Now in space: A cutting-edge satellite the size of a shoebox built by students

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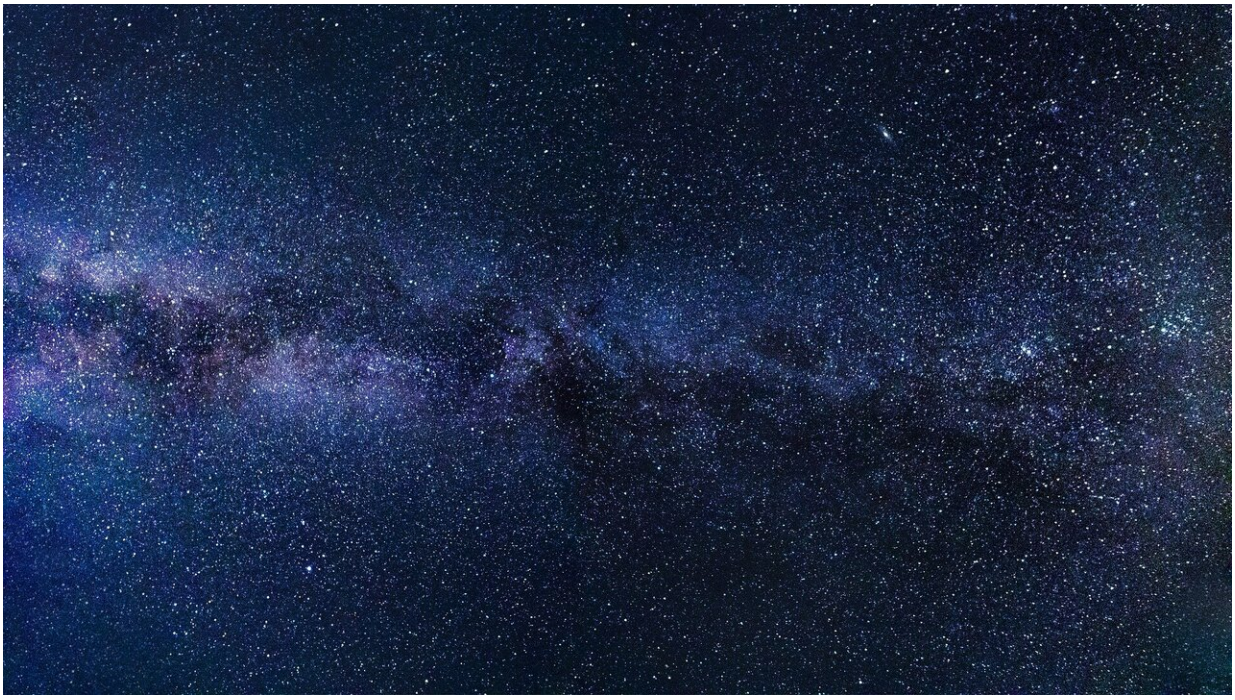

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Just be thankful there are students like Paige Northway and Nathan Wacker, two University of Washington students who think it's neat to work on stuff like a satellite the size of a shoebox.

For most of us, all that is beyond our comprehension.

But that's how things move forward in our high-tech age. Going from rotary phones to the 1973 brick-like mobile phones to today's 7-ounce smartphones entails complicated engineering, and that means technologically savvy people like Northway and Wacker.

In case you missed it—and you probably did—one big part of the future in space is tiny satellites weighing maybe 7 pounds, with thousands orbiting around the Earth. Their size, numbers and advancements in technology will mean everything from making the internet faster to helping climate research.

Instead of relying on two or three large satellites to look at weather, a whole bunch of mini-satellites can cover an area in much more detail.

Earlier this month, at 7 in the morning, a satellite assembled by about six dozen UW students was blasted up into space at NASA's Wallops Flight Facility on the Virginia coast. It piggybacked on an unmanned cargo spacecraft sent to the International Space Station to resupply astronauts and pick up their garbage.

Over the past five years the students had spent an estimated 25,000 hours on the project, including building a custom thruster for the satellite. The thruster uses new technology that uses no moving parts. Instead, sparks are used to vaporize small amounts of solid sulfur, which then propel the satellite.

That's not the kind of propulsion that'll have the power to send a craft up into space. But it's enough to nudge a mini-satellite while in orbit.

Another custom-built item was a system that would transmit data at such a high frequency that it'd quickly send down reams of information at a cheaper cost than now available. The UW mini-satellite will transmit down a test packet. For those of you that paid attention in science class,

that high frequency is 24GHz, which is in the K-band spectrum.

All this work is a complicated, long ways from playing an intergalactic-themed video game or movies, says professor Robert Winglee, the group's adviser.

The name CubeSats is used to describe this new way of making a cheap, small satellite—a 4-inch cube that's standardized in size so parts can be mass-produced. The UW one is three times as big. The students decided to call it HuskySat-1.

Northway says the hardware for the UW one cost around $40,000. NASA provided the main grant money.

Because of the standardization, the UW mini-satellite has a little Sony camera module that sells for $65 and will take pictures of Earth. Certainly, there are plenty of those from space.

But camera setup was built with the help of students at the Raisbeck Aviation High School in the Highline School District.

Northway, 30, is a doctoral student in Earth and Space Sciences.

Right from the start while in high school in Brainerd, Minnesota, "I did well in math. I knew I wanted to do engineering," she says. Her dad runs a construction consulting firm, her mom runs payroll at a resort.

Wacker, 20, is a junior in computer science and a graduate of Mercer Island High School.

NASA spokesman Keith Koehler says the CubeSats program is a success, with 23 universities around the country getting funding—"students are receiving the hands-on aspects of the projects, as

well as the real-world problem resolution."

Technology has advanced so much, says Koehler, that the mini-satellites "are at least 1,000 times faster in processing speed" than the guidance computer on the historic Apollo 11 mission.

Curt Blake, president and CEO of SpaceFlight, the Seattle company that assists in ride-share launches for CubeSats, says the mini-satellite industry is in its infancy. He compares it to the smartphone, which initially was used mostly for messaging and email.

"Now there are millions of applications available," he says. "Access to space is doing the same thing."

In a way, the mini-satellites hark to the very first ones. The very first satellite, Sputnik I, launched by the Soviets in 1957, weighed 184 pounds. Explorer I, the first U. S. satellite, launched the next year in 1958, weighed all of 31 pounds.

The Cygnus cargo spacecraft carrying the UW mini-satellite and other mini-satellites is now attached to the space station, where it will stay until early 2020.

Then the Cygnus will leave the space station, at which point the mini-satellites will be placed into orbit from a deployer with springs that will push them out into space.

The Cygnus will burn up as it enters the atmosphere, along with the garbage it'll be carrying.

The UW mini-satellite will circle the Earth every 94 minutes for around 3 1/2 years, begin to lose altitude and then also burn up.

When Wacker tells his 20-something friends about the project, about this contraption the size of a bread loaf that'll be orbiting the Earth, he says they reply, "That's cool. Wow."

It really is.