**Transcript:**

We're putting together a rover.

And this is what it will look like when it gets to Mars. But before we get to this point we've got to put Mars 2020 together.

I'm Chris Salvo. I manage the team that puts together the rover mechanical subsystem.

You see here it's a fully assembled chassis. But it's all still shiny aluminum.

We paint it white so that it reflects sunlight. The white reflective property of the paint is important because our paint will need to survive in temperatures as hot as your oven and down to temperatures colder than occur any place on Earth.

There are lots of areas on the chassis that must not have paint on them. And each of those has to be carefully masked. There can't be any folds. There can't be any stray edges. It all has to be perfect. Otherwise we'll wind up with paint in places where we can't have it or portions of the structure that are missing paint where we need it.

Here we are rolling up to the paint building.

This very special formulation of paint has to live through all of the difficulties of getting to Mars, shaking on the launch vehicle, as well as existing on the surface of Mars in the hot and cold cycles. For the paint to work right, it has to be just the right thickness and evenly applied.

To prepare the aluminum surfaces, we have to make sure they're very clean. The shiny aluminum surface is then reduced to more of a scuffed surface that's ready to accept paint. This generates dust as well. That all has to be cleaned and vacuumed off so that we don't have any particles that are going to get under the paint and keep if from adhering or cause it to flake off.

There are rules for the application of this paint that include things like a time limit between when you scuff the surface of the aluminum and when you have to apply the paint.

Like most of the assembly of the rover, the painting process is not fully automated like you might see in a manufacturing plant, because we're building one-of-a-kind machines.

When you send a spacecraft into space, all of what we call the volatile materials that you take with you--the water that's absorbed into things or other chemicals--

tend to come out in the vacuum of space. And they float around and redeposit on surfaces where you don't want. One of the ways to prevent this is to bake it out.

This is one of our larger thermal vacuum chambers. This oven is 10 feet in diameter. We cook out all of those chemicals that might cause us problems later. After the baking, we need only to deliver it to the assembly facility. We have to keep it clean, so we put it in a double bag.

When we get to the assembly building, there's a room called an airlock, where we transition from the dirty outside to the clean inside of the assembly facility. We very carefully clean portions of the fixture that are going to touch areas inside the airlock. The outer bag got dirty outside. So we take that off and throw it away. And the bag inside is relatively clean.

Then we're ready to leave the airlock and come into the main assembly facility. The descent stage and the cruise stage are here already. The rover now joins them so that the whole spacecraft can be put together and ready for Mars. We can then remove the inner bag.

This is a big moment! All the components that will control the actions of the rover --all the instruments that will be looking for things on Mars go inside this chassis, as it forms the foundation for the entire rover.

Starting from a pile of aluminum panels, it took 4 months and over 5,000 work hours to get the chassis to this point. It'll take another 3 or 4 months in the assembly facility to turn this chassis into something that looks like a completed rover.

It'll be an amazing day for all of us to see this rover on top of the rocket in July of 2020.