Music.

NARRATOR: Recent shuttle missions to the International Space Station have added to the outside of the orbiting laboratory,

now the crew of space shuttle Discovery's STS-120 mission will add to the inside, as well.

Riding in the cargo bay of space shuttle Discovery is a module called Harmony that will link laboratories from NASA,

and Europe and Japan's space agencies. It will also give ISS crews more room to work and live in by expanding the station to about 18,000 cubic feet.

This morning we take a look at this important mission. Live from NASA's Kennedy Space Center in Florida, this is the STS-120 webcast.

STEPHANIE STILSON: Welcome, I'm your host, Stephanie Stilson, Discovery's flow director at Kennedy Space Center.

We are joined today by our special guest, astronaut Sandra Magnus, a mission specialist who flew aboard space shuttle Atlantis during mission STS-112.

She will tell us about spaceflight and will answer some of our viewers' questions.

Sandy, you flew with STS-120 Commander Pam Melroy and worked with
International Space Station Commander Peggy Whitson during STS-112.

How do you think this flight will go for both of them?

SANDRA MAGNUS: Oh, they'll have a great mission. They're both hard workers. They're both great people to work with.

They've got some great crews. They've got a difficult mission, but they're going to do a great job. It'll be a lot of fun too.

STILSON: The module Discovery will be carrying is called Harmony,

and it will be an addition to the International Space Station in many ways.

NARRATOR: Harmony, also known as Node 2, will connect more than laboratories at the International Space Station.

It is literally a link between what the station has accomplished so far and its potential to dramatically improve research in microgravity.

Harmony, which was built in Italy, is also a link between the space station and students on Earth who chose the name for the module.

Once attached to NASA's Destiny laboratory, Harmony will extend the living area inside the International Space Station to about 18,000 cubic feet.

Unlike most other modules on the station, Harmony has six hatches, or doorways, that can hold other
station components.

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Upcoming space shuttle missions will carry a set of new research labs to the station that will connect to Harmony.

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When the work is complete, Harmony will be the center of the most advanced laboratory complex ever flown.

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STILSON: As we said, Pam Melroy will command the mission, which will be her third. George Zamka is the pilot, while

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Scott Parazynski, Stephanie Wilson, Douglas Wheelock, Dan Tani and Paolo Nespoli will serve in many roles as mission specialists.

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00:02:51,240 --> 00:02:54,990
Paolo Nespoli will serve in many roles as mission specialists.

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Commander Melroy recently talked about the mission's unique role.

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PAM MELROY: Well, this is a pretty complex assembly mission,

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and that's because we actually have two goals that we're trying to achieve.

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Usually when we have an assembly mission, there's one big element that we're delivering and activating. In this case,

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we actually have two things that we're doing. Our first activity will be to deliver the Node 2, which is named Harmony,

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and it's essentially the hub of all the scientific laboratory sections of the space station. So we'll be delivering that.

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We're actually going to be stowing it temporarily on the side of Node 1,
Unity, because it doesn't go into its final location after we've undocked,

because we're actually docked to the place that it's finally going to go.

So you can imagine there's a lot of complexity associated with moving that element around. In addition, we're taking the P6 solar array, which currently sits on top of the Z1 truss,

where it's been since 2000 when it was delivered just after the first people started living aboard the space station.

And we're going to be moving it all the way out to the end of the port truss.

STILSON: Sandy, all space station segments undergo a rigorous prelaunch regimen.

Tell us a little about Harmony's history since arriving at Kennedy Space Center.

Certainly. The Harmony module came to Kennedy Space Center from its assembly factory in Turin, Italy,

in June 2003 aboard an Italian cargo airplane. Harmony was driven to the Space Station Processing Facility here at Kennedy so technicians and engineers could run tests and ready critical elements of the module for launch. From there,

the 31,000-pound segment was packed into a cargo container shaped like the shuttle's cargo bay and driven carefully to the launch pad.
It's now inside Discovery's cargo bay and it's ready to take its place in space.

Once Harmony is connected to the station in its temporary position, the crew will move another segment of the space station to its permanent place.

The P6 truss segment that Commander Melroy just talked about will be detached and moved to the far left side of the long girder that crosses the center of the outpost. For the seven-person crew of Discovery and the three people aboard the International Space Station, the mission will be a complex mix of spacewalks, robotic arm maneuvers and plenty of tasks inside the shuttle and the station. Astronaut Scott Parazynski talked about the work.

We'll demate the cooling loops, the ammonia fluid lines.

We'll demate power and data connectors, also on spacewalks,

and then the robotic crew from inside the space station will grapple the P6.

Dan Tani and I, my spacewalking partner on EVA2,

will unbolt the P6 and then the P6 will be lifted off its perch on top of the station and over the course of the next couple of days,
involving a handoff to the shuttle arm and then back to the space station arm,

we’ll get it into position for EVA3 when Doug Wheelock and myself will

essentially reverse this whole process. We’ll guide the P6 into place, giving verbal commands to the robotic operators inside,

and once it’s exactly where we want it, we’ll bolt the two structures together.

STILSON: Discovery carries another important element for the space station on STS-120:

new crew member Daniel Tani. Tani will take the place of Clayton Anderson, who will ride Discovery back to Earth.

He will also help move Harmony to its permanent home at the end of the Destiny lab after Discovery leaves.

To make Tani comfortable during his two-month stay at the station,

NASA has packed food and clothing the astronaut chose.

The supplies are tucked into several lockers on Discovery's middeck and

will be transferred to the station while the orbiter is docked.

It may not sound like much room for all the things one would need for months in space,

but every single shuttle locker can be packed full of supplies. To show just how much a locker can hold,
we brought this mock-up locker over from the Flight Crew Equipment area here at Kennedy.

MAGNUS: Lockers can be packed with special equipment, clothing and food.

This one is a test unit that engineers can practice with.

We stuff these full of food like this, and we just open it up and chow down.

STILSON: How do you keep all this stuff from floating around out of control inside the shuttle or the station?

MAGNUS: You can open the locker and there's usually trays in there.

You can pull out the trays and so you can just target a smaller section,

and they have nets and things over them to keep things from exploding out of them when we open them.

STILSON: How do you know which locker to open?

MAGNUS: There's a lot of smart people on the ground that figure out ahead of time how to pack the things that we need,

and they have nice labels on the front: food, clothing, onboard documentation and various types of computer equipment,

other things that we need. So we know exactly where to go.

STILSON: Well, how many times during a mission do you have to access the locker?
MAGNUS: We actually get in and out of the lockers all day long. Of course,
all your meals are in lockers, so you're opening that frequently,
your clothing to get dressed in the morning and change clothes in the evening
and, of course, all the equipment that we need to use.

We get in and out of there a lot.

STILSON: Speaking of important aspects of the space station, several guests of the
nasa.gov Web site posted questions recently for Sandy.

Among them, Molly from Wayne asks simply, "Do astronauts have fun in space?"

MAGNUS: Yes we do. It's a lot of fun. You're working very hard during a shuttle mission, it feels like
you don't have a lot of time,
but you're floating and that adds a lot of fun to our work.

STILSON: Great. Our next question comes from Silvio of Italy.

During Shuttle missions and ISS, how many "free time" slots do astronauts have,
other than for sleeping?

MAGNUS: For a shuttle mission, you really don't get a lot of free time.
We usually have about a half a day off, 10 days or so into the mission, and you spend a little bit of that time catching up on your work, because invariably there’s something you’re behind on.

But you do end up with a little bit of time to look out the window and just think about where you are and how special of a place it is.

STILSON: Speaking of having a lot to do, Katie from Malvern asks, "Does each astronaut get assigned a job?"

MAGNUS: Yes we do. Again, on shuttle missions, because you're so very busy, you want to practice for what you're going to do in space before you go, so everyone has very specific tasks, whether it's working the robot arm, working on the spacewalks, directing the spacewalks or even working on the locker in the stowage and keeping track of things, so we're all very practiced at our specific job.

STILSON: Corey from Phonexville wants to know about the launch. He asks, "Is it scary launching up into space?"

MAGNUS: You know, I was wondering if I was going to be scared or not when I did my first launch, and it turns out I was just so excited about it, it was so thrilling to finally get to go do this, I was not frightened at all.
STILSON: Regarding this mission in particular, and with what you know about the space station,

Justin from Tuscaloosa asks what the biggest challenge will be during the STS-120 mission.

MAGNUS: The biggest challenge actually in the mission itself is, as you heard Pam talk about,

they have to not only take Harmony out of the payload bay and attach it to the station,

they also have to move the P6 truss out to the very end of the truss, and that's

going to involve some complex robotics and some complex spacewalks.

And in the meantime, on the inside, Dan and Clay are very busily switching

their things so that Dan can set up and get ready to live on the station and

Clay can bring all of his things and come home.

STILSON: Well, finally, we wanted to give everyone a chance to experience a mission through the
eyes of an astronaut.

We've prepared some video highlights from mission STS-112, which was the last mission you flew on. Sandy,

would you go through the video with us and tell us what you're seeing?

MAGNUS: Certainly. I'd love to. Of course, right before launch,

you get into your pressure suits and make sure they're functional,
and you're looking forward to getting out to the launch pad and getting strapped into the orbiter, and it takes a few hours to do that.

I was the last one in, so I didn't have to lay on my back for very long until it was time for launch.

And six seconds before launch, the main engines light. We do that to make sure that they're working properly.

You feel the sway of the whole stack, and then at T-0, at launch, the solid rocket boosters light and it's noisy. It's vibrating, everything's rattling around.

You hear a lot of roaring; even though you have a helmet on, it's still noisy.

I was trying to watch the computer screens; they were bouncing all over the place. And it stays like that for two minutes,

and then the solid rocket boosters fall off. We have another six-and-a-half minutes,

we get to orbit. We turn ourselves into an orbiter and live at home,

and a couple days later, we're already ready to dock to the space station,

open the hatch and meet the space station crew. Peggy and her crew had been up there for four months already. We didn't have a lot of time to talk.

We immediately had to get to work. As I mentioned,
shuttle missions are very busy. Peggy and I got started on the robotics, using the station robotic arm to get the S1 truss out of the payload bay and swing it around and attach it.

While we're working on the robotics to get the S1 attached, the spacewalkers are getting ready for their spacewalk because they're going to go out immediately after we attach the truss. Working the robot arm is difficult.

It takes two people. We do not have any windows, we're triangulating with different camera views to keep track of where the truss is.

We have to move it very slowly because it's very heavy, 45,000 pounds. And we very slowly move it into place and the spacewalkers then come out, and it's their turn to go to work.

And they connect all of the data cables and the power cables and the thermal cables.

And the S1 contained the radiators, basically the cooling system for the station. And once we had everything connected, the ground immediately started to deploy the radiators, and here you see them turning the radiators to the deploy position,

and they'll sort of unfold like accordions. Meanwhile, the spacewalk was continuing.

They had a lot more work to do in some other areas.
After maybe nine days or so, we got everything done.

We really had come together almost like a big family and it was time to say goodbye, and that was sort of sad. I know the station crew was happy to see us go and I think they were equally happy to see us go, because we just sort of brought our own little whirlwind tornado of activity while we were there.

But we shut the hatches, said goodbye.

We had to depressurize, and left three people living aboard the space station while we prepared to undock and come home.

And we have a very nice tradition on the station where they'll ring us off with the bell and announce that Atlantis is departing, and we knew that was officially the end of our docked stay, and home we go.

What's really neat though, before we depart from the station completely, we do a fly-around. We do sort of a big loop where we can see the station, we can see the part of the station that we just added, and we do a lot of photography for the photo documentation of the station. About a day later, we've packed up the shuttle, we've turned ourselves back into a heavy glider and we come home. And it seems like the mission went by so fast,
it's almost a dream by the time you land and you look back at the last 11 days or so.

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And it's hard to believe you were up in space at the space station,

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adding a piece of it and being successful. And now your mission's over and you go back to work.

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STILSON: That's just amazing. Well, thank you very much for that in-depth look at spaceflight from a
unique perspective,

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and thanks for being our guest today.

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MAGNUS: You're welcome. It was my pleasure.

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STILSON: Well, that's going to wrap it up for this preview of mission STS-120 aboard Space Shuttle
Discovery.

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Keep updated during the countdown and launch of the shuttle on NASA.GOV and check back during
the mission for updates,

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status reports and live coverage of the mission. I'm Stephanie Stilson. Thank you for watching.