local governments and legal commentators… have questioned the FAA's authority to regulate UAS operations at low altitudes, at least those conducted purely intrastate and over private property" (p. 8). Similar doubt was expressed by Judge Meyer in *Haughwout*. What is more, Donohue (2021) has declared "it is remarkable" the FAA has taken this perspective and argued "that history and law establish that property owners, and states, control the airspace adjacent to the land [low-altitude airspace, that is]" (p. 2).

Besides the question of federal or state or local regulatory authority, Rule (2015) identified another important airspace question raised by drones, specifically the concept of drone package delivery operations:

> Suppose, for instance, that a U.S. Postal Service office were to begin regularly sending drone flights through the airspace above a neighboring parcel of land as part of a new drone delivery program. Suppose further that the drone flights were relatively quiet but that they occurred several times a day at an average altitude of just fifty feet directly over the neighbor's backyard. Would these regular drone overflights give rise to a compensable Fifth Amendment takings claim? (p. 171–172).

Rule (2015) describes the approach taken by courts to takings claims as an "ad hoc test, which requires courts to make multiple subjective judgments" and contends that this approach "could make it difficult for government entities interested in flying drones over private property to know where they stand under the law" (p. 172). Miller (2020) further investigated the potential issue of takings claims resulting from drone delivery operations. Observing that "most drones would travel within 500 feet of the ground," Miller (2020) suggested, "As of now, it is unclear who owns this airspace" (p. 140). Donohue (2021) offers another argument: "Navigable airspace, as an anchor for expanded federal control, cannot extend to the ground without violating property rights and state sovereignty" (p. 34).

Skorup (2022a) asserts "Constitutional law questions and property rights precedents… will pose daunting legal impediments to broad claims of federal authority over low-altitude airspace and to drone operations above private land" (p. 160). The solution to overcoming that challenge, argued by Skorup (2022a) and Skorup (2022b), is for the FAA to establish drone highways in the sky, designed to facilitate drone delivery operations, among other applications. "[P]ublic officials should lease corridors of airspace above the public rights-of-way, opening up millions of miles of new drone highways while still protecting landowner property rights" (Skorup, 2022a, p. 160).

Yet, some perspectives diverge on the issue. Not all agree with the *unclear* nature of low-altitude airspace ownership, or, for one example, the argument made by Donohue (2021). Turner & Baxenberg (2018) criticized an attempt by the Uniform Law Commission to restrict UAS operations "from flying below 200 feet without express, individual permission from every landowner below" (p. 1). The absence of a clear definition as to the scope of the landowners "exclusive control of the immediate reaches" (*United States v. Causby et ux.,* 1946, p. 264), and a recognition by the Supreme Court in *Causby* itself that the act passed by Congress permitting "the public right of navigation through the sky" is valid, Turner & Baxenberg (2018) argue this "suggests that the federal government has flexibility in defining what lies in the public domain" (p. 2). Counter to Donohue (2021), Turner & Baxenberg (2018) argue "[t]he idea that property owners have the right to exclude drones flying above their property simply 'has no place in the modern world'" (p. 2).

Moreover, Turner & Baxenberg (2020) argue that "[p]roperty rights advocates overread Causby and [m]isunderstand aviation law" (p. 2). In their interpretation of *Causby*, "the only 'claim' that a property owner has in regard to airspace occurs when frequent flights within the

airspace affect the use of the ground" (Turner & Baxenberg, 2020, p. 2). Emphasizing that "Causby *Did Not Establish a Property Right in Airspace*" (Turner & Baxenberg, 2020, p. 2) (emphasis in original), Turner & Baxenberg (2020) argue the *Causby* precedent does *not* support the argument that there should be a statutorily defined altitude at to which the "immediate reaches" of property extends.

Further, in a legal brief submitted to the U.S. Court of Appeals for the District of Columbia Circuit (D.C. Circuit), Turner & Baxenberg (2021) argued that in *Causby*, "the Supreme Court confirmed that real property owners do not have a property right in the adjacent airspace that would allow them to exclude aircraft from flying over that property" (p. 26). "Just as low-altitude airspace regulated by the FAA must be considered 'navigable airspace,' [citation omitted]," state Turner & Baxenberg (2021), "that airspace cannot be subject to the ownership or control of millions of private property owners across the country" (p. 27).

Conversely, in a brief submitted to the D.C. Circuit in the same case, Rupprecht et al. (2021) argued, "While FAA is statutorily authorized to regulate the airspace above minimum altitudes of flight prescribed by regulation, FAA, and Congress, have never specifically prescribed minimum altitudes for drones. Only maximum, not minimum, altitudes are prescribed [citation omitted]" (p. 62). This brief challenged recent rulemaking conducted by the FAA arguing, among other things, but germane to this review that this particular "rule's use of the term 'airspace of the United States' claims unfettered authority to regulate all airspace, including down to non-navigable airspace in a private backyard" (Rupprecht et al., 2021, p. 62). The D.C. Circuit's opinion in this case did not specifically address the question of low-altitude airspace ownership in a property rights context (*Brennan v. Dickson*, 2022). The court wrote only that "the FAA identified its statutory authority" in both the proposed and final rules challenged in the case, without expanding on the issue any further (*Brennan v. Dickson*, 2022, p. 39).

Congress has also caught wind of the low-altitude airspace issue. In May 2017, Senators Feinstein, Lee, Blumenthal, and Cotton introduced the Drone Federalism Act. The legislation would, among other things, direct the FAA to:

> [E]nsure that the authority of a State, local, or tribal government to issue reasonable restrictions on the time, manner, and place of operation of a civil unmanned aircraft system that is operated below 200 feet above ground level or within 200 feet of a structure is not preempted (Drone Federalism Act, 2017, p. 2–3).

If enacted, the Drone Federalism Act could resolve some of the low-altitude airspace ambiguities, at least with respect to a state government's authority to regulate low-altitude airspace. Additional proposed legislation would require the FAA to "update the definition of 'navigable airspace'" and provide a formal statutory definition for "immediate reaches of airspace" (Drone Integration and Zoning Act, 2021, p. 4, 2). That definition is, with respect to UAS operations, "any area within 200 feet above ground level" (Drone Integration and Zoning Act, 2021, p. 2).

Airspace and Air Taxis

In addition to the low-altitude airspace debate caused by drones, the impending arrival of air taxis has also sparked some commentary. Air taxis designed for use in Urban and Advanced Air Mobility operations (UAM and AAM, respectively), similar to drones, will operate at low altitudes in busy airspace (FAA, 2020). Ravich (2020) identified airspace as a legal and regulatory barrier to the integration of UAM. Unlike traditional commercial aviation operations, UAM operations are likely to take place within one state or city. Such operations, in the view of Ravich (2020), "seemingly fall within the police powers of local governments in matters related to general healthy, safety, and welfare" (p. 677).

Yet recent moves by the FAA to claim authority "over all airspace 'above the grass'" adds complexity to this burgeoning controversy (Ravich, 2020, p. 677). Additionally, Ravich (2020) notes that the FAA's ability to regulate airspace also extends to "aeronautical activities on the ground," citing a 1944 Supreme Court case, *Northwest Airlines v. Minnesota*, further obfuscating the issue (Ravich, 2020, p. 678). Still, Ravich (2020) maintains that it is "unclear… whether federal authorities (not local or state regulators) will have the power to regulate access and control of the altitude airspace *beneath* the NAS (*e.g.,* 400 – 500 feet above ground level)" (p. 680).

Similarly, Immel & Langlinais (2020) commented that high volumes of UAM operations might "give rise to a claim that the operations are 'substantially' interfering with the landowner's enjoyment of his property" (p. 2). A nuisance claim could also be brought (Immel & Langlinais, 2020).

All this is to highlight the various perspectives scholars, practicing lawyers, and courts seem to be taking in addressing the airspace issue for the contemporary age of aviation. At the time of this writing, the FAA appears to be unpersuaded by any scholarly debate thus far. The agency's position remains: "FAA rules apply to the entire National Airspace System -- there is no such thing as 'unregulated' airspace" (FAA, 2021).

Conclusion

Airspace ownership, *to wit*, low-altitude airspace ownership, is a complex and inexact legal issue. Innovative aviation technologies and operational concepts, such as drones and UAM air taxis, are poised to define the modern age of aviation operations. Yet historic and contemporary literature highlights regulatory gaps and areas within the law that are unclear as to the governance of certain novel aviation operations. The history of airspace ownership controversies, from the *ad coelum* doctrine to *Causby*, and now to more recent controversies, shows that low-altitude airspace ownership remains an important, contested issue. This review should serve as a guide for future research and scholarship examining that important, contested issue. To be sure, that future research and scholarship must continue to suggest solutions to the complexities presented by this policy challenge.

References

Ackerman v. Port of Seattle, 55 Wn.2d 400 (1960). https://casetext.com/case/ackerman-v-port-of-seattle

A.J. Hodges Industries, Inc. v. United States, 355 F.2d 592 (1966). https://casetext.com/case/aj-hodges-industries-inc-v-united-states

Anderson, R. B. (1961). Some aspects of airspace trespass. *Journal of Air Law and Commerce, 27*(4), 341–359. https://scholar.smu.edu/jalc/vol27/iss4/3

Andritsos, K., Scott, B. I., & Trimarchi, A. (2022). What is in a name: Defining key terms in urban air mobility. *Journal of Intelligent & Robotic Systems*, *105*, 1-9. https://doi.org/10.1007/s10846-022-01694-1

Bacon v. United States, 295 F.2d 936 (1961). https://casetext.com/case/bacon-v-united-states-2

Ball, S. S. (1928, April). The vertical extent of ownership in land. *University of Pennsylvania Law Review and American Law Register*, *76*(6), 631–689. https://scholarship.law.upenn.edu/cgi/viewcontent.cgi?article=8295&context=penn_law_review#:~:text=It%20is%20the%20soil%2C%20the,things%20which%20may%20be%20owned

Banner, S. (2008). *Who owns the sky? The struggle to control airspace from the Wright Brothers on.* Harvard University Press. https://doi.org/10.4159/9780674020498

Brennan v. Dickson, No. 21-1087 (D.C. Cir., 2022). https://www.cadc.uscourts.gov/internet/opinions.nsf/55807FB471B60BB08525888E0051AEA6/$file/21-1087-1956978.pdf

Brenner v. New Richmond Reg'l Airport Comm'n, 2012 WI 98 (2012). https://casetext.com/case/brenner-v-new-richmond-regl-airport-commn

Brown v. U.S., 73 F.3d 1100 (Fed. Cir. 1996). https://casetext.com/case/brown-v-us-63

Butler v. Frontier Tel. Co., 186 N.Y. 486, 79 N.E. 716 (1906). https://casetext.com/case/butler-v-frontier-telephone-co

Cahoon, C. (1990). Low altitude airspace: A property rights no-man's land. *Journal of Air Law and Commerce, 56*(1), 157–198. https://scholar.smu.edu/jalc/vol56/iss1/5

Causby v. United States, 104 Ct. CL. 342 (1945). https://cite.case.law/pdf/11004443/Causby%20v.%20United%20States,%20104%20Ct.%20Cl.%20342%20(1945).pdf

Civil Aeronautics Act of 1938, Pub. L. No. 75-706, 52 Stat. 973 (1938). https://libraryonline.erau.edu/online-full-text/books-online/CivilAeronauticsAct.pdf

Cohen, W. (1958). Justice Douglas: A law clerk's view. *University of Chicago Law Review*, *26*(1), 6–8. https://chicagounbound.uchicago.edu/uclrev/vol26/iss1/4/

Cooper, J. C. (1948). State sovereignty vs. federal sovereignty of navigable airspace. *Journal of Air Law and Commerce, 15*(1), 27–38. https://scholar.smu.edu/jalc/vol15/iss1/3

Cummings, J. J. (1953). Ownership and control of airspace. *Marquette Law Review*, *37*(2), 176–184. https://scholarship.law.marquette.edu/mulr/vol37/iss2/6

Domnarski, W. (2006). *The great justices, 1941-54: Black, Douglas, Frankfurter & Jackson in chambers*. University of Michigan Press. https://doi.org/10.3998/mpub.156576 s

Donohue, L. K. (2021). Who owns the skies? Ad coelum, property rights, and state sovereignty. In M. Feeney (Ed.), *Eyes to the Sky: Privacy and Commerce in the Age of the Drone*. Cato Institute. https://scholarship.law.georgetown.edu/facpub/2369/

Drone Federalism Act, S. 1272, 115th Cong. (2017). https://www.congress.gov/bill/115th-congress/senate-bill/1272/text

Drone Integration and Zoning Act, S. 600, 117th Cong. (2021). https://www.congress.gov/bill/117th-congress/senate-bill/600/text

Eubank, J. A. (1930, January). Ownership of the airspace. *Dickinson Law Review*, *34*(2), 75–104. https://ideas.dickinsonlaw.psu.edu/dlra/vol34/iss2/1

Federal Aviation Act of 1958, Pub. L. No. 85-726, 72 Stat. 731 (1958). https://www.govinfo.gov/content/pkg/STATUTE-72/pdf/STATUTE-72-Pg731.pdf#page=1

Federal Aviation Administration. (2021, August 30). *Airspace 101 – Rules of the sky*. https://www.faa.gov/uas/getting_started/where_can_i_fly/airspace_101

Federal Aviation Administration. (2020, June 26). *Urban air mobility concept of operations*. https://nari.arc.nasa.gov/sites/default/files/attachments/UAM_ConOps_v1.0.pdf

Field, A. T. & Davis, F. K. (1996). Can the legal eagles use the ageless preemption doctrine to keep American aviators soaring above the clouds and into the twenty-first century. *Journal of Air Law and Commerce*, *62*(2), 315–383. https://scholar.smu.edu/jalc/vol62/iss2/2

Garland, O. J. (1937). The proper theory on which to seek an injunction against overflights over land. *Washington University Law Quarterly*, *22*(4), 559–564. https://openscholarship.wustl.edu/law_lawreview/vol22/iss4/8/

Government Accountability Office (GAO). (2020, September 16). *Unmanned aircraft systems: Current jurisdictional, property, and privacy legal issues regarding the commercial and recreational use of drones* (GAO Report B-330570). https://www.gao.gov/assets/b-330570.pdf

Griggs v. Allegheny County, 369 U.S. 84 (1962). https://tile.loc.gov/storage-services/service/ll/usrep/usrep369/usrep369084/usrep369084.pdf

Gustafson, L. P. (2017). Arkansas, airspace ownership and the challenge of drones. *University of Arkansas at Little Rock Law Review*, *39*(2), 245–278. https://lawrepository.ualr.edu/cgi/viewcontent.cgi?article=1979&context=lawreview

Hackley, H. H. (1937). Trespassers in the sky. *Minnesota Law Review*, *21*(7), 773–804. https://scholarship.law.umn.edu/cgi/viewcontent.cgi?article=2498&context=mlr

Hannabalson v. Sessions, 116 Iowa 457 (1902). https://cite.case.law/iowa/116/457/

Hinman v. Pacific Air Transport, 84 F.2d 755 (9th Cir. 1936), cert. denied, 300 U.S. 654 (1937). https://casetext.com/case/hinman-v-pacific-air-transport

Huerta v. Haughwout, No. 3:16-cv-358 (JAM) (D. Conn. Jul. 18, 2016). https://casetext.com/case/huerta-v-haughwout

Immel, J. J. & Langlinais, J. A. (2020). The challenges to urban air mobility. *The Air & Space Lawyer*, *33*(3). https://www.americanbar.org/content/dam/aba/publications/air_space_lawyer/fall2020/asl_v033n03_fall2020_immellanglinais.pdf

Kingsley, R. & Mangham, C. R. (1932). The correlative interests of the landowner and the airman. *Journal of Air Law and Commerce*, *3*(3), 374–399. https://scholar.smu.edu/cgi/viewcontent.cgi?referer=&httpsredir=1&article=3695&context=jalc

Klein, H. D. (1959). Cujus est solum ejus est.. quousque tandem. *Journal of Air Law and Commerce, 26*(3), 237–254. https://scholar/smu.edu/jalc/vol26/iss3/2

Lacey v. United States, 595 F.2d 614 (1979). https://casetext.com/case/lacey-v-united-states#p615

Lashbrook, L. D. (1946, March). Ad coelum maxim as applied to aviation law. *Notre Dame Law Review, 21*(3), 143–154. http://scholarship.law.nd.edu/ndlr/vol21/iss3/1

Leavitt, I. M. (1947). The landowner versus the airport. *West Virginia Law Review, 50*(2), 145–157. https://researchrepository.wvu.edu/cgi/viewcontent.cgi?article=4010&context=wvlr

Logan, G. B. (1930, August). The case of Smith v. New England Aircraft Company. *The Journal of Land & Public Utility Economics*, *6*(3), 316–324. https://www.jstor/org/stable/3139001

Long Lake Twp. v. Maxon, 336 Mich. App. 521 (2021). https://www.courts.michigan.gov/siteassets/case-documents/uploads/OPINIONS/FINAL/COA/20210318_C349230_47_349230.OPN.PDF

Miller, B. M. (2020). Drone delivery and the takings clause. *Texas A&M Journal of Property Law*, *6*(2), 139–168. https://scholarship.law.tamu.edu/journal-of-property-law/vol6/iss2/3/

New York Times. (1929, January 20). Land owner holds air space rights: Aerial transport bringing up many questions of public and private ownership. *ProQuest Historical newspapers: The New York Times with Index*.

New York Times. (1930, March 5). Landowner does not control airspace, expert holds. *ProQuest Historical newspapers: The New York Times with Index*.

Palisades Citizens Ass'n, Inc. v. Civil Aeronautics Board, 420 F.2d 188 (1969). https://casetext.com/case/palisades-citizens-assn-inc-v-cab#e1d4194b-2f6c-4762-a43f-f0a3c89f700c-fn6

Ravich, T. M. (2020). On-demand aviation: Governance challenges of urban air mobility ("UAM"). *Penn State Law Review*, *124*(3), 657–689. http://www.pennstatelawreview.org/wp-content/uploads/2020/07/On-Demand-Aviation-Governance-Challenges-of-Urban-Air-Mobility-%E2%80%9CUAM%E2%80%9D.pdf

Reeves, A. G. (1909). *A treatise on the law of real property*. Boston Little, Brown, and Company.

Rhyne, C. S. (1944). *Airports and the courts.* National Institute of Municipal Law Officers.

Rule, T. A. (2011). Airspace in a green economy. *UCLA Law Review*, *59*, 270–320. https://scholarship.law.missouri.edu/cgi/viewcontent.cgi?article=1337&context=facpubs

Rule, T. A. (2012). Airspace and the takings clause. *Washington University Law Review*, *90*, 421–472. https://scholarship.law.missouri.edu/cgi/viewcontent.cgi?article=1481&context=facpubs

Rule, T. A. (2015). Airspace in an age of drones. *Boston University Law Review*, *95*, 155–208. https://www.bu.edu/bulawreview/files/2015/02/RULE.pdf

Rule, T. A. (2022). Drones, airspace, and the sharing economy. *Mercatus Working Paper Series*. https://www.mercatus.org/publications/technology-and-innovation/drones-airspace-and-sharing-economy

Rupprecht, J., Candelario, E., & Yodice, K. Brief of Petitioners, Brennan v. Dickson, No. 21-1087 (2022), 2021.

Skorup, B. (2022a). Drones, airspace design, and aerial law in states and cities. *Akron Law Review*, *55*(1), 157–186. https://ideaexchange.uakron.edu/cgi/viewcontent.cgi?article=2554&context=akronlawreview

Skorup, B. (2022b). *Is your state ready for drone commerce? The 2022 state-by-state scorecard*. Mercatus Center. https://www.mercatus.org/system/files/skorup_dronescorecard_2022.pdf

Smith v. New England Aircraft Co., 270 Mass. 511 (1930). https://casetext.com/case/smith-v-new-england-aircraft-co-inc

Speciale, R. C. (2006). *Fundamentals of aviation law*. McGraw-Hill.

Speir v. United States, 485 F.2d 643 (Fed. Cir. 1973). https://casetext.com/case/speir-v-united-states

Swetland v. Curtiss Airports Corp., 41 F.2d 929 (1930). https://casetext.com/case/swetland-v-curtiss-airports-corporation-2

Swetland v. Curtiss Airports Corp., 55 F.2d 201 (1932). https://law.justia.com/cases/federal/appellate-courts/F2/55/201/1565138/

Tahoe-Sierra Preservation Council, Inc., et al. v. Tahoe Regional Planning Agency et al., 535 U.S. 302 (2002). https://supreme.justia.com/cases/federal/us/535/302/case.pdf

Thrasher v. City of Atlanta et al., 178 Ga. 514 (1934). https://cite.case.law/ga/178/514/

Thrope, L. J. (1947). Flight on aircraft as a taking of property. *Wyoming Law Journal*, *1*(3), 148–150. https://scholarship.law.uwyo.edu/wlj/vol1/iss3/10

Turner, J. S. & Baxenberg, S. M. (2018, October 17). Causby and effect: How the Uniform law Commission's misplaced reliance on a 1946 Supreme Court case threatens the drone industry. *Thomson Reuters Westlaw*. https://www.wiley.law/assets/htmldocuments/Causby_And_Effect.pdf

Turner, J. S. & Baxenberg, S. M. (2020). Clearing the air: ULC rightfully rejects property rights advocates' line in the sky. *The Air & Space Lawyer, 33*(3). https://www.wiley.law/assets/htmldocuments/ASL_v033n03_Fall2020_TurnerBaxenberg.pdf

Turner, J. S. & Baxenberg, S. M. Brief of the Association for Unmanned Vehicle Systems International as Amicus Curiae in Support of Respondents, Brennan v. Dickson, No. 21-1087 (2022), 2021.

Uniform State Law for Aeronautics (1922). https://nap.nationalacademies.org/read/22735/chapter/12#78

United States v. 15,909 Acres, 176 F. Supp. 447 (1958). https://casetext.com/case/united-states-v-15909-acres#p448

United States v. Causby et ux., 328 U.S. 256 (1946). https://tile.loc.gov/storage-services/service/ll/usrep/usrep328/usrep328256/usrep328256.pdf

U.S. Const. amend. V. https://www.senate.gov/civics/resources/pdf/US_Constitution-Senate_Publication_103-21.pdf

Whitnah, D. R. (1966). *Safer skyways: Federal control of aviation, 1926–1966*. The Iowa State University Press.