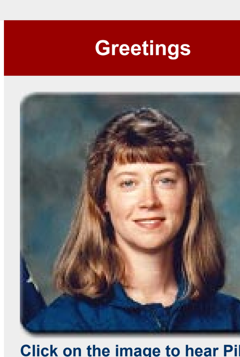
Preflight Interview: **Pamela Melroy**

The STS-92 Crew Interviews with Pamela Melroy, Pilot.

Greetings



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Crew Interviews
Interviews Go

Q: Speaking with Pam Melroy, the Pilot for STS-92. First off just tell me why you wanted to be an astronaut and was there any particular event or any person that really inspired you to become one - an astronaut?

A. Yes. I was definitely very inspired by the Apollo program, especially Apollo 11, the first landing on the moon. I really remember that. I mean, that was a big event in my family. We were on vacation. And I remember us all crowded around the television set, watching it. My father was actually taping it, which was a pretty big deal at the time, and we kept the tape. And it really had a big impact on me. I was a pretty serious little kid, you know. And I just felt like I wanted to do something important with my life. And this seemed like the most important thing anybody could do. Something that was for the good of everyone. And it was just very inspiring to me. And ever since then, I've always wanted to be an astronaut.

Now, give me an overview of your education and career. How did you get to be where you are right now?

Well, when I decided I wanted to be an astronaut the only astronauts that I knew about at the time were military test pilots. So, I decided I had to be a military test pilot, too, although, of course, that's obviously not true now. But at the time, that's what I thought. And so, I actually planned my whole life around that. I studied physics and astronomy at Wellesley College. I went into ROTC. I was very fortunate. At the time that I had decided I wanted to be an astronaut, women were not even allowed to be military pilots. But I was born at the right time, and the doors just opened a few years ahead of every step that I made. And so, I was really lucky. When I was in high school, they started letting women fly in the military. And so, after I graduated from college I got a master's degree from MIT and then I went to pilot training. And I flew the KC-10- the military version of the DC-10-for several years, and then was selected for the Air Force Test Pilot School and became a test pilot. And that was the steps that it took. And it's prepared me very well, I think, to be a pilot astronaut.

All right. Now getting down to this flight. This flight starts a series of missions that involve some of the largest and most critical hardware for the International Space Station. Just discuss this flight's pivotal role in the assembly sequence and why this flight is so crucial to enabling the success of the missions to follow.

It's very exciting to be a part of an assembly mission for the station. It's pretty exciting. It's been a while since we brought a piece of hardware up to the station, so we're very excited about being the next crew that will do that. But the pieces that we're taking up are, in fact, extremely important. The Z1 Truss is going to be critical because, until it's up there the solar arrays can't be attached, which means the crew can't live aboard because there's not enough power to sustain them. We're also bringing up what I like to call "the side door" to the station. Because of the assembly sequence, it's not always possible to dock the shuttle to the same location and actually successfully attach pieces. You have to have some flexibility. And so, we're bringing up that extra flexibility.

Now, what have been some of the biggest challenges for you and your crewmates in getting ready for the shuttle flight?

Probably the biggest challenge for this mission is the complexity. You know, I think people understand that, on shuttle missions, sometimes we do maybe three or four EVAs. On some of them, we'll actually do a rendezvous and a docking. In some cases, we might be attaching big pieces of hardware or doing multiple ingresses. Well, on our flight, we're doing all of those things. So, we're going to be extremely busy. So, the hardest thing has been to try to juggle the timeline and figure out what needs to happen first. How are we going to do things? We've had a few surprises where we've realized that there were certain critical paths. We had to do some things before others, and it wasn't the way we were expecting. And so, I think juggling the timeline, because of the complexity of the mission, has definitely been the hardest part.

Now, after you rendezvous and dock with the International Space Station, your number 1 priority is the installation of the Z1 Truss that you mentioned earlier. Describe the Z1 Truss in some amount of detail. How big is it, and what does it do for the International Space Station?

Well, I have to tell you: the Z1 Truss is probably not the prettiest segment of the International Space Station. We actually kind of made a little bit of fun of it the first time we saw it, because when we went down to the Kennedy Space Center a couple of years ago, when we just saw the bare bones, and they were still, you know, attaching pieces to it, it looked sort of like one of those old-fashioned milk crates on steroids. It's, you know, quite, quite large. But it was sort of this boxy shaped thing with, you know, just sort of structural pieces. Now, of course, they've attached a lot of equipment to it, and they've closed it out with blankets so that it looks like a large white cube now. So it's a little slicker looking. But I think that I'd stake that it's the strongest piece. If it's not the most beautiful, it's definitely the strongest piece because it was designed as a structural truss.

All right. What is the process of installing the Z1 Truss?

Well, that's going to be very interesting. We're going to be using the Common Berthing Mechanism for the very first time on our mission in space. And it's a special mechanism that has four latches that you know, you put the piece of the station and the new element that you're going to attach; you get them really close together using the robotic arm, and then these latches will reach out and, actually from the inside, and grab the pieces and cinch them down. And then we have 16 bolts that will drive to hold them together strongly enough so that it can hold pressure. So, it's a kind of an interesting little ballet between the robotic arm operator, who has to get these two pieces close together, and then we have the Berthing Mechanism operator-which, for my flight, will be me-on a laptop computer driving these latches and bolts. And so, there's sort of a little ballet that goes back and forth to make sure that we do that all in the right order.

Great. Now, how would you compare the Common Berthing Mechanism to other docking mechanisms we're more familiar with? Is it similar or different?

The Common Berthing Mechanism is probably, well, you can tell by the name that it's one of the ones that we're going to use most often on the station. We have several other berthing mechanisms. Some of them are based on the Common Berthing Mechanism. It's probably the most universal. And it's also one of the more complicated ones. Most of the other berthing mechanisms tend to be subsets, you know, just latches kind of, kind of that sort of thing. Just, you know, very similar to the Common Berthing Mechanism, except smaller pieces.

Now, what are some of the issues you face in using the Common Berthing Mechanism?

Well, it's the issues that you face any time you use a new piece of hardware. I think this is where being a test pilot has been very helpful for me, because I have approached it the same way I would approach the first flight of a new airplane, where you really try to understand the engineering issues. In that, there's been a lot of engineering and analysis done. We've had a lot of help from the folks down at the Marshall Space Center and Boeing [who] have worked very hard to come up with all the best engineering analyses that they can. And we've done some testing. But of course, it's always, you know, here in one-g and it's not in the environment of space. And so, basically, we've just tried to study as hard as we can, look at every possible thing that might not go perfectly, and come up with a plan for it.

All right. Now, on the Z1 Truss, what kind of additional communications are going to be possible after it's up there?

This is an extremely important part of the Z1 Truss. We will have the Ku-band antenna and also the SGANT antenna that we're installing. Essentially, right now there isn't a permanent - we have an Early Communication System that the ground can use to control the station while there's no one living aboard. But, you would not want to have people living aboard without having pretty much constant voice communications and, hopefully, video as well. And so, these antennas will be preparing the station for the crew that will come and live aboard. They will provide all that communications.

Now, what are the Control Moment Gyros and what do they do?

The Control Moment Gyros are actually a pretty elegant little system that will help us control the attitude of the station without having to use propellant from the thrusters. The gyros will actually help...it's a very simple sort of flywheel kind of concept that, you know, will control the attitude of the station.

Now, what are the DC-to-DC Converter Units and what do they do?

The DC-to-DC Converter Units are a very actually simple system. They're used to step down the voltage that you get from the solar arrays. So you get this, you know, power coming in from the sun to the solar arrays. It becomes a DC electrical signal; but you need to step it down because it's pretty strong so that it, you know, can be the same kind of DC voltage that you, you know, would use to operate equipment here on Earth. Because we want the inside of the station to be, you know, you'd be able to use commercial equipment and other kind of things. And so, it's just stepping it down so that we can use equipment like that.

Now you mentioned earlier that you're adding another Pressurized Mating Adapter to the International Space Station. That'll happen during the second EVA. What does the Pressurized Mating Adapter-3 do, and where is it going to be located?

The Pressurized Mating Adapter-3 will be on the opposite side of the Node from the Z1 Truss. We're installing the Z1 Truss on the zenith of the Node; hence the name Z1. We'll be attaching PMA-3 to the nadir, or the bottom, of the Node. And as I mentioned before, I sort of have been calling it "the side door" of the station. It turns out that it's very critical for the flight after us that will be attaching the solar arrays. They can't dock to the same port that we're docking to on the station and attach the solar arrays. The solar arrays would hit the shuttle if we did that. And so, they'll be able to dock to PMA-3 instead, and that will give them the flexibility to attach the solar arrays.

Very good. Could you tell me a little bit about the process of PMA-3's installation? How does it happen?

PMA-3 installation is going to be a very challenging day for us. We're actually going to be doing it while we have an EVA going on. So that's a big deal. That means that we have commanding of the station going on. We have robotic operations, as Koichi Wakata, our arm operator, will be physically picking up the PMA out of the payload bay and moving it into position. The EVA crewmembers will actually have to unbolt it before he can do that. So, they'll unbolt it. He'll lift it up. He'll bring it all the way around. It's in a very awkward position for the robotic arm; it's almost over the nose of the shuttle. So, he's using the arm to put it in a place where there are no cameras and he really can't see. We'll literally be looking out the overhead window at it. And so, then he'll get it close into position. We're going to send the two EVA crewmembers up there. They're going to be sitting on either side, and we have been jokingly calling them "Mombacks" because they're going to say to Koichi, "Com'on back, com'on back, com'on back" until he gets it close enough. And then it'll be my turn to throw the latches and to cinch it down, and then to drive the bolts. So, we have this very complex ballet that's going on for the PMA-3 installation. It will be a real challenge.

You talked a little bit about your responsibilities there during one of the EVAs. In general, what do you do while the EVAs are going on? There are four of them on this flight.

Well, as the Pilot, my primary responsibility is always going to be shuttle systems. And so, I will be doing a lot of the routine maintenance and the things that have to be done to keep the shuttle running so that everybody else can focus on the EVAs. And I think that's a really important function, and that's my primary function. But I'm also responsible for commanding station systems. And in some cases particularly when the EVA crewmembers are attaching power umbilicals and cords…together what you want is you don't want any power running through them because it's an electrical hazard. And so, in some cases, I'll actually be responsible for make…configuring station systems to make sure that they're ready for those EVA tasks. And so, it's kind of, I'm sort of responsible for the shuttle and the station systems, to make sure everything is the way it needs to be to support the spacewalker crew.

Now during the flight, you're ingressing into the International Space Station. What are you going to be doing inside there? And also, will you be entering the Zvezda Service Module? And if you're not, why aren't you going to be going there?

Right now, we're not planning on going in Zvezda. And that's simply because our timeline is, as I already mentioned, pretty full. We have two ingresses, and we're very busy right now during both of them. So right now, we don't have any tasks that are planned for it. But it is possible-it's always possible-you know, with any kind of a system, that if something comes up and particularly if the Russians ask us to do a task, we're prepared and we are trained to go inside the Zvezda to do whatever tasks they ask us to. But right now, all of our tasks are in the Node and in the FGB - Zarya. My tasks will be…will involve outfitting the Z1, which is kind of fun for me. Because I'll, of course, be operating the Common Berthing Mechanism to attach it, and then I get to go inside. We actually get to ingress. There's a small pressurized area, very small but we'll actually get to go inside. It'll be fun for me because I'll get to see all the equipment that I just operated to latch it and cinch it down. And we'll be hooking up heaters in there. We'll attach a grounding strap across the, you know, the element to make sure, again, no electrical shock hazard. And we'll actually be taking some of the equipment out of it to use again on a different Common Berthing Mechanism.

Now you're going to be docking with two Russian Progresses attached. If you would, describe the processes and challenges of a rendezvous and docking with the ISS on this mission.

Well, I think that our mission is like, you know, most of the station missions in that we have done this before. We have docked with the station. This will, you know, it's only a few times, but I think we feel very comfortable from our experience with Mir and with our experience so far with ISS. So it is a well-understood plan. I think the most interesting part about it is the way that we approach the station. We actually come at it from underneath. And then we will fly all the way around it until we're on top of it. And that'll be wonderful! To look down at the station, with the Earth behind it! Oh! I mean, wonderful pictures. I just can't wait to see it! I think it'll be really fantastic! The shuttle is actually a wonderful vehicle to fly in space. It is very easy to control extremely precisely. When I tell you that these two enormous space vehicles, we can control the shuttle to move closer and closer to the station at the rate of a tenth of a foot per second! So, I mean, pretty slowly. Very, very slowly. You get these, you know, these enormous vehicles just very gracefully and slowly moving towards each other. And that's one of the wonderful things about the shuttle is that it has that capability for really fine control. So, it's a great Pilot task.

All right. Now tell me about the process of undocking on this flight. What happens?

Well, undocking is obviously a little bit less nerve-wracking. And so I think it's, you know, it's a sad moment, I'm sure, for everyone when you undock from the station. For us, it'll just be a matter of keeping to a good corridor so that we don't plume the station solar arrays right now with our jets. You know, we have these reaction, these control thrusters that fire. And so we don't want to plume them. And so, we'll just keep to a very specific corridor as we back out. Once again, we'll be going away from the station, up above it. And then once we get to a certain distance, we'll take our last pictures and we'll say our farewells. And then we'll fire our thrusters and start to move away from it in a large, graceful arc. And it's very simple to let orbital mechanics take over once you've made the final burn away.

Now after years of astronaut training and assignments in the astronaut office, this is your first space flight. What are you looking forward to and what advice have your fellow astronauts given you?

Well, they've given me a lot of advice because I'm always asking them! Obviously, there is nothing like actually being there. And I've trained a lot. And I feel like I'll be prepared for the tasks that I'm going to do. But I think, actually being in the physical environment of zero-gravity, I mean, definitely, without a doubt, that is the thing I'm looking forward to the most. In the training that I've had, I had, you know, 20 seconds at a time of zero-gravity on the zero-gravity trainer airplane that we have. And the first time I experienced that, I just got a huge grin on my face and I started to laugh! And I can't even imagine how much fun it's going to be, 24-hours-a-day for, you know, 11 days on end. For sure, that's going to be the most, most fun part of it. And that's what a lot of people say. So I've gotten a lot of advice about, you know, sort of all those little details that you don't think about. You know, how food can get away from you if you're not careful. And a lot of little things that the crew has been very helpful. They're going to take care of me. I know they're going to take really good care of me.

Now you are the third woman to serve as Pilot on a space shuttle mission. Do you see yourself as a role model for women and girls?

You know, it's hard to see yourself as a role model. It really is. I mean, I'm just an ordinary person with a very unusual job. But I'd like to think that, if nothing else, people could look at me and say, "Hey, she's an ordinary person. And she can do this extraordinary job. Maybe I could, too." And if I could possibly inspire girls to think that, that would make me really happy.

All right. Now give me a big picture here. Give me an overview of the role of this flight in preparing the ISS for the arrival of the Expedition 1 crew, which is really what it's all about.

We're pretty excited that we're going to be the last crew to visit the station before Shep and his crewmates get up there. And we're pretty excited about being the last ones. We plan on, you know, hopefully leaving it a tidy and comfortable home for them. It's sort of like being the last people there before, you know, someone moves into a new house. So we take that responsibility really seriously. Obviously, without the…Z1 structural Truss you know, you can't add the solar arrays and there won't be power to live aboard. But I think, you know, from our standpoint, we look at that as our friends and our comrades, and we would like to make sure the inside is looking just as good as the outside.

Now our Russian partners have shown a lot of perseverance in getting us to this point in the assembly. What do you think of the contribution so far? And what does our partnership entail from this point on with the future flights?

I have been very impressed with their contribution so far. Our crew went to Russia for some training last year. And I think one of the things that came across very, very strongly to all of us was how robust their hardware is. It's very, you know, different design philosophy than American hardware, which tends to be, you know, pretty complex and sort of high-tech. And they tend to take a very robust approach to things. They use things that have worked before and are very trustworthy. And so, I think that they bring that element of confidence from all their experience on Mir and their hardware that they build, and so I think that that is an extremely important contribution to the International Space Station. And I think that all their years of experience in space will be very important to us in dealing with any issues that come up in the future.

Now, what is the importance of establishing the space station you're going up there to work on? What do you believe it will lead to in the years to come?

You know, I think 10 years from now, people are not going to remember a world without the International Space Station. I really think that it's just going to be an absolute part of our culture and society in ways that are impossible to predict right now. But for me, as someone who was trained in astronomy I think that the biggest contribution is the 24-hour-a-day science. I mean right now on the shuttle, we go up maybe 7 or 8 times a year for maybe 10 days. We spend a day or two on either end reconfiguring the shuttle from a rocket ship to an orbiting space laboratory spacecraft. And then we have to reconfigure it into an airplane to come home. And that's been very good. I mean, it's been a really good place for us to start. But if you look at a huge national laboratory like, say, Lawrence Livermore labs, what if you only ran that lab around 50 days a year? I mean, that's, you know, you really can't get as much done as if you had it running full-time. And that's what we're finally doing. We're building an international laboratory that will be doing science 24-hours-a-day, 365-days-a-year. And as a scientist, that's what really excites me.

Now yours is also the 100th shuttle flight. If you would, discuss the significance of the space shuttle in human space flight history-its uniqueness and accomplishments and what it's going to be doing in the future.

The space shuttle, it sure is unique! You know, as a Pilot, it's really a fascinating system. I mean, it's amazing! We're the only vehicle in the world that can actually bring this huge payload up to space and come home. Or bring a payload home if you needed to, to be fixed. A really unique vehicle. Obviously, in a lot of ways an experimental vehicle. I don't think that you will see a fleet of space shuttles as an airline industry. I think you'll see something a little different. But the shuttle will have been the important step in transitioning from going to space being a very unusual event; it will be the step between that and it becoming a routine event. We're not there yet. But the shuttle is the link in between.