“A View Of The Solar Eclipse From The Edge of Space” Transcript

Excerpt from August 11, 2017 episode of Science Friday.

IRA FLATOW: OK. You have 10 days and counting to prepare for the solar eclipse. A group of students and scientists is working to capture images and hopefully live-streaming the clips from a unique vantage point, a balloon thousands of feet up there, up, up and away, and conducting a bit of science, too.

My next guests are part of that team. Angela Des Jardins. OK. Leader of the NASA Eclipse Ballooning Project. She's also Assistant Research Professor in physics at Montana State University in Bozeman.

Welcome to Science Friday, Angela.

ANGELA DES JARDINS: Thank you very much. Aha!

FLATOW: Now, Levi Willmeth is a computer science student at Oregon State University in Corvallis, Oregon. He's member of the Oregon State and Linn Benton Community College Eclipse Ballooning Team. Welcome to Science Friday.

LEVI WILLMETH: Thank you for having me.

FLATOW: Well, Angela, there are so many different projects happening for the Eclipse. Why did you choose balloons? You know? What can we learn from that vantage point?

DES JARDINS: The really great thing about balloons, so these balloons we're talking about are not what you would imagine as hot air balloons or party balloons, these are special balloons that actually go to the edge of space, so up to about 100,000 feet. And from that vantage point, you can actually see the curvature of the Earth and the blackness of space. It really looks like you're looking down on the planet.

And so the idea came about because I knew there were lots of student high-altitude ballooning groups around the country.

FLATOW: And Levi, you're on one of these teams and you're working to capture images from a boat offshore. Give me an idea of what you have to build to get your balloon and payload together. There's a camera on the balloon going up?

WILLMETH: That's correct.

FLATOW: How do you keep the camera pointed where you want to, I imagine, which is at the eclipse?

WILLMETH: So one of the-- so each of the teams has kind of solved this in different ways. Personally what we've done is we've tied the camera itself to our payload, which is tied to the neck of the balloon, so that as the balloon itself gets quite large. It has a large amount of inertia that kind of holds it in place.

And in order for that camera to sway around, this gigantic balloon has to also sway. And we found that really helps dampen all the small motions of wind that you might kind of encounter along the way. Plus, as it gets really high, the air becomes very thin and everything kind of really settles out once you get up to the top there.

FLATOW: I want to get a few more questions. But I'm still trying to noodle, because I'm not that smart, how do you keep the camera pointed in a floating balloon at the moon-- at the sun. You know?

DES JARDINS: So actually, let me just interject here really quick. You know? That's the first reaction, is that, with these balloons we actually want to look at the sun. But if you think about any time you would actually might want to point your camera towards the sun, it totally saturates your image.

FLATOW: Right.

DES JARDINS: And so actually for most teams, looking at the sun is not what we want to do. That thing that's amazing from this vantage point is actually the shadow. So looking down on the Earth as a planet, and seeing that shadow come across the Earth is really a profound, amazing thing to look at.

Now, that's not to say some teams are going to choose to look at the sun. You know? I myself have an infrared solar experiment that's going to really want to look at the sun. But for most teams, the balloon is going to move around, there is some you pointing capability in some cases, but for the most part it's going to move around. And you're going to see-- from that high, you can see 200 miles in every direction.

So you can actually see the shadow coming across the Earth for about 10 minutes before it's actually totality where the balloon isn't in, and 10 minutes going.

FLATOW: And is there real science to be learned there, Angela?

DES JARDINS: There is some really fantastic science. There's really three key pieces of science that we're doing here. So there's a sister project in addition to streaming live video that we're actually going to look at, how the eclipse shadow actually affects the atmosphere.

And so every day, you know, we have the sunrise and sunset that sets up gravity waves, so turbulence, basically, in the atmosphere. Gentle waves. But we know the eclipse is actually going to set up much stronger turbulence in the atmosphere. So that's one piece.

We actually have partnerships with NASA Ames to fly some resilient bacteria on many of the balloons. And the question here is, so actually, in the upper atmosphere, the temperature and pressure is very similar to that of the surface of Mars. So we want to be able to ask the question, how clean do the spacecraft have to be when we send them to other planets?

And then the final piece is sending all of our data with a project sponsored by Google called the Eclipse Megamovie Project. And here, they're actually taking the very last little moments of light, called Bailey's beads, and taking lots and lots of images to examine that exactly to be able to look at that exact surface of the sun. So the exact size of the sun, and exactly what's going on the surface of the sun, which you can only do during a total solar eclipse.

FLATOW: Dr. Des Jardins is leader of the NASA Eclipse Ballooning Project, Assistant Research Professor in physics at Montana State University in Bozeman. And Levi Willmeth is a computer science student at Oregon State University in Corvallis, Oregon.

Thank you both for taking time to be with us today.

WILLMETH: Thank you for having us.

DES JARDINS: Thank you.

FLATOW: You're welcome.