Droneport Texas LLC
Taking Flight to the Lone Star Skies!

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Anita Ramasastry, President
Uniform Law Commission
111 N. Wabash Ave, STE 1010
Chicago, IL 60602

Dear President Ramasastry:

On behalf of our clients and fellow unmanned aviation colleagues, thank you for this opportunity to share a collective aviators' perspective on the draft "Tort Law Relative to Drones Act" from the October 26 to 28, 2018 Drafting Committee Meeting. We recognize the legal morass created by the current patchwork of laws regarding unmanned aviation at the state and local levels. Representing remote pilots, Droneport Texas wishes to offer observations of a practical and pre-existing nature under which we currently fly.

A Perspective on Aerial Intrusion: *U.S. v Causby*[1] and Dead Chickens

Airplanes can be thunderous machines. As no public sound studies are readily available for World War Two-era four-engine aircraft such as the Boeing B-17 Flying Fortress and the Consolidated B-46 Liberator, we offer comparison to charted values by Purdue University for Noise Sources[2]. A jet aircraft at 25 meters during takeoff (the lowest altitude given for aircraft flying over Causby's property) produces 150 dB of noise suffered by nearby listeners. We opine that a similar volume of noise was made over Causby's chicken coops.

Unlike the internal combustion radial engines used at the end of World War Two, the electric motors used for consumer-level small Unmanned Aircraft Systems (sUAS) are much less intrusive. Available evidence measures the noise output of the DJI-series of consumer sUAS to

[1] *United States versus Causby*, 328 U.S. 256 (1946).
[2] *Noise Sources and Their Effects* (Chart), Purdue University, Department of Chemistry, <https://www.chem.purdue.edu/chemsafety/Training/PPETrain/dblevels.htm>.

range from 75.8 to 79.8 dB[3]. By comparison, a conversation carried on in a normal tone of voice measures 60 dB. Registering at the approximate noise level of 76 dB, the common source of daily noise to approximate the DJI squadron of unmanned aircraft (UA) is music being played in a living room[4].

The difference between the takeoff roar of the Purdue University's model jet at 150 dB and the approximated noise of a drone at 80 dB is 70 dB. Measurements in decibels (dB) are logarithmic; for example, an increase in sound from 50 to 80 dB is a volume increase of 1,000 times. The difference between the noise output of a four-engine manned transport-category aircraft and a four-engine electric drone is a factor of ten million. Therefore, we opine that the sound of a UA in flight—at a volume of one ten-millionth of the disturbances involved in *U.S. v Causby*—is not likely to result in the economic loss of chickens nor create a disturbance to those on the ground.

A Fallacy of *ad coelum* Legal Theory: Navigable Airspace and the Sea

For public benefit, state and local governments create infrastructure improvements. Whether the improvement is a night light or a telephone pole, there is benefit conferred to all nearby by means of tax-payer dollars. The U.S. Supreme Court determined in *Stop The Beach Renourishment, Inc. v. Florida Department of Environmental Protection*[5] that a state-authorized beach renourishment project which added sand waterward of privately-owned uplands created new beaches which are publicly owned. The Court determined that an upland property owner is not entitled to damages as a consequence of the loss, thus negating the legal theory of common law riparian rights due to the separation of the upland property from the waters' edge. Public improvements, e.g. power lines and telephone poles, added near and on (via right-of-way) private property create public-owned renourishment of the land. As the pressure systems of the sky act as tides of the sea, the eddies and currents and aerial accretions create a public, not private, airspace.

As the U.S. Supreme Court determined that beach front property owners do not have a protected property right to be able to maintain contact with the water, terrestrial land owners do not have a similar protected property right to the skies. Since land owners cannot have ownership of the air resulting from public improvements, no aerial trespass can take place.

[3] Levin, Tim, "How Loud Is Your Drone? -The Drone Noise Test of P2, P3P, P4P, I2." *WeTalkUAV.com*, February 18, 2017, <https://www.wetalkuav.com/dji-drone-noise-test/>.
[4] *Noises and Their Effects* (Chart), AirportNoiseLaw.com, <http://www.airportnoiselaw.org/dblevels.html>.
[5] STOP THE BEACH RENOURISHMENT, INC. v. FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION ET AL. CERTIORARI TO THE SUPREME COURT OF FLORIDA No. 08–1151. Argued December 2, 2009—Decided June 17, 2010, <http://bit.ly/c9Y1Xu>.

A Fallacy of *ad coelum* Legal Theory: Surface-class Airspace Reversal

As a practical air safety matter of controlling the airspace around busy airports, the U.S. National Airspace has rings of controlled airspace which go all the way to the ground. Any aircraft, manned or unmanned, requires prior approval of the local air traffic control tower before entering the airspace. These rings of airspace are known as Class B, C, D, and surface Class E airspace[6].

According to FAA Master Airport Records[7], there are 734 airports with operating air traffic control (ATC) towers, representing the Class B, C, and D primary airports. This group of airports has surface areas with a minimum radius of 4 nautical miles, or roughly 4.6 statute miles. Each represents a minimum surface area of 66.5 square miles. The combined surface area for all ATC-towered airports is over 48,800 square miles of airspace owned all the way to the ground in accordance with federal regulation. This surface area represents a significant portion of urban and suburban area within the United States.

Could a landowner legally fly their own drone in the *immediate reaches* of their property within a surface airspace area without prior ATC approval? No, the landowner's property within surface airspace requires the same prior approval to fly their own drone as the non-landowner who wishes to fly their drone in the same area, even within the *immediate reaches*. Therefore, the *ad coelum* legal theory could not reasonably prevail as a defense against an unauthorized flight by the land owner within surface airspace.

A Fallacy of Aerial Trespass: Treaty on Open Skies[8]

With the availability of images from space, thanks to *Google Earth*™, everyone's backyard is now available for public view. So, does one have a reasonable expectation of privacy when satellites equipped with high-resolution cameras are constantly taking photographs of the Earth? No. Perhaps the aerial intrusions of family picnics and backyard barbeques is limited to the Superpowers? Not really.

The **Treaty on Open Skies** was fully ratified on January 1, 2002 and currently has 34 party states. The treaty specifies that a member state's entire territory is open to observation by members. Certified aircraft have video cameras, optical panoramic and framing cameras for daylight photography, infra-red line scanners, and synthetic aperture radar. These systems provide all-weather capability for both day and night observations—*there is no time when one's*

[6] 14 CFR part 71—*DESIGNATION OF CLASS A, B, C, D, AND E AIRSPACE AREAS; AIR TRAFFIC SERVICE ROUTES; AND REPORTING POINTS.*
[7] U.S. Federal Aviation Administration Form 5010 Database, <https://www.gcr1.com/5010WEB/>, March 25, 2019.
[8] *Treaty on Open Skies*, U.S. Department of State, <https://www.state.gov/t/avc/cca/os/>.

property cannot be observed. The United States of America authorizes foreign entities to record imagery which might otherwise be subject to claims of invasion of privacy. Currently, there are eight such observation flights scheduled over the United States for 2019[9]. Since the very photos which could create a claim of tortious trespass for the drone operator can be on the desks of French fonctionnaires and Russian apparatchiks, the lawful acquisition of such imagery by the drone operator is derived from *a maiore ad minus.*

Optical Flow Navigation: Public Safety and Station-keeping Guidance

Besides the various on-orbit systems for navigation, there are other onboard systems used for sUAS guidance, navigation, and control (GNC). One form of navigation that requires no radio signals—terrestrial or space-based—is optical flow. This form of navigation compares real-time images of objects, surfaces, and edges in a scene to determine relative motion between the aircraft and the scene. Optical Flow analysis provides inputs to the GNC to help maintain the position of the UA. This form of navigation is in use today. The ability of a UAS to maintain position is not only useful for envisioned consumer goods delivery but is also an important element in public safety for sUAS obstacle clearance and avoidance.

Summary

- The comparison of economic damage caused in *U.S. v Causby* is extreme with drones producing one ten-millionth of the acoustic perturbance and not likely to kill anyone's chickens.
- The U.S. Supreme Court in *STOP THE BEACH RENOURISHMENT, INC. v. FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION ET AL.* determined that property owners do not have a protected property right to be able to maintain contact with the water. Translated from the horizontal into the vertical, terrestrial land owners do not have a similar protected property right to the skies.
- Surface class airspace within the U.S. National Airspace requires prior permission to enter, regardless of landownership status. Landowners in such areas do not enjoy special privilege of access to the skies from other pilots regardless of altitude.
- Aerial imagery trespass is a fact of life and supported by the United States with its fellow signatories to the *Treaty on Open Skies*. As the federal government confers such access to foreign entities, such access is afforded to U.S. remote pilots and sUAS operators.
- Optical flow navigation—analysis of relative movement based upon captured real-time aerial images—is currently in use and contributes to public safety by offering a completely autonomous form of aerial navigation.

[9] Open Skies Consultative Commission, 2nd Meeting of the 77th Session OSCC (77) Journal No. 260, Agenda item 3, 22 October 2018, <https://www.state.gov/documents/organization/287236.pdf>.

Based upon these points, Droneport Texas finds insufficient justification to support an addition to tort law beyond what currently exists.

Thank you, again, for this opportunity to provide a collective pilots' point of view.

Sincerely,

David C. Hook

David C. Hook
President