MEMORANDUM

To: House of Representatives Communications and Technology Committee

From: Ella Atkins, *Professor of Aerospace Engineering, University of Michigan*

Subject: Statement on Senate Bill No. 992

Date: *November 29, 2016*

Executive Summary of Support for and Proposed Amendments to the Bill:

- I would like to commend Sen. MacGregor and the Michigan Legislature for their efforts in developing an Unmanned Aircraft System (UAS) statute. As someone who has been immersed for the last three+ years in the Federal Aviation Administration (FAA) rulemaking process as it relates to UAS, as well as having worked with Sen. Colbeck in an attempt to develop a state regulatory process, I fully acknowledge the complexities. My advocacy focused on recent rulemaking and legal interpretations by the Federal Aviation Administration (FAA) particularly relating to the operation of small UAS for academic research and teaching.
- I also own a small airport in Brooklyn, MI. Through this experience as well as my agricultural background I am of the opinion that the recent FAA rule changes lack certain protections for personal property rights. Due to this fact, I want to urge further examination and ultimately amendments to SB 992 in order to explicitly recognize immediate reaches airspace as being owned and controlled by the property owner rather than being "taken" for the National Airspace System (NAS). I believe Michigan can be a leader in preserving our residents' right to use and enjoy properties which in many cases have been owned and supported through property tax for generations.[1]
- SB 992 remains an excellent vehicle specifically in Sections 11 and 13 which welcome commercial and recreational UAS operations into the National Airspace System over Michigan excluding immediate reaches airspace per US v. Causby [1]. However, I think the legislature could strengthen Sections 11 and 13 by acknowledging personal property rights.
- Section 22 addresses specific cases of bad behavior using UAS. While these are important, recognizing and penalizing unauthorized transit through immediate reaches airspace will address these and additional issues not yet captured, e.g., annoyance with no definitive privacy violation as shown in Figure 3 on the next page.
- In addition to agreeing with Sec. 11 & 13 with personal property protections, I support creation of a Michigan Unmanned Aircraft Systems Task Force, the language acknowledging right-of-way for emergency service UAS, and no-fly restrictions to protect Michigan's endangered species.

Background: US Code Title 49 [2] offers the public "right of freedom of transit through the navigable airspace" and tasks the [FAA] Administrator with "controlling the use of the navigable airspace and regulating civil and military operations in that airspace in the interest of the safety and efficiency of both of those operations." §40102 (B)(32) states "*navigable airspace* means airspace above the minimum altitudes of flight…including airspace needed to ensure safety in the takeoff and landing of aircraft." §40103 indicates "A citizen of the United States has a public right of transit through the navigable airspace." Regulators enacted this code for manned aircraft transiting the National Airspace System (NAS) but did not envision the small unmanned aircraft system (UAS) or "drone". As an indicator, paragraph (b) in §44718 [2] states the Secretary of Transportation decides whether a proposed structure will obstruct the navigable airspace to ensure safe approach and departure corridors. It is impractical for the Secretary to review every proposed structure to be erected below the airspace classified "navigable for public transit" in

[1] New airport runways are approved through public hearings, and existing airport approach and departure corridors are disclosed during real estate transactions. Such airspace corridors have therefore been acknowledged long-term as being part of the NAS.

US Code Title 49 [2]. The low-altitude airspace occupied by our homes has instead been designated "immediate reaches" by the US Supreme Court in US v. Causby [1], indicating "The landowner owns at least as much of the space above the ground as they can occupy or use in connection with the land." In contrast, the FAA Unmanned Aircraft Program Office (UAPO) under Jim Williams indicated airspace is now "navigable down to the ground" thus is part of the NAS [3].

Federal Aviation Regulations (FAR) for small UAS: The FAA provides guidance for small UAS operating under 400 feet above ground level altitude. Modelers (hobbyists) are referred to Advisory Circular (AC) 91-57A [4], and a recent MOU [5] supports small UAS flight for educational purposes. A new small UAS rule [6] known as "Part 107" became active in late August 2016. To-date, specific FAA guidance [4]-[6] has focused on line-of-sight (LOS) flight under 400 feet, but a process for beyond line of sight (BLOS) waiver under Part 107 [6] is anticipated. Landowner permission is required in AC 91-57 and AC 91-57A, compatible with the immediate reaches airspace distinction in US v. Causby [1]. However, BLOS approval will allow small UAS to routinely transit multiple properties, and small UAS are already capable of navigating BLOS autonomously or with first-person view (FPV). BLOS flight is being approved first for rural areas; however, such restrictions will not eliminate safety, annoyance, or privacy invasion risks.

Issue: A vision for "UTM" (UAS Traffic Management) is being formulated at the national level. NASA and companies such as Amazon (Figure 1) and DJI have proposed a model in which small UAS strictly operate at and below 400 ft. AGL altitude. However, per the Figure 1 caption, routing of "low-speed localized traffic" through the 0-200 ft. airspace layer will certainly direct traffic through the immediate reaches airspace distinguished from the NAS in US v. Causby [1]. A "perfect storm" of lobbyists is pressuring Congress and FAA to take all airspace down to the ground for "free public transit". Manned aircraft groups (AOPA, ALPA, EAA, etc.) lobby for small UAS to be kept below 500 feet, while small UAS groups (AUVSI, Amazon, etc.) lobby for this "unoccupied" airspace to be "freely available" to support their group's business plans. Most Michigan residents don't yet realize they are at risk of losing ownership and control of their immediate reaches airspace through its impending "taking" for free use by Amazon et al.

Recommendation: Our residents must be able to legally say "no" or even charge a fee for UAS passage through the airspace within immediate reach of their property. Otherwise we risk creating a chaotic landscape of legal cases due to privacy invasion and safety risk (Figure 2) as well as actions motivated by annoyance and fear (Figure 3). UAS unquestionably must follow federal regulations for operations in the navigable airspace above immediate reaches that is shared with manned aircraft. However, I strongly discourage Michigan from enacting blanket legislation that defers to federal rules in all UAS-related matters. While it is possible Congress and FAA will enact common-sense policies for immediate reaches airspace in the long-term, current indicators suggest our property rights are at risk.

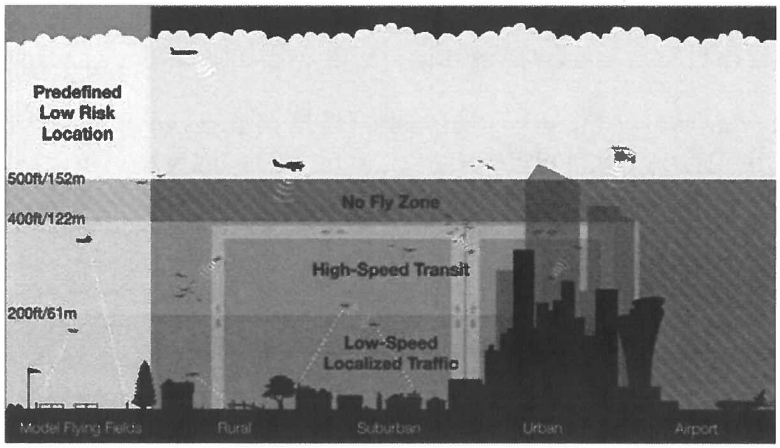

Figure 1: "Airspace is a shared resource – this is really important. Once you take off and fly, you are sharing the air." –Gur Kimchi, Amazon Prime Air. http://dronelife.com/2016/05/03/amazon-unveils-plan-drone-integration/ .

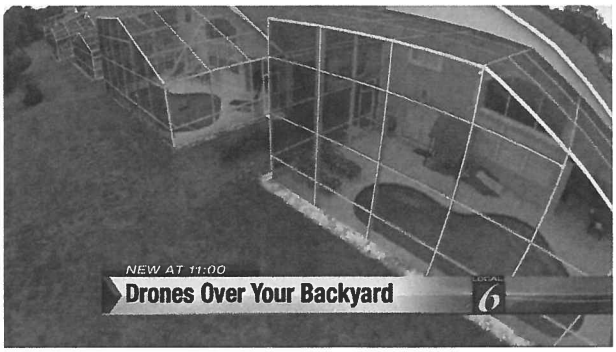

Figure 2: Privacy violation potential illustrated: http://www.clickorlando.com/news/florida/orange-county/neighbors-complain-of-drones-flying-over-winter-park-back-yards.

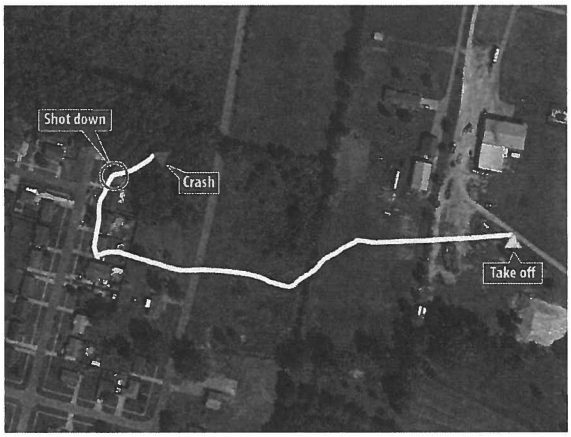

Figure 3: Path of a controversial drone in Kentucky: http://www.dailymail.co.uk/news/article-3294792/Victory-Kentucky-Drone-Slayer-took-aircraft-home-SHOTGUN.html. See http://www.nbcnews.com/news/us-news/case-dismissed-against-william-h-merideth-kentucky-man-arrested-shooting-n452281 for further discussion. If all drones "share the air", citizens such as Mr. William Meredith from Kentucky would have no recourse to stop a drone from transiting or hovering low over their backyards. This drone disturbed Mr. Meredith's enjoyment of his property. The Kentucky court found in favor of Mr. Meredith, yet federal rules suggest that if the operation was conducted under Part 107 (rather than AC 91-57) this flight would be legal provided privacy-invading imagery was not captured. Note that residents such as Mr. Meredith could not know whether the drone was capturing privacy-invading imagery or not.

References

[1] United States Supreme Court, "United States v. Causby," 328 U.S. 256, 1946, https://supreme.justia.com/cases/federal/us/328/256/case.html.

[2] 49 United States Code, "Subtitle VII – Aviation Programs," US Government Printing Office, 2011, https://www.gpo.gov/fdsys/pkg/USCODE-2011-title49/html/USCODE-2011-title49-subtitleVII.htm.

[3] "Has the FAA Claimed Jurisdiction Over Indoor Airspace?" http://dronelaw.com/2015/05/18/has-the-faa-claimed-jurisdiction-over-indoor-airspace/.

[4] Federal Aviation Administration (FAA), "Model Aircraft Operating Standards," Advisory Circular, Sept. 2, 2015, https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_91-57A.pdf.

[5] Federal Aviation Administration (FAA), "Educational Use of Unmanned Aircraft Systems (UAS)," May 4, 2016 https://www.faa.gov/uas/resources/uas_regulations_policy/media/Interpretation-Educational-Use-of-UAS.pdf.

[6] Federal Aviation Administration (FAA) and Department of Transportation (DOT), "Operation and Certification of Small Unmanned Aircraft Systems," RIN 2120-AJ60, released June 21, 2016, http://www.faa.gov/uas/media/RIN_2120-AJ60_Clean_Signed.pdf. Also see the Fact Sheet at http://www.faa.gov/news/fact_sheets/news_story.cfm?newsid=20516.

Ella M. Atkins, Professor of Aerospace Engineering, University of Michigan
Email: ematkins@umich.edu, Cell: 443-745-6069