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ZOOM in on america

By the U.S. Missions of Austria and Poland

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A Woman in Space



Marsha Ivins

In this issue: Astronaut Marsha Ivins

Zoom in on America

I learned to fly before I learned to drive

Interview with Marsha Ivins



Marsha Ivins (photo State Dept)

Zoom in on America: *Marsha, you spent 55 days in space; 55 days with no gravity. Is this a problem for a woman who has long hair?*

Marsha Ivins: 55 days was broken out over 5 different flights. So, my longest straight time in space was 14 days, really, 2 weeks. And a problem with hair is it goes everywhere. And so, normally, I would keep my hair tied up, like this, except of course to take the big picture. Hair is the smallest problem you might have with no gravity. If you think about your clothes floating as you're trying to put them on, as you think about your food as you are trying to eat it ... these are all things that have to be taken into consideration when you design a spacecraft for people in space and when you go live in it.

Zoom in on America: *Did you want to become an astronaut from the start or was it just a natural next step on the time line of your career?*

Marsha Ivins: I consider having been an astro-

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naut and working for the space program was my career. I wanted to be an astronaut from the time I was 10 years old, which in 1961 is when we sent our first American astronaut into space on a rocket. And from then on, one thing I wanted to do with my life was to work for the space program. Becoming an astronaut was really an extra bonus to that. I went to work for NASA as an engineer and applied to the astronaut program three times before I was selected in 1984.

Zoom in on America: *What were your duties when you worked as an engineer for orbiter displays and controls?*

Marsha Ivins: My first job at NASA was not as an astronaut. It was as an engineer. And in the early 70s we were designing the space shuttle. The group that I worked for designed all of the cockpit, all of the displays and controls. So our job was to make sure that the 1,800 circuits, switches and circuit breakers that were in the

shuttle could be reached, could be seen by astronauts while they were launching, while they were in orbit, and when they were coming back to land.

Zoom in on America: *What exactly is HUD, the Orbiter Head-Up-Display? What did you do working to develop it?*

Marsha Ivins: A Head-Up-Display is an instrument that sits in front of the pilot's eye through the window, allowing the pilot to see things that are normally on the cockpit, and instead of looking down into the cockpit, and then up, and then down into the cockpit when your aircraft is moving very fast, like the shuttle does when it comes in to land, it is easier to just have all that information in front of your eyes. I worked on developing the information on this display while I was working as an engineer, not as an astronaut. And it is the display that astronauts use to land the shuttle so that they could see all their primary flight information in front of them as they look at the runway.

Zoom in on America: *You hold an impressive number of licenses: a multi-engine Airline Transport Pilot License, single engine airplane, land, sea and glider commercial licenses. Which of them is the most fun to fly?*

Marsha Ivins: I started flying when I was 15 years old. In fact I learned to fly before I learned to drive a car. And I've had an opportunity in my life to fly a lot of interesting civilian airplanes; from little two-seat airplanes to the NASA jet trainer. But the most fun to fly, in my mind, is the airplane that I've been flying for the last thirty years which is called a Stearman. It's a 1946 round-engine, open-cockpit, fabric-wing biplane.

Zoom in on America: *You took part in 5 space flights: STS 32, 46, 62, 81 and 98. Which of these space flights are the most memorable?*

Marsha Ivins: I think the first space flight is always one of the most memorable for anybody because it is your first space flight. So, I would have to say that that one was significant, but

they were all great. My second flight... we did a science experiment that had never been done before. My third flight was the longest flight – 14 days. My fourth flight – we went to MIR space station. And on my fifth flight we brought the first laboratory module to the International Space Station as we were doing the construction of the Space Station. It was my job to operate the mechanical arm to actually take that laboratory module out of the cargo bay and put it on the Space Station, which was probably the hardest thing I have ever done. And the scariest because it was a one of a kind, 1.4 billion dollar laboratory module without which there would be no Space Station science, so the pressure was on me to actually do this job. So I have to say that one, which also was my last, was probably the most memorable.

Zoom in on America: *Will human race move on to one day live in space?*

Marsha Ivins: I hope so. We have always been explorers as people of the planet Earth. We've always wanted to know what's over the next hill, what's across that ocean, what's beyond that part of the world that we can't see and space is that next part that we can't see. We need technology that is not developed yet in order to allow people to live permanently away from the planet. But we're starting. We have people who have been living on board the space station for six months at a time since the end of the year 2000 so we always have had and we right now have 3 people that are in space. So one day maybe we'll be able to take the next step that will let us find a planet that has an earth-like environment and be able to actually live there just like we have expanded to cover the entire area of the Earth.



STS 98 Crew Members
(photo NASA)

Marsha Ivins' Most Challenging Mission

February 7, 2001 - Cape Canaveral, Florida. STS 98 crew: Commander Kenneth Cockrell, Pilot Mark Polansky, and Mission Specialists Robert Curbeam, Thomas Jones, and Marsha Ivins are in position on board Space Shuttle Atlantis, ready for the second attempt at launch. At 6:13 p.m., Space Shuttle Atlantis launches successfully into space.

February 9 – Space Shuttle Atlantis docks with the International Space Station (ISS). The hatches are opened and the first part of the mission: the delivery of water, cables, a computer, as well as personal items for the station crew, is successfully completed. But the most important and the most challenging task still awaits Mission Specialist Marsha Ivins.

February 10 - Marsha Ivins starts to install Laboratory Destiny on the ISS with the use of a remote manipulator system, or mechanical arm.

Mission Specialist Marsha Ivins attached the remote manipulator system (RMS) to the Destiny lab in the Space Shuttle's payload bay and lifted it out of the Space Shuttle. She then flipped the 16-ton lab 180 degrees and moved it into position to attach to Node 1 on the International Space Station. Once attached, a set of automatic bolts tightened to hold the lab permanently in place.

The task was accomplished with full success.

Three spacewalks were needed to complete the assembly of Destiny. The STS 98 mission lasted 12 days, 20 hours, 20 minutes and 4 seconds. On February 20, 2001 Atlantis landed safely at Edwards Air Force Base, California.

(based on: http://www.nasa.gov/mission_pages/shuttle/shuttlemissions/archives/sts-98.html)



Space Shuttle Atlantis photo NASA

Would You Like to Live in Space? Consider Eating

There are many things to consider with regard to food and eating in space. The basic question is, of course, what food to take on board a spaceship? There are no food stores, no places to replenish the empty bread basket, and you have to have enough food and drink to last through the entire voyage, or an even longer stay on the International Space Station.

One challenge is to store food and to prevent it from simply floating away in a zero-gravity environment. The first astronauts ate unappetizing concentrated foods in the shape of pills. Today there are foods that need water to prepare, such as pasta, and there are condiments like ketchup, mustard, and mayonnaise. But salt and pepper in space comes in liquid form only. Sprinkled salt or pepper is dangerous to spacecraft since it can clog air vents or jam mechanical equipment. While there is an oven in the Space Station to

heat food, there are no refrigerators. All food must come in practical, properly packed containers. Natural foods such as fruits must be packed so that they retain freshness.

A big question is not only what food to take and how to store it, but how to eat in zero-gravity conditions. In space, you have to force food into your mouth and into your digestive tract, so you must be more in control of your body than when you are on Earth. Drinking is even more challenging. Sometimes you have to fly after a drop of water which is trying to escape your thirsty mouth.

But don't let that discourage you. You can learn to eat and drink effectively on board a spaceship. Most of your food will look just like it does in your favorite store. Just remember, you can't dispose of the empty packages in space. You must bring all of the trash back home.



Astronaut Mike Fossum, participating in the mission's second scheduled session of extravehicular activity. During the seven-hour, 11-minute spacewalk, Fossum, installed television cameras on the front and rear of the Kibo Japanese Pressurized Module, removed thermal covers from the Kibo robotic arm and prepared an upper docking port for flight day seven's attachment of the Kibo logistics module. (AP Photo/NASA)



Astronaut George Zamka, STS-120 pilot, floating into the Unity node of the International Space Station while Space Shuttle Discovery is docked with the station. October 25, 2007. (AP Photo/NASA)

Science Fiction or Reality?

Will people vacation in space? The question may have sounded like science fiction in the times of Jules Verne (the better for the great writer himself!), but today commercial spaceflight is a reality. People have already traveled to space on holiday.

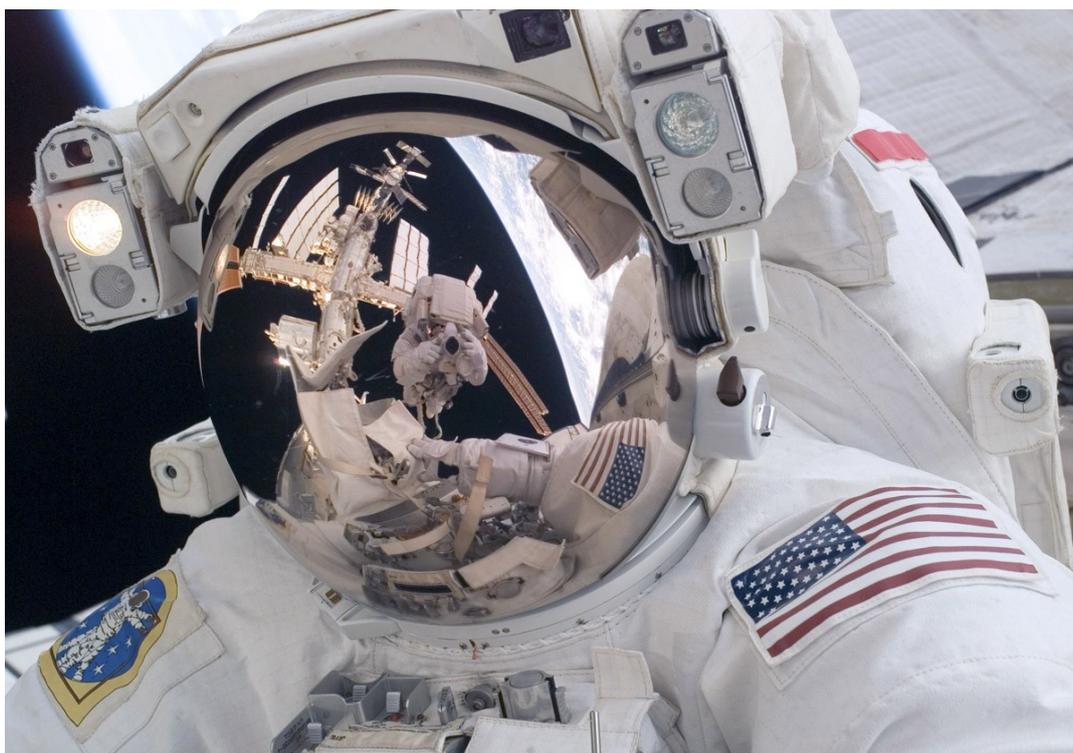
Space tourism started at the beginning of the 21st century. In 2001 an American, Dennis Tito, wrote his name permanently into the history of space travel when he became the first space tourist. He spent over a week (April 28 - May 6) at the International Space Station (ISS) and paid \$20 million for his space holiday. The price has gone up since then: in 2009 a trip to space cost \$40 million. Transportation to the ISS has been provided so far on the Soyuz TMA spacecraft.

New, private companies such as SpaceX, Space Adventures, Excalibur Almaz, the Space Island Group, and Bigelow Aerospace are developing the commercial spaceflight business. They hope to be capable of sending tens of thousands of people on the holiday of their dreams. This is a high-cost enterprise requiring the most ad-

vanced technology and, for a while, the cost of a rocket ticket is not likely to go down. But what seems to be out of reach for an average human being today may become a reality sooner than we think. At the moment, there are 500 people on the waiting list for a flight into space, which is about the same as the total number of astronauts who been to space to date. One thing should be remembered, however: one not only has to be rich to afford a holiday in space. Health is another factor in determining one's eligibility for a space flight.

On October 8, 2012 NASA and SpaceX celebrated the successful liftoff of the SpaceX Dragon spacecraft on a landmark cargo mission to the ISS. *This was a critical event in spaceflight tonight*, said NASA Administrator. *We're once again launching spacecraft from American soil with the supplies our astronauts need in space. NASA and the nation are embarking on an ambitious program of space exploration.*

Science fiction? Hardly. The future of space travel is now.



Astronaut Mike Fossum, STS-124 mission specialist, as he participates in the mission's first scheduled session of extravehicular activity (EVA) as construction and maintenance continue on the International Space Station (AP Photo/NASA)

ACTIVITY PAGE

EXERCISE 1

Read the text about Marsha Ivins' NASA experience below. Put the missing words (below) back to the text.

Ms. Ivins was ... (1) at the Lyndon B. Johnson Space Center beginning July 1974, ... (2) as an engineer for orbiter displays and controls and man machine engineering, and development of the Orbiter Heads-Up Display (HUD). In 1980, she was ... (3) as a flight engineer on the Shuttle Training Aircraft (Aircraft Operations) and a co-pilot in the NASA administrative aircraft (Gulfstream-1). Ms. Ivins was ... (4) in the NASA Astronaut Class of 1984 as a mission specialist.

Ms. Ivins ... (5) a multi-engine Airline Transport Pilot License with Gulfstream -1 type rating, single engine airplane, land, sea, and glider commercial licenses, and airplane, instrument, and glider flight instructor ratings. She has ... (6) over 7000 hours in civilian and NASA aircraft.

A veteran of five space flights, (STS-32 in 1990, STS-46 in 1992, STS-62 in 1994, STS-81 in 1997, and STS-98 in 2001), Ms. Ivins has ... (7) over 1,318 hours in space.

(source: <http://www.jsc.nasa.gov/Bios/htmlbios/ivins.html>)

EXERCISE 2: GRAMMAR: ARTICLES

Watch the interview with Marsha Ivins for *Zoom in on America* (link on p. 3) and decide if the sentences below are True or False.

1. Marsha Ivins worked as an astronaut at NASA from the start.
2. The Orbiter Head-Up-Display helps the pilot see the most important information without having to constantly move his head up and down.
3. Ms. Ivins spent 1318 hours in space.
4. She learned to drive before she got her first pilot license.
5. Marsha Ivins' first mission in space in 1990 was also her most difficult.

EXERCISE 3: SPEAKING

Work with another student. Look at the NASA picture below showing the view from the cupola on the International Space Station. Describe the photo and then discuss the advantages and disadvantages of living in space.



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