Preflight Interview: **Mamoru Mohri**

Before we get into the specifics of this particular flight, I want you to tell me about yourself. Why did you want to become an astronaut?

Before I was selected as the first Japanese astronaut by the National Space Development Agency of Japan, called NASDA, in 1985, I was a professor of surface and vacuum science at Hokkaido University in Japan where I mainly specialized in nuclear fusion materials. I wanted to become an astronaut to study material sciences in microgravity and in the real vacuum of space. It was my great pleasure to be selected as a crew member on the Space Shuttle Endeavour Mission STS-47 which launched in September 1992. This flight was called Spacelab Japan. On this mission, we performed 43 experiments proposed by Japanese and American scientists. We conducted material science and life science experiments in the unique environment of space. We spent eight days in space, and every day I felt as if I was in "Alice in Wonderland". Everything I saw no longer fit within its known parameters. So as a scientist, I could explain what was occurring around me and yet I was very much entranced.

How did you get to be where you are right now?

After my first mission, I went back to Japan to work as a manager in NASDA's astronaut office for four years. Then I returned to NASA in 1996 to begin training as a Mission Specialist for another spaceflight. I was very fortunate to be assigned to this Earth observation mission because, as a surface physicist in the previous mission, I noticed some similarities in surface topography between material surface and Earth's surfaces. Using electron, ion or photon beam technology, I analyzed many different material surfaces like alloys, semiconductors, and ceramics. For example, when I watched the surface of the Sahara Desert from the space shuttle, it looked just like the composite material surface being seen through an electron microscope. One is a large-scale view of hundreds of kilometers where the other is on a very, very small scale in micrometers. As an expert in surface topography in atomic scale which means that I am accustomed to looking at infinitesimal objects, or immeasurably tiny objects, I was fascinated by these similarities and relative views of materials. In addition to these similarities, a technique to be used on our Surface Radar Topography Mission is similar to one I used when working on small materials. That is a radar beam from the space shuttle touches the Earth's surface, radio waves are reflected and are received by the antenna and then recorded to obtain surface topography. In my previous work in atomic scale surface, we used electrons, ions or photons as primary beams and detected signals from the surface. So the basic idea and techniques between the two studies are similar, although the observation areas have huge differences.

Briefly summarize for me what you will be doing during this particular flight. What are your primary responsibilities?

I am primarily responsible for recording reflected radio waves, and operating the data recorder and a laptop computer that controls the data being recorded. There are three recorders on the flight deck to be used for normal data takes and three on the mid-deck as spares for a contingency situation. We run two recorders normally; one for C-band radar and one for X-band radar observation. Because a C-band radar tape lasts 30 minutes and an X-band radar tape last 60 minutes for data takes, I'll be pretty busy just changing tapes on these recorders. In addition to this, I will have to check the position of the outboard antenna by a different laptop computer. We also have to back up scientists on the ground in case they cannot uplink certain commands for the payloads.

Why is the data being recorded instead of downlinked live?

The capacity of acquired data using the C- or X-band radar is much larger than the shuttle's present real time downlinking capability. That's why we have to carry over 300 recording tapes onboard. However, in order to check the quality of acquired data, we sometimes downlink or playback data at a slow rate.

What type of tapes are being used to collect the data?

We use Sony 19-millimeter recording tapes on the radar portion of this mission which are the only other things made in Japan besides me.

What we will learn about the Earth from the data acquired on this mission?

There are a lot of benefits for our lives. For example, some of you might remember four years ago in January 1995 one of the most beautiful harbor cities in Japan, Kobe, was damaged by an enormous earthquake and more than five thousand people were killed. This tragedy happened because of the fact that some houses were built on a fault, and this fault could not be predicted to cause such serious damage. If we had known the land more precisely, thousands of lives could have been saved. There are many such unstable ground areas in the world and in the future we may be able to alert people who live in such areas about imminent dangers.

What additional roles do you play in this flight?

I will also conduct a couple of secondary payload experiments with a high definition TV camera taking videotape using new precision techniques. This is a collaborative experiment between NASDA and NASA. This new technique will bring greater quality to the pictures comparable to that of motion pictures. In other words, the concept is much closer to that of real life. Instead of just looking at a picture on a screen, you will see the Earth's surface as if you were the astronaut seeing it from space. I call this technique "viewer friendly" because the viewer will be able to vividly see the Earth's surface dimensions. The viewer will be able to tell the difference between mountains, rivers, lakes, volcanoes, et cetera. Let me emphasize that the mission's primary objective is radar technology. High definition TV is supplementary. This is our first time to use this new technique exclusively for Earth observation. We hope that scientists will make new discoveries from the tapes taken by high definition TV.

Let's talk about the international partners on the flight. What are the different international partners contributing?

As you know, Japan is one of the major contributors to the International Space Station Project. We have performed microgravity experiments, robotics, and extravehicular activity engineering together with NASA in the previous shuttle missions. This mission, STS-99, will be a paradigm of international collaboration in the field of Earth observation which will play a very important role in the International Space Station Project.

Tell me about EarthKam. Is it comparable in any way to the flight's primary payload?

This is a part of a student education program proposed by The University of California at San Diego. Intermediate school students are able to take photographs of the Earth by commanding an electronic camera located on the flight deck window. This is also the first time Japanese students will participate in this program. I think this will be a very good opportunity for them to learn about the environment of the Earth. It will also be advantageous for them to share ideas with students in other countries by way of the Internet and having to communicate in English. Four schools in Japan are participating in the program. In addition, NASDA has recruited approximately 100 other schools in Japan who are very interested in being able to study the photographs that will be available on the Internet. This technology offers a new educational tool for these students. The school children of Japan are very enthusiastic about the program.

Greetings

Click on the image to hear Mamoru's greeting.
Mission Specialist, STS-99
Japanese version

Crew Interviews

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