Good afternoon Chairwoman Gibson, Chairman Rodriguez and fellow Council Members. I am Ben Esner, the Director of the Center for K-12 STEM Education at the NYU Tandon School of Engineering. I appreciate the opportunity to testify before you today as you consider legislation that would regulate or ban the use of Unmanned Aerial Vehicles.

At NYU Tandon School of Engineering, students, faculty and researchers use UAVs for a number of research and educational purposes, and importantly we also incorporate this technology in our extensive K-12 STEM learning programs for middle and high school teachers and students. Over more than a decade of this work, our school has trained hundreds of teachers in engineering, computer science and research methods, and worked directly with thousands of NYC public school students in an array of programs supported by the National Science Foundation, philanthropic foundations and corporations.

Our engineering students and researchers often experiment with UAVs in innovative and exciting ways, enhancing their educational experiences, developing future technology and furthering scientific inquiry. The hands-on training students receive from fabricating, assembling and programming UAV’s, including the research that can be conducted when flying one, is invaluable to their understanding of a constantly evolving engineering field.

This technology sits, along with other interactive devices, at a fascinating intersection of disciplines that encompass mechanical engineering, electrical engineering and computer science. The applications of these technologies, from ‘smart cities’ ideas for controlling traffic and inspecting civil infrastructure, to monitoring and testing for pollutants and contaminants, need to be explored and developed by responsible researchers and students.

In our K-12 education programs, it is precisely this intersection of disciplines and these kinds of applications that most deeply engage young people and their teachers in STEM learning. The ability to design, build, program, test and iterate is at the core of activity based teaching and learning, and at the core of engineering research. We urge you to consider these factors as they pertain to the pending legislation, and the implications and possible unintended consequences for education and research projects that incorporate UAV technology.

Some interesting ways in which our students are using UAV and similar technology for education and research include the area of environmental monitoring. In another of our Mechanical Engineering labs, faculty and graduate students are at work on a high school
UAV curriculum, leveraging students’ innate interest in and engagement with these devices. It teaches across STEM disciplines, using the real tools of engineers and scientists like microcontrollers, motors, actuators and sensors while illuminating and applying fundamental concepts in physics, aerodynamics and wireless communication. This curriculum, too, delves deeply into computer and computational science, from the programming required to control an UAV to the programming required for sensor-based data acquisition and analysis, to—who knows?—maybe some students taking on the significant challenge of programming for autonomous flight.

In another example, one of our most accomplished engineering graduate students was working in a public high school in Brooklyn. To teach about data collection and research methods, he used an UAV as an experimental instrument, relying on the exciting nature of UAV technology to hook these students and draw them in to conducting what was in truth a pretty standard exercise in measuring and calculating speed. Needless to say, for the young people in his class, there was nothing “standard” about that lesson.

Specifically regarding the legislation that has been introduced: the definition of an UAV can often be very broad and we would ask the Council, as they are considering relevant regulations, to balance public safety interests along with educational interests. Here are a few examples of ways that regulations may impact our students and researchers who take advantage of UAV technology:

Students in our K-12 STEM programs may build UAVs in the classroom, testing the device in a nearby parking lot or open space surrounding schools. Restricting the ability to fly UAV’s around schools or requiring permission before doing so would hamper these hands-on educational programs. Further, UAV’s built in classrooms would not have make, model and serial numbers that can be registered to an individual user. In the case of research, even if the UAVs were commercially purchased, registration and liability insurance requirements would add time and cost before being able to use a UAV for research purposes.

Restricting height of flight and the time of day UAV’s can fly will impact research efforts that take advantage of this technology. While generally UAV’s used for educational purposes may not fly very high, sometimes specific research questions would need to be explored at heights greater than 400 feet above ground, such as measuring certain environmental conditions or testing specific sensor-based applications. UAV’s testing night vision technology or other technologies not reliant on the visible light spectrum would need to be flown at night and restrictions on time of day for UAV flights would hinder research efforts.

We hope that any regulations put forth take into consideration the unique challenges that educational and research institutions, and programs such as those offered by NYU’s Center for K-12 STEM Education, would face in allowing students and researchers to take advantage of this technology.

Thank you again for the opportunity to testify.