The Economist

Stopping asteroid strikes

Defenders of the Earth

The cosmic near-miss in February has boosted research on space rocks

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ON JUNE 24th NASA, America's space agency, announced it had discovered the 10,000th "Near Earth Object" (NEO), the rather dry name given to asteroids and comets that orbit the sun in the vicinity of Earth and which might, therefore, one day smash into it. Ten thousand potentially dangerous objects sounds a lot, but NASA reckons there could be ten times as many still waiting to be found.

A week earlier, on June 18th, the agency therefore launched a "Grand Challenge" intended to recruit and co-ordinate help from industry, academia and anyone else who is interested for a project to detect any asteroid that could threaten Earth. All ideas are welcome. NASA's bosses are also thinking of allocating extra time on the ground-based telescopes they control to the search for such threats. They have plans, too, to revive a mothballed space telescope called the Wide-field Infrared Survey Explorer to aid in the hunt. And Lori Garver, the agency's deputy administrator, has asked for the budget of a programme to find 90% of NEOs with a diameter above 140 metres (whose impact could devastate a small country) to be doubled. So far, NASA reckons it has a quarter of these in the bag, but finishing the job at the present rate of discovery will take decades.

Nor is this renewed effort all NASA's. The European Space Agency is chipping in, too. In May it opened a NEO Co-ordination Centre, to help scientists organise their work and share data. And the B612 Foundation, a charity which hopes to build and launch an asteroid-hunting space telescope called *Sentinel*, has also reported a substantial rise in donations.

The reason for all this activity is the events of February 15th, when an asteroid a mere 15-20 metres across exploded with the force of a medium-sized atom bomb over Chelyabinsk, in Russia, and another, much larger one buzzed Earth a few hours later. What had been regarded as the stuff of science-fiction novels suddenly became a clear and present danger—but one that, unlike

earthquakes, volcanic eruptions, tsunamis and hurricanes, might actually be prevented by timely human action.

NEOShield, a research project involving several European Union countries, as well as Russia and the United States, is looking at three main ways of diverting incoming asteroids. One is to use a "kinetic impactor"—in effect employing a heavy, fast-moving spacecraft as the cue ball in a game of interplanetary billiards. The second is a "gravity tractor". This is a spacecraft parked near an asteroid, so that its minute gravitational pull will slowly tug the rock into a safer orbit. And if an incoming object is particularly large, or is detected particularly late, the third course of action would be to blast it into a new orbit with nuclear weapons.

If all else fails, or if a threat is spotted too late to deflect, there is also the option of evacuation. In 2008, for example, a small asteroid was detected 20 hours before it hit Earth. The world's astronomers scrambled, and its likely point of impact was calculated with what turned out to be reasonable accuracy. It blew up over the Nubian Desert, in Sudan, and no one was injured. But this incident showed that a properly organised early-warning system might pay dividends if ground zero turned out to be a populated area.

John Tonry, of the University of Hawaii, hopes to provide one. He is working on an eight-telescope system called ATLAS (Asteroid Terrestrial-impact Last Alert System). It is designed to scan the whole sky twice a night, looking for fast-moving objects. Unlike most astronomers, Dr Tonry presumably hopes he will not find what he is looking for. But if he does, many people who would not otherwise have lived to tell the tale may thank him.

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