Palm-Sized Satellite FemtoSat Aims To Bring Down Cost Of Space Missions

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Decades ago, no one would have thought that massive computers that took up volumes of space could be shrunk down to, at the very least, an Apple watch, but it happened.

Now, in a similar fashion, engineers from Arizona State University (ASU) have developed a prototype for a tiny, palm-sized satellite that could literally turn the outer space within one's grasp.

The ASU research team believes that their SunCube FemtoSat satellite could someday become a radically cheaper space-bound platform that brings down the costs of space missions.

"With a spacecraft this size, any university can do it, any lab can do it, any hobbyist can do it, says Assistant Professor Jekan Thanga, one of the project researchers.

Sending Tiny Satellites To Outer Space

Thanga and a team of undergraduate and graduate engineers spent two years creating the 3-centimeter-per-side (1.2 inches) satellite cube, which is powered by a recovered scrap of solar panel.

Launch and launch-integration for full-size satellites swing from $60,000 to $70,000 per kilo (2.2 pounds), an extremely hefty amount. The ASU research team said that these kinds of expensive costs prevent most educational institutions from building and launching their own spacecraft.

Compared to the tens of thousands of dollars needed per kilo, launch expenses for the SunCube FemtoSat will run at about $1,000 for it to reach the International Space Station and $3,000 for it to fly into low-Earth orbit. Additionally, Earth escape will cost $27,000.

Thanga said this was a crucial price point they wanted to hit. When SpaceX's huge Falcon Heavy rocket blasts off into space later this year, costs will likely drop by as much as half, he said.

The FemtoSat's design standard bootstraps from the Cal Poly CubeSat standard, Thanga told Tech Crunch, and it allows for major customization.

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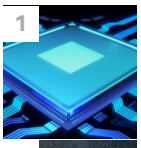
1 
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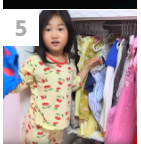
5 
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Thanga said "space for everybody" is their major goal.

"That's how you invigorate a field ... getting more people into the technology, getting their hands on it," said Thanga.

From Full-Size Spacecrafts To Disposable Mini-Satellites

The clever invention has a possible caveat, however: can lots of miniature satellites do the job of a full-size spacecraft?

Thanga said that over the years they spent working on the project, he and his students remained focused on miniaturization with a clear vision of creating disposable spacecrafts for exploration.

The emergence of smartphone tech has made everything pocket-sized, and Thanga said they're riding along this wave of "miniaturization." He said there is a whole community out there that is interested in low-cost swarms of disposable satellites.

"We're interested in tackling the space access problem," added Thanga. "What if we can have students send experiments into space? With something as small as this, you can make mistakes and send again."

In the meantime, Thanga is collaborating with Professor Erik Asphaug to get a prototype into space next year with their Asteroid Origins Satellite mission.

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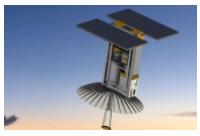

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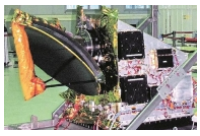

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