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THE DECADE OF RESULTS: THE INTERNATIONAL SPACE STATION'S NEXT 10 YEARS

Abstract

The International Space Station, humanity's first permanent home in space, is now entering its third and most productive decade of utilization, including research advancement, commercial value, and global partnership. The first decade of ISS was dedicated to assembly of the station itself, and the second was devoted to research and technology development and learning how to conduct these activities most effectively in space. The third decade is one of results, in which NASA aims to verify exploration and human research technologies to support deep space exploration, continue to return medical and environmental benefits to humanity, and lay the groundwork for a commercial future in low-Earth orbit (LEO). Today, with U.S. commercial crew and cargo transportation systems online, the ISS is busier than ever. NASA's research and development activities aboard are advancing the technologies and procedures that will be necessary to send the first woman and first person of color to the Moon and the first humans to Mars.

This paper will explore two of NASA's primary areas of focus onboard the ISS in the next decade: basic and applied research that will return benefits to humanity on Earth, and completing work for deep space exploration. Some of these fundamental experiments, such as the Alpha Magnetic Spectrometer and the Cold Atom Laboratory, will help expand humanity's understanding of the structure of the universe around us. Other applied research onboard will advance the state-of-the-art in areas as varied as biotechnology, in-space production, and physical sciences. Also of critical importance over the next decade will be completing the development of the technologies and operations necessary for deep space human exploration that can only be accomplished on the ISS. The environmental systems, communications protocols, and human health mitigations required for the first human missions to Mars are being tested and progressively iterated prior to initial deployment in the late 2020s.

With NASA's announcement that it will, with its International Partners, extend the operational lifetime of the ISS through 2030, the human spaceflight community has the opportunity to utilize the next decade to fully realize the global investment in ISS. This investment has given us not only the laboratory itself, but the transportation and communication infrastructure and, most importantly, the enduring spirit of cooperation that has built the foundation for humanity's next chapter in space.