

AUDIO SCRIPT

[M1: Male Host; M2: Male Guest; F1: Female Guest]

M1: Good morning, listeners, and welcome to Science Matters. Today we're talking about the International Space Station. The government has spent a whopping \$150 billion on the ISS, as it's called. Some people wonder whether the ISS is worth this huge amount of money. With me today are Leonard Anderson, space blogger and science writer for the *Daily Times*, and Dr. Janet Tejada, professor of astronautics at Hudson University. Welcome to you both.

M2: Thanks, Trevor.

F1: Good to be here.

M1: Leonard, let me start with you. You've been very critical about the cost of maintaining the ISS. First of all, can you tell us how the ISS got started?

M2: Sure, Trevor. The ISS started in 1998 when a Russian-built, U.S.-funded module, about the size of a bus, was launched about 200 miles above the Earth. Two weeks later, the Space Shuttle Endeavor took two more modules and connected them to the Russian module. It cost about \$100 billion and was the most expensive man-made structure ever built. Since then, the U.S., Russia, Japan, Canada, and Europe have all added components and equipment to the ISS. It's really a great example of what can be achieved through international cooperation. So, over the years, the ISS has grown and today it's about the size of a football field.

M1: Gee, I didn't realize it was that big.

M2: It certainly is, Trevor.

M1: All right, so let's move on to your criticisms ...

M2: So, the ISS is constantly occupied. Astronauts have lived there successively since 2000. The amount of time allocated to research has varied considerably over the past 15 years. For example, in 2008, crew members spent only about three hours per week on scientific research, and I have to say, Trevor, it was pretty basic research.

F1: The number of research hours has increased though.

M2: Yes, that's true. In 2009, the ISS was able to accommodate six crew members. Prior to that, there were only three. So NASA says it now spends about 50 hours a week on research. My concern is not so much the quantity of research as the quality. What "real-life" benefits do we see from all this expensive research? You know, they

have amazing facilities up there, laboratories and so forth, but it just seems to be a classic case of the government mispending public funds. I'll leave you with this: Revenue to fund the ISS comes from our hard-earned tax dollars, so there should be more financial accountability.

M1: How would you respond to that, Dr. Tejada?

F1: Well, Leonard is correct about the ISS being a very expensive operation. A lot of the initial research involved analyzing the effect that living and working in space has on the astronauts' health. Over 200 crew members have lived at the ISS in the past 15 years, so scientists have been able to study the risks to the human body of living in that environment. Despite the expense, this research will be of enormous benefit to future space programs, such as the Mars Mission, because we'll have a much better idea about how to live safely in space.

M1: What *are* the risks, Professor?

F1: Muscle atrophy and decreased bone mass are two of the adverse effects of living in a zero gravity environment. Crew members must exercise for at least two hours a day to prevent these conditions from occurring. But back to the research, one of the most exciting experiments has been collecting positrons and electrons using an instrument called the Alpha Magnetic Spectrometer, which is attached to the exterior of the ISS. It has detected some anti-matter particles that could provide clues about dark matter.

M1: Dark matter? What's that?

F1: Dark matter is the invisible substance that makes up more than 80 percent of all matter in the universe. It is very mysterious and incredibly interesting. It exerts gravity, but it doesn't emit light, hence it is very difficult to study. Solving the mystery of dark matter will be one of the greatest discoveries in science. There is a lot of other exciting research being done, exploring the physics of neutron stars, for example. Finally, they are doing a lot experiments in the area of human health that will help fight diseases such as cancer and asthma. I think we will see the best science between now and the closure of the ISS in 2024.

M1: Fascinating stuff. Now after this short break, I'd like to take some questions from our listeners.