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WORLD
 research

Boeing helps NASA fast-track research experiments onto the International Space Station

By Ed Memi

On one of its last missions into space, in 2009, *Atlantis* hauled tons of equipment to the International Space Station. The shuttle's cargo also included a colony of tiny worms.

Thousands of them, from a rubbish dump in the United Kingdom city of Bristol.

It was part of a space station experiment to help U.K. researchers better understand what causes the body to lose muscle mass during prolonged periods in a weightless environment. The worms were returned to Earth on the next shuttle mission to the station.

The International Space Station, or ISS, has proved to be a critical, one-of-a-kind platform for microgravity research in biology and biotechnology, Earth and space science, human physiology, physical science, technology development and education. Hundreds of experiments have been placed on board the orbital outpost, with many more planned—although with the shuttle fleet now retired, they will be carried to the station by Russian or other spacecraft.

These experiments have led to advances that will be useful not only in the exploration of space but for helping people on Earth.

- Medical researchers have demonstrated a new method for delivering drugs to cancer cells.
- Studies on the durability of materials in the vacuum of space have already led to changes in materials used in dozens of spacecraft built over the past five years.

- Research on the ability of germs to cause disease could lead to a vaccine for salmonella, a leading cause of food poisoning.

With such promising results, NASA wants to shorten the time it takes to get experiments on the station. And Boeing has done just that.

"Boeing has been instrumental in helping to implement lean payload integration so we can accelerate and accommodate more research on the ISS," said Marybeth Edeen, NASA National Laboratory manager.

The U.S. portion of the station was designated a National Laboratory in 2005, which opened the world's only microgravity laboratory for use by non-NASA researchers. And now that the building phase of the station is complete, astronauts on board have much more time to devote to these experiments.

In February, Boeing and NASA rolled out a variety of technical products that significantly reduce payload integration timelines. Among those products is new testing equipment—which NASA plans to procure—that reduces the amount of time it takes to prepare a payload.

"Ultimately, we want to make the process more user-friendly to scientists, and that will dramatically increase researchers' use of the station while reducing the length of preparation time it takes for launch," said Scott Copeland, Boeing ISS Payloads & Flight Integration director.

Another software tool that Boeing

developed and will license to payload developers lets them operate and interact with their experiments on the station with the very same software they use to conduct their ground experiments.

These, among other improvements, have reduced the time it takes to get research experiments on board the station from what had been 18 to 24 months to only seven to nine months.

It represents a significant step forward in the amount of research that can be done in space—research that began almost 60 years ago when a dog named Laika was launched into orbit in the Russian spacecraft Sputnik 2—an experiment to better understand the effect spaceflight might have on living creatures before humans ventured into the last frontier.

That flight set the stage for scientific research that would prove humans could not only survive in space but go to the moon—and perhaps one day to Mars and back, a journey that could last several years. ■

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PHOTOS: (Below) A view of the International Space Station. **NASA (Insets, from left)** At Marshall Space Flight Center in Huntsville, Ala., Boeing software engineers Tiffany Duncan, left, and Tom Sues review software designed to make it easier to conduct research on board the space station. **MIKE MCCORMICK/BOEING** A materials experiment is mounted on the exterior of the station. **NASA** Astronaut Michael Lopez-Alegria, International Space Station Expedition 14 commander, performs keyboard operations in the station's Destiny laboratory module. **NASA**

