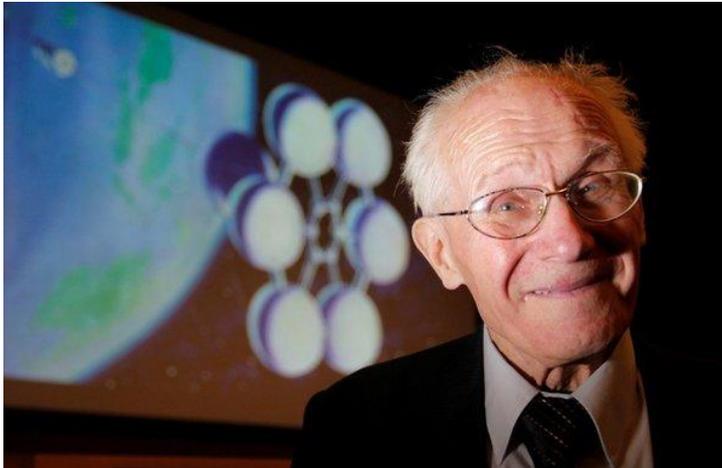


50 years of space elevator dreams



Carissa Ray / msnbc.com

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Russian engineer Yuri Artsutanov, now 81, came up with the space elevator concept 50 years ago.

Alan Boyle writes: When Soviet engineer Yuri Artsutanov came up with his concept for an "electric train to the cosmos" in 1960, he thought it'd take 200 years to turn it into a reality. Fifty years later, the 81-year-old is more optimistic: Now he thinks the first space elevator will rise into the heavens 30 years from now.

"It's happening very quickly," he told me through an interpreter today.

Artsutanov is among the optimists who have come to the Microsoft corporate campus in Redmond, Wash., for the 2010 Space Elevator Conference this weekend. (Microsoft and NBC Universal are partners in the msnbc.com joint venture.) The annual gathering brings together researchers and entrepreneurs who specialize in the technologies that could come into play if anyone ever builds Artsutanov's train to the cosmos.

The basic idea is that payloads and people could someday ride vehicles attached to ribbons of super-strong material, reaching orbits as high as 100,000 kilometers (62,500 miles). Similar, shorter railroads in the sky could be constructed on the moon and Mars, creating the outer-space analogs of commuter rail systems. The concept's proponents say the cost of access to outer space could fall to as little as 1 percent of the current cost - if and when such elevators are built.

One of the themes of the conference is that space-elevator technologies could yield payoffs long before the construction of those elevators:

- Next-generation materials incorporating carbon nanotubes are thought to be a requirement for those space elevator ribbons, and could also be used in earthly products ranging from bulletproof vests to aircraft and spacecraft. In fact, up to \$2 million in prizes could be won today at the conference as part of the NASA-backed Strong Tether Challenge.
- The elevators would have to be powered by laser-based energy transfer systems - gizmos that could be used by NASA and the military as well. Last year, Seattle-based LaserMotive won \$900,000 in another NASA-backed challenge aimed at encouraging the development of lightning-fast robots powered only by light beams.

- Experts are trying to figure out how tethers interact with Earth's magnetic field and orbital debris, in order to make way for a space elevator in the long term. But such expertise can be applied to making space operations safer in the near term as well. Next year, the Naval Research Laboratory is scheduled to launch a tether experiment known as TEPCE to see how small satellites can navigate through the magnetosphere using "propellantless propulsion."

Jerome Pearson, an American engineer who independently laid out his ideas for a space elevator in 1975 and is considered in some circles as the concept's co-inventor, is currently fleshing out plans for a tether-equipped mini-satellite known as ElectroDynamic Debris Eliminator, or EDDE. He envisions a fleet of EDDE satellites that can use tethers rather than thrusters to travel up and down, gathering tons of space junk in giant nets, possibly to be incinerated in the lower atmosphere. That scrap metal from space could also be recycled into new space stations - or space elevators, for that matter.

If the EDDEs work as Pearson and his colleagues hope, Earth's magnetic field could become an outer-space ocean for whole fleets of small craft flying up and down, back and forth. That would pose huge regulatory challenges, and arguably diplomatic challenges as well. "We would have to do flight plans, miss other objects and make sure we're operating safely," Pearson told about 40 attendees at a morning session today.

Is the elevator moving?

Pearson and Artsutanov, who is visiting from St. Petersburg, Russia, are clearly the stars of the show due to their status as creators of the space elevator dream. "This is a time when the two inventors of the space elevator are together," Pearson observed. But there's a big question hanging over the event: When will everything come together to make the concept look less like a dream and more like a reality?

Bryan Laubscher, an astrophysicist who is the conference chair as well as president of Odysseus Technologies, is sticking with his standard answer that it will take 15 years to build the first space elevator. "And next year we'll probably be saying 15 years again, unless we see some breakthroughs in carbon nanotube development," he said.

The way he sees it, materials science is the key missing piece in the space elevator equation. "We have one big problem on the space elevator," he said. "Everything else pales in comparison to that, and that is: materials."

Others might say money is the big problem. Laubscher says it would be far less expensive to operate multiple space elevators than to continue with the chemical-rocket technology that provides the world's only current means to get to outer space. "If that's the only game in town, I predict we're not going to get very far," he said.

But Laubscher's figures also suggest it would take \$19.5 billion to design and build the world's first space elevator. That's more than NASA's total annual budget. The space agency may be willing to invest in elevator-related technologies, but the actual job of building the elevator will have to be up to the private sector. And so far, the investment interest just doesn't seem to be there.

Going up?

Some of the folks at the Space Elevator Conference insist that interest is perking up: Michael Laine, who went through a gloomy round of financial and legal tribulations as founder of the Liftport Group, told me he's involved in setting up a substantial venture-capital fund for projects that could be seen as spin-offs of the space elevator concept. By the time the 2011 Space Elevator Conference rolls around, there just might be a light at the end of the carbon nanotube tunnel.

Artsutanov's translator, Eugene Schlusser, said half-jokingly that there was an easy way to solve the money problem. "What you need to do is find a military application, and the money will follow," he told me.