

Written Statement of Dr. Jamey Jacob
Executive Director of Oklahoma Aerospace Institute for Research and Education
Williams Chair and Professor of Mechanical and Aerospace Engineering
Oklahoma State University

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Chairman Lucas and Ranking Member Lofgren:

Thank you for inviting me to testify today. It is an honor to speak with you about the work underway within the state of Oklahoma to help advance emerging technology in the US in advanced air mobility (AAM) and safe integration into the national airspace.

In addition to serving as the Executive Director of the Oklahoma Aerospace Institute for Research and Education, I also serve as Director of the Counter-UAS Center of Excellence and as Professor of Mechanical and Aerospace Engineering at Oklahoma State University, as well as president of the Unmanned Systems Alliance of Oklahoma.

Since development of laboratories for autonomous and remotely piloted aircraft in the 90s for undergraduate teaching tools, Oklahoma State University has been a leader in aerial robotics. As of part of our land grant mission, we have fostered education, research, outreach, and application of these systems into areas of public use, such as agriculture, energy, environmental monitoring, and national defense, working with national labs and industry alike.

We have used this technology to help spur interest in aerospace and other STEM careers, particularly for under-represented minorities including urban areas and tribal nations, leveraging programs within the Choctaw, Cherokee, and Osage Nations of Oklahoma, providing new opportunities for these sovereign nations to use this technology to support their tribal members and develop new entrepreneurial activities within their borders and support their federal customers.

As examples of our use inspired research and development, we are working with the FAA to develop technology to add in navigation and flight inspection, improving performance and reducing cost to keep US airports and aerial navigation safe; with NASA to develop deployable aircraft to explore Mars and balloons to explore Venus; with national labs to evaluate the efficiency of wind farms; oil and gas companies to search for new American energy sources and find sites of fugitive emissions to safeguard precious natural energy resources and protect the environment; evaluate systems to inspect crops and livestock and eradicate feral hog infestations; survey lakes and rivers to mitigate invasive species, protect endangered ones, and measure outbreaks of diseases and blooms; search for wildfires in rangelands and forests, protecting grasslands, forests, and the firefighters and forest rangers that preserve them; developing systems to monitor at-risk marine mammals such as dolphins and whales; and working with international partners such as Bombtechs without Borders to find and dispose of unexploded ordnance within active combat zones, including Ukraine. These are just some examples of the projects that our creative researchers and students are currently working on.

Of critical national importance is OSU's Counter-UAS Center of Excellence. Supporting the needs of both the Departments of Defense and Homeland Security, the Counter-UAS Center of Excellence works with private companies to evaluate threats of drones by state and non-state actors using the systems as both symmetric and asymmetric weapons threatening US warfighters and the public, as well as evaluating systems to detect, identify, and mitigate these threats. In addition to developing the gold standards to evaluate these defensive systems, the Counter-UAS Center of Excellence is currently working with the US Army to develop curricula and training capabilities for the DoD Joint Counter-UAS University, housed at Fort Sill, to train soldiers in Counter-UAS technology across all branches of the military to help bridge the gap in knowledge and training.

Federal support has been the catalyst to enable this use inspired research. Government

funding has been a powerful driver in pushing technology from the laboratories to end-user adoption, crossing the valley of death that many innovations never bridge. Support from programs such as the NASA University Leadership Initiative and National Science Foundation National Robotics Initiative, has allowed us and other universities to push the boundaries in using UAS to improve wind and weather observations and forecasting, which will result in adoption of AAM solutions in urban setting, and greatly increase our capability to accurately predict severe storms, saving lives and property. The NASA University Leadership Initiative is an example of transformative research support as it aims to unite NASA's Aeronautics Research Mission and prominent American research universities to produce innovative ideas that allow university and industry teams to provide unique solutions to the most complex problems facing aeronautics today.

Technological progress depends on the fundamental discoveries in the university and national research labs and resulting translation to innovation that small businesses and entrepreneurs excel in, and the scalability to consumer products provided by larger global companies. Without the public investment from federal research funding, the risks are too great for private investment alone to develop breakthrough technology needed for cutting edge products and new high-tech jobs.

As an example of this, through EDA funding, in cooperation with private and tribal partners, we have founded the LaunchPad AAM Center and Flight Range with the Osage Nation and Tulsa Innovation Laboratories to develop novel programs to support small business innovation and provide unique flight-testing solutions, helping to bridge this divide.

To maintain the US lead in this technology requires continued support of academic research funding and increased collaboration between universities and private industries, allowing collegiate laboratories to shoulder the burden of high-risk fundamental research and development and allowing US entrepreneurs and the American people to profit from the rewards that this

research generates.

The US heartland – flyover country – has often been ignored in favor of coastal concentrations that traditionally receive the bulk of research funding. However, East and West Coast states generally lack the access to open low risk airspace afforded by low populations, generating potential new opportunities by utilizing flyover country as fly-in research ranges. This too requires support by federal funding.

Facilities such as the Choctaw Nation of Oklahoma test site as part of the FAA BEYOND program are critical to US capabilities. Further development of these and other facilities that allow testing of this technology to evaluate use cases and performance is much needed to provide crucial safety data for the FAA, such as advancing beyond visual line of sight drone operations and routine cargo deliveries of critical supplies for first responders, disaster response, medical emergencies, and impoverished regions.

These new inventions have been developed through public private partnerships – combinations of government funding, private investment, and academic research and development from research labs across the country. This driver of innovation is a powerful engine for economic growth and one of America’s greatest competitive strengths.

We are in a new golden age of aviation. Like the previous golden eras that preceded this in the 1920s and post WWII, this new era witnesses the introduction of new technology, in this case autonomy and electrification, that will have a tremendous impact on the US and how individuals use aerial transportation for travel and commerce. This era that we are in the process of birthing will have an even wider reach than the two that went before.

We believe the future of advanced aviation is bright, and that the quality of life for all Americans can be enhanced by advancing and exploiting this emerging technology. Research conducted at land grant and other universities play a critical role in this potential prosperity, but

we require the federal government's support to ensure that these technologies flourish and provide the benefits to society that we know are possible.

Thank you again for inviting me to share my opinions. I will be happy to answer any questions that you may have.