Statement by Kevin Conole, United States Representative,
on "Space and Global Health," February 6, 2020

Thank you, Madame Chair. The United States Delegation appreciates the subcommittee noting the crucial role of space data and technology in the public health domain and welcomes the establishment of this agenda item on "Space and global health." The U.S. is a world leader in this field.

The positive impact on public health from space programs goes far beyond enhancing astronaut health and performance and mitigating the risks associated with human spaceflight. Technological advancements have improved healthcare. The International Space Station (ISS) has served as both a unique laboratory and a driver to address complex health problems on Earth, and Earth-orbiting satellites have helped limit the spread of diseases worldwide.

Earth-observing satellites provide environmental data and information to help safeguard public well-being. These data provide researchers, public health officials, and first-responders with the information and imagery they need to anticipate and respond to health emergencies or, better yet, avoid them altogether. Environmental data and information from the U.S. National Oceanic and Atmospheric Administration (or NOAA) help predict malaria risk in Sub-Saharan Africa, prepare and protect vulnerable populations from extreme heat waves, and protect coastal communities from the impacts of harmful algal blooms and shellfish toxins to name just a few of the ways space-based Earth observations are supporting global health-related applications.

In addition, NOAA operates the Search and Rescue Satellite Aided Tracking (SARSAT) system – part of the international Cospas-Sarsat Program, which helps locate lost or distressed aviators, mariners and recreationists at any time, in any condition, around the world. In 2019, NOAA satellites helped rescue 421 people in the United States alone.

Over the last year, NASA has helped develop products that significantly improve life on Earth and public health. A material called Langley Research Center-Soluble Imide that was originally developed for use on a less polluting supersonic airplane is being used in cardiac leads such as pacemakers, across the globe in patients with heart failure or cardiomyopathy for cardiac resynchronization. There are more than 26 million people diagnosed with heart failure worldwide and this polymer may make those devices more durable and easier to implant.

There are many examples of how space research and technologies significantly improve public health. NASA recently helped develop an improved next generation life support water filter that was tested on the ISS, that uses proteins called aquaporins (which are found in virtually all life forms). These proteins embedded in a lightweight membrane showed they outperformed current filters and can be used to filter twice as much fluid with nearly double the water recovery than other home purifiers. Additionally, industrial uses for this water purification technology is now being tested.

Madame Chair, the microgravity environment on the ISS allows researchers to discover how cells age and alter organ function. Tissue chips that are three-dimensional micro-physiological systems which model human organ functions, are a better representative then two-dimensional cell cultures. Developed through grants from the U.S. National Institutes of Health and flown in space on the ISS National Laboratory program, tissue chips are being tested to predict the effect of drug-induced toxicities. The program is intended to enhance pharmaceutical development and limit safety issues. These studies on the ISS are now on going and have shown great promise in speeding up drug development, and will also help get medications to countries in need at a lower cost.

The ISS National Laboratory is a unique research platform available to researchers from the international community, Fortune 500 companies and small companies, research institutions, government agencies, and others—all of which are interested in leveraging microgravity to address complex problems on Earth, such as osteoporosis and frailty in older adults. The ISS National Laboratory has just completed another mission in which the Jackson Laboratory modified a mouse gene to stop production of a growth factor, myostatin, which limits muscle growth. This results in muscle growth in mice and humans. "Mighty mice" with increased muscle mass have just returned from the ISS, and the results from this study could help find the cure to prevent diseases on Earth that result in muscle and bone loss.

Research on the space station has also shown that people who are in good physical condition may have decreased recurrent infections. People, whether on Earth or on the ISS, may have a reactivation of viruses that cause chickenpox, or herpes. This is thought to occur more often when people are stressed. Recently it was found that in a group of astronauts, who lived on the ISS for approximately 6 months and who either were in good physical condition before the spaceflight or who maintained that level of conditioning during the spaceflight, had significantly less viral reactivation than their associates who were not in as good physical shape. This study highlights the importance of physical conditioning in prevention of some infectious diseases.

Thank you, Madame Chair, for the opportunity to share this information with the subcommittee and to highlight the health benefits of space exploration to the world, for the benefit of all humankind.