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Hey everybody! Technology is always getting smaller.

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A computer used to take up an entire room but now it fits in the palm of your hand.

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Well, spacecraft aren't all that different.

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They're traditionally very large and difficult to build but we're working on ways to miniaturize them.

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We're going to talk all about that on this episode of Crazy Engineering.

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Hey everybody, we're here with Andy Klesh in one of JPL's smaller clean rooms.

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We're building CubeSats in here. Andy, what exactly is a CubeSat?

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A CubeSat is really just a standard small spacecraft and we're talking a very small spacecraft;

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10 by 10 by 10 centimeters at their smallest down here and yet they go up to about 30 by 20 by 10 centimeters

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and we've launched hundreds into low Earth orbit for the last 10 to 15 years.

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So, this really is a big contrast to how we normally operate at JPL with our larger clean rooms

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and our larger spacecraft. It is, we're trying things a little bit different over here.

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It's much more rapid development. Trying things out with 3-D printing

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and building things up a lot quicker because these missions are a lot smaller.

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If I were to build Voyager today, could I miniaturize it? Could I make it really small?

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Absolutely not, Voyager has so many different capabilities and these CubeSats are very, very, limited

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but they're very focused on what they do so they can do one thing and do it very, very, well.

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You're the chief engineer of one of these CubeSat projects.

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Could you tell us a little bit about the one you're working on? I work on MarCO, or Mars Cube One.

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Can we take a look at the spacecraft? Absolutely, it's right here.

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This looks more like a computer to me than a spacecraft. Can you explain a little bit about how it works?

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We have a propulsion system to actually steer us to Mars; a radio to talk back to Earth;

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and the computer and electronics so that we can actually operate. So MarCO is actually going to Mars?

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That's right, we're launching with InSight.

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So MarCO will travel along with InSight all the way to Mars?

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Actually, there are two identical MarCO spacecraft and they separate from InSight at Earth.

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Each spacecraft will then travel to Mars on its own over six-and-a-half months.

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MarCO's single purpose is to relay data back from InSight during its entry, descent and landing at Mars.

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We're really excited about this. It's the first interplanetary CubeSats that we'll have.

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What do you see for the future of CubeSats? Because these are low cost,

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we see them going to many cool places throughout the solar system. We also see them working together.

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What we call fractionated space. Where the spacecraft is really broken up into all individual instruments

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each with a focused task and together they perform the entire mission. We're hoping to see

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all kinds of new technology with CubeSats down the road.

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Andy, thank you so much for showing this to us and hope you guys

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had a lot of fun learning about it and check back soon for some more Crazy Engineering.

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(Music)

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If you guys like that you can click over here to watch more Crazy Engineering