

From VOA Learning English, this is As It Is.

Welcome back. I'm Caty Weaver.

On the show today, we look into the future of space exploration. The American space agency NASA has announced plans for a new effort to study the sun.

And, NASA scientists are considering new technologies for a possible human trip to the planet Mars. Newly released information about space radiation means the trip needs to take less time than is currently possible.

The American space agency is making final preparations for a project to study the sun. NASA scientists hope to observe the way solar material gathers energy and heats up as it moves through the sun's lower atmosphere. Katherine Cole has more about the Interface Regional Imaging Spectrograph, also called IRIS.

The outer layer of the sun's atmosphere, known as the corona, is thousands of times hotter than the surface of the sun. Solar material heats up as it rises through the inner atmosphere to the corona.

Researchers want to know why this is. So they are preparing a mission to study what scientists call the sun's "interface region." This is the area between the corona and the sun's photosphere.

The energy and matter, called plasma, that flow through the interface region have a major effect on Earth. This area is the source of the sun's ultraviolet radiation. The radiation affects Earth's climate. It also can influence the space environment near our planet. The energy that passes into the interface region is also responsible for solar wind.

Scientists believe the Interface Regional Imaging Spectrograph can help them understand the process. IRIS is a small satellite that can perform complex solar observations.

Alan Title is the IRIS lead investigator. He is based at Lockheed Martin's Advanced Technology Center in California.

“What we want to discover is what the basic physical processes are that transfer energy and material from the surface of the sun out to the outer atmosphere to the corona. And remember, the corona extends throughout the heliosphere. We live in the sun’s outer atmosphere.”

IRIS will provide highly detailed images that will show even individual structures of energy as they stretch away from the sun. NASA officials say the images will be three to four times as detailed as those from the agency’s Solar Dynamics Observatory.

IRIS will also provide spectra. Spectra measures different wavelengths of light at once.

NASA says IRIS will observe temperatures extending from about 5,000 to 65,000 degrees Celsius. That number will rise to about ten million degrees during solar flares. But, lead investigator Alan Title notes IRIS will keep a safe distance from the sun.

“IRIS flies around the Earth so it only gets about 600 kilometers closer to the sun than here we are on Earth, and that’s only about 92 million miles away. So it’s really not very much closer to the sun.”

The IRIS mission is expected to last two years and cost more than 180 million dollars. But scientists say the solar explorer could keep going much longer. IRIS is set to launch on a Pegasus XL rocket from a military base in California on June 26. I’m Katherine Cole.

Scientists, astronauts and space exploration fans have been dreaming about sending human beings to Mars for years. The American space agency has plans to make it happen by the middle of the 2030s. Recently, new information about a danger linked to the trip got NASA searching for solutions. Christopher Cruise tells us more.

NASA officials hope to send humans to Mars in about 20 years. But it is a goal that has technical and medical barriers.

New findings published in the journal Science suggest that a trip to Mars could give travelers a greater risk of radiation than NASA permits. Earlier research already has established that exposure to radiation increases a person's risk of developing cancer.

The radiation measurements noted in the Science report were from the spaceship that carried the Rover exploratory vehicle to Mars in 2011. An instrument on the vehicle has been recording radiation levels since it landed on the red planet. It found that the amount of radiation exposure was a large fraction of what is considered an acceptable limit over an astronaut's lifetime.

Cary Zeitlin is with the Southwest Research Institute in San Antonio, Texas. His team examined the radiation measures collected. This was done on the 253-day, 560 million kilometer trip to Mars. Cary Zeitlin says space travelers would face radiation exposure comparable to getting full body computed tomography x-rays every five to six days. He says the results are worrying.

"The concern is not so much any immediate effects on people, although those are possible, but long-term health effects like cancer, or damage to the central nervous system."

Humans traveling on a spacecraft to Mars would be exposed to two kinds of radiation. One is low-energy particles called Galactic Cosmic Rays, or GCRs. The other is solar particle radiation, which depends on sun spot activity.

Mr. Zeitlin says improvements in protective equipment might help keep astronauts safe from the solar radiation. But he says the cosmic rays are a bigger problem.

“They can typically go through several inches of solid matter shielding without being attenuated (reduced) very much. So astronauts in deep space will get a continuous low radiation dose.”

He and his team will continue to take radiation measurements as the rover Curiosity continues to explore. Researchers want a complete picture of the radiation risks involved in human travel to Mars.

I’m Christopher Cruise.

NASA experts are considering these numbers on radiation levels in their early planning for a mission to Mars. Some scientists say the answer might be improvements in the driving force of spacecraft.

They say new propulsion technologies are needed to shorten the time it takes to get to Mars. This would reduce the time a person is exposed to the radiation along the way.

Chris Moore leads NASA's advanced exploration systems program. He says engineers are working on systems that could cut a trip to Mars from 250 to 180 days.

Eddie Semones is a space flight radiation health officer for NASA. He says a trip to Mars would require higher speed and protective equipment elements. But, he says the protection requires materials too heavy for a successful launch.

And that's As It Is for today. Thanks for joining us.