Building Curiosity: Going For A Spin

Transcript:

Hi, I'm Nathaniel Thompson and I'm Dan Coatta and this is your Building Curiosity Update.

We're standing here in front of the large spin table. This is the machine that we use to measure the mass properties of the Curiosity spacecraft. Mass properties describes the way an object moves through space.

There's three mass properties that we measure; mass, center of gravity and the rotational inertias. The rotational inertias tell us how the matter is distributed and spread out. It effects how easy it is to spin the object and also how the object will wobble as it's spun.

During the cruise phase, as we're flying through space to Mars, the vehicle is rotating and it's using a camera or star scanner to navigate by taking pictures of the stars. If we're rotating and wobbling, we can't get a good track on the stars and we won't be able to properly navigate. We also use antennas to communicate back with Earth. Again, if we're wobbling too much we can't correctly communicate with Earth.

The principle of a rotational inertia test is very similar to the way you have your tires balanced at your local mechanic.The mechanic will rotate the tires very quickly on a machine that measures the amount that it wobbles. They will then put balancing weights on the tire until it spins smoothly. This is exactly the way we spin and balance our spacecraft.

Now, we know what mass properties are. How do we go about measuring them?

To do that we need a special machine called a spin table. This is a miniature version of the large table that we use to measure our spacecraft. The table floats on a cushion of air. There are sensors inside the body of the table that measures the balance of the rover on top of the table, kind of like a see-saw.

We've done a lot of testing already here at JPL. Now, we're packing up our table and getting ready to ship it to Florida. In Florida, we'll be doing the most exciting test of all. A full spacecraft with fuel loaded on the table, measuring it to make sure it's ready for launch.

I'm Nathaniel Thompson and I'm Dan Coatta and this has been your Building Curiosity Update.