## Agenda Item 10 – Spinoff Benefits of Space Technology Statement by Kevin Conole June 24, 2024

Thank you, Chair. The United States continues to "bring NASA technology down to Earth." Developed during NASA mission work, these innovations are made available to entrepreneurs, companies, academia, and other government agencies through the NASA Technology Transfer program. Each year, NASA technologies find new life through secondary uses that benefit people around the globe.

For nearly 50 years, NASA has tracked examples of successful commercialization in its annual Spinoff publication. We have documented more than two thousand space technologies that are improving life on Earth. Recent spinoff technologies include the first wireless arthroscopic camera to be cleared by the U.S. Government and a new 3-D printing method that allows additive manufacturing at almost any size with otherwise unprintable metals.

Hydrogen is emerging as a clean-energy option, with governments around the world, including the United States, introducing major hydrogen incentives and subsidies in recent years. NASA, long the world's largest user of hydrogen, has laid the technological groundwork for this promising source of renewable energy. The world's first practical hydrogen fuel cells were built for the Gemini and Apollo programs before the idea of "green energy" existed. Batteries were simply too heavy to send to the Moon to power the Apollo service module. Today, the same facility that designed and manufactured the fuel cells for the Apollo and Space Shuttle programs is still producing fuel cells, now for commercial and industrial use. Today's hydrogen fuel cell – and liquid hydrogen – technology would not be where they are today without America's space program.

Apollo and the Space Shuttle were two of NASA's largest programs, but technology also spins off from the agency's smaller programs – and spacecraft. When a medical device company working on a wireless arthroscope camera sought input from NASA engineers, they found that they were facing many of the same issues that arise in CubeSats. Both need to be small and lightweight with a reliable power source and well-managed temperatures. Agency technologists made suggestions on batteries, radio technology for encrypting high-definition signals, and chips and processors for the device's central processing unit. Now, there is a private U.S. company that created a Wireless Camera System that lets surgeons work unburdened by cables and related interruptions and contamination concerns.

And lastly, Chair, a new family of metal 3-D printers – including one of the world's largest – are using a technology developed with NASA funding. Additive friction stir deposition allows 3-D printing with metals like aluminum alloys, which are lightweight and high-strength but cannot be printed by other means. NASA was interested in enabling the additive manufacture of rocket bodies, pressurized tanks, and airplane fuselages, so the agency helped fund the technology's development by the private sector, which now has distributors around the world, has sold printers to most major aerospace companies, and also licenses the technology to larger manufacturing companies. The technique also allows large-scale printing, and it's the basis for one of the world's biggest metal 3D printers.

These are just a few examples of the ways we ensure innovations developed for space exploration are benefitting everyone by creating jobs, protecting the planet, and improving lives globally.

Additional information about these and other spinoffs can be found in the NASA publication Spinoff 2024, which can be found online (at <a href="https://spinoff.nasa.gov/">https://spinoff.nasa.gov/</a>), and hard copies of the books have been provided to all delegations.

Thank you, Chair.