Russia asks: How do you stop space objects hitting Earth?

Timothy Heritage and Gabriela Baczynska and Michael Shields, Reuters

(Reuters) - What can man do to prevent Earth being hit by meteorites and asteroids?

Russia [1] has found, to its cost, that it has no answers. But U.S. and European experts may be able to help with a few ideas that at first glance seem straight out of science fiction, including smashing spacecraft into asteroids, using the sun's rays to vaporize them, or blasting them with nuclear bombs.

That should come as some relief to the many worried Russians who want something done immediately, even though scientists say the explosion of a meteor over central Russia [2] on Friday was a once-in-a-lifetime event.

"We must create a system to detect objects that threaten Earth and neutralize them," Dmitry Rogozin, a first deputy prime minister in charge of the defense industry, wrote on Twitter.

For all their nuclear missiles, he said that neither the United States nor Russia [2] could shoot down such meteors. Even President Vladimir Putin held up his hands, saying no country was able to protect against such events.

But there is hope for Russia as it looks for a solution. Last week's near miss from an asteroid half the size of a football field, the same day as the meteor explosion, has heightened awareness of the dangers Earth faces.

At a conference in Vienna on Monday, scientists said it was time for man to do more to spot objects hurtling towards the planet and to counter their threat.

LASER BEAMS AND GRAVITY TRACTORS

The European Union-funded NEO Shield consortium, whose aim is to investigate the best ways to deal with an object hurtling towards Earth, outlined some of its ideas in Vienna.

These included creating a "kinetic impactor" to fire a huge spacecraft into an asteroid to alter its path; another was making a "gravity tractor" by parking a big spacecraft near an object and using thrusters to lead it away by using the weak gravitational force as a cosmic tow-rope.

Exploding a nuclear device on or near an asteroid would be a method of last resort, it said.

A U.N. "action team" for dealing with near-Earth objects (NEOs) proposed setting up an International Asteroid Warning Network, plus advisory groups on mounting space missions to handle threats and planning for an impact disaster.

Timothy Spahr, director of the Minor Planet Center (MPC) at the Smithsonian Astrophysical Observatory which collects asteroid data, called for "rapid all-sky search capacity" using a space-based infrared survey to detect objects much faster than now.

The U.S. and European space agencies, NASA and ESA, warned that man should also prepare for impacts that are unavoidable - such as having procedures in place for wide-scale evacuations.

Detlef Koschny, responsible for near-earth object activity at the ESA's Space Situational Awareness program, said separately that it was now possible to determine possible impact zones with just a few hours' notice.

He cited the example of an object that hit the Sudan desert in 2008. It was spotted only 20 hours before it hit and the initial estimated impact zone of 2,000 km was narrowed down to an area of the desert within a few hours.

"In a similar case in the future, civil authorities would be able to tell the population in the narrowed-down area to stay away from windows, glass or other structures and stay indoors," he said in emailed comments to Reuters.

ESA experts in Darmstadt, Germany [3], plan to set up a survey to monitor the night sky using automated telescopes capable of spotting objects before they enter the atmosphere, he added.

"NOT OUT OF STAR TREK"

In California, scientists are working on a system to harness the power of the sun and convert it into laser beams that can destroy, evaporate or change the course of asteroids.

"This system is not some far-out idea from Star Trek," said Gary B. Hughes, a researcher and professor from California Polytechnic State University, San Luis Obispo.

"All the components of this system pretty much exist today. Maybe not quite at the scale that we'd need - scaling up would be the challenge - but the basic elements are all there and ready to go."

A University of Hawaii team of astronomers is also developing a system with small telescopes called ATLAS that would identify dangerous asteroids before their final plunge to Earth.

The team predicts the system will offer a one-week warning for a 50-yard (45-metre) diameter asteroid known as a "city killer" and three weeks for a 150

yard (137 meter)-diameter "county killer."

"That's enough time to evacuate the area of people, take measures to protect buildings and other infrastructure, and be alert to a tsunami danger generated by ocean impacts," said astronomer John Tonry.

Russian experts said, however, that constructing an early warning system would hardly be worth the money as such events are so rare - the last known meteorite strike on such a scale in Russia was reported in 1908.

One Russian expert estimated the cost of such a system would be $2 billion. Others put it higher.

"Also, spotting is one thing, but preventing impact is yet another thing," Igor Marinin, editor of a space journal published by Russian space agency Roscosmos, told Reuters.

Referring to the injury toll of almost 1,200 after Friday's meteor explosion, most of them cut by glass, he said: "Compared to the number of victims of car accidents or cancer every year, this affected relatively few people."

Back in Russia, some people are simply trusting in fate.

Konstantin Tsybko, a legislator from the city of Chelyabinsk in the Ural mountain region, said on Monday: "Chelyabinsk residents may feel safe because nothing like this will happen in the next few hundred years."

"This is the first town in the history of our civilization to come under a space attack, survive this attack, and survive it successfully," he said.

(Additional reporting by Victoria Bryan in Frankfurt, Irene Klotz in Miami and Sonia Elks in Moscow; Writing by Michael Shields and Timothy Heritage; Editing by Jason Webb)

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