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Space rocks are natural space debris which could pose a threat to Earth. This artist's conception depicts the various types of space rocks which concern scientists. Image credit: Courtesy NASA/JPL-Caltech.

Stars, planets, nebulae and comets aren't the only space-dwellers to capture our imagination. Beyond the beautiful images we see of those objects, we also have to think about ... space debris.

Natural space debris - the kind generated by the universe itself (not manmade objects left to float in space, referred to as orbital space debris) - includes space rocks. Sometimes those rocks, which can breakaway from asteroids, reach the Earth's surface. If they're large-enough, they can create an "impact crater."

It's actually stunning how much space debris reaches Earth. Scientists report that our planet is hit with about 100 *tons* of natural space debris *every day*. Don Yeomans, who studies such things for NASA, tells us more:

Every day, Earth is pummeled by more than 100 tons of material that spewed off asteroids and comets. Fortunately the vast majority of this "spillover" is just dust and very small particles. We sometimes see these sand-sized particles brighten the sky, creating meteors, or shooting stars, as they burn up upon entry into Earth's atmosphere.

But it isn't just "small stuff" which hits the ground or the water:

Roughly once a day, a basketball-sized object strikes Earth's atmosphere and burns up. A few times each year, a fragment the size of a small car hits Earth's atmosphere. These larger fragments cause impressive fireballs as they burn through the atmosphere. Very rarely, sizable fragments survive their fiery passage through Earth's atmosphere and hit the surface, becoming meteorites. (See "Yeoman's Top Ten Asteroid Facts, #2.)

Scientists are often able to track larger bodies if their trajectories reach "near-Earth" territory. That's why people throughout the world knew that an asteroid - called "2012 DA 14" - was approaching Earth.

Expected to get as close as 17,200 miles above the surface of our planet - on the 15th of February, 2013 - this asteroid ("about half the size of a football field") was bigger than anything else that had ever come so close to Earth (since experts started surveying for such things in the 1990s).

However ... no one predicted that a meteor (about the size of a bus, with an estimated mass of 10,000 tons) would break through our atmosphere 20-30 miles above Earth - on the same day as the asteroid's visit - traveling at the estimated rate of 19 miles per second.

No one predicted that 32.5 seconds after atmospheric entry, that meteor would disintegrate in a spectacular explosion, releasing nearly 500 kilotons of energy (roughly equivalent to the power of 30 Hiroshima bombs).

No one knew because "near-Earth" tracking systems, currently in place, are not sophisticated-enough to detect natural space debris as "small" as 55 feet (17 meters).

Systems like Europe's proposed SSA program - with its various telescopes, radar and other "near-Earth" sensing

devices - would help to monitor what could become a threat to people on the ground. With such devices scanning earth's low-orbit, perhaps scientists would have been able to detect the meteorite which impacted Russia on the 15th of February, 2013.

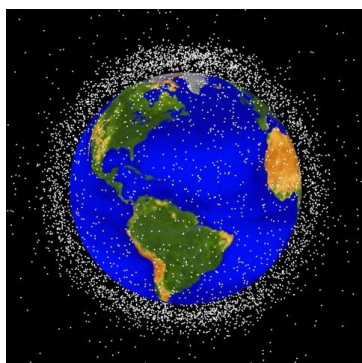
See Alignments to State and Common Core standards for this story online at:

<http://www.awesomestories.com/asset/AcademicAlignment/SPACE-ROCKS-VISIT-EARTH-Exploring-Space-Images-from-NASA>

See Learning Tasks for this story online at:

<http://www.awesomestories.com/asset/AcademicActivities/SPACE-ROCKS-VISIT-EARTH-Exploring-Space-Images-from-NASA>

Media Stream



Orbital Space Debris

Image from NASA/JPL (Jet Propulsion Laboratory) at CalTech.

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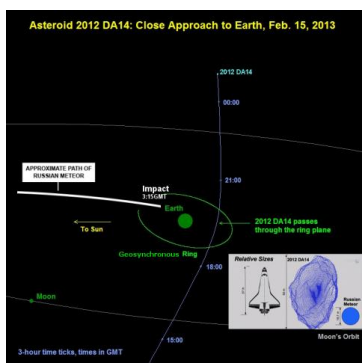


Space Surveillance and Tracking - Proposed

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Russian Meteor - Comparative Sizes

Image of relative sizes, online courtesy NASA.

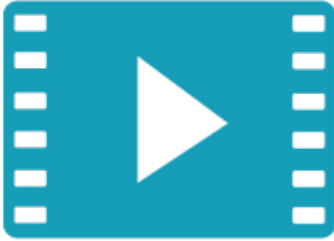
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SPACE ROCKS VISIT EARTH

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Meteors as Shooting Stars

Clip from Science@NASA, released 11 October 2012, online courtesy NASA.

View this asset at: <http://www.awesomestories.com/asset/view/Meteors-as-Shooting-Stars>



Asteroid "2012 DA 14"

Clip and quotation, above, from NASA/JPL (Jet Propulsion Laboratory) at CalTech.

View this asset at: <http://www.awesomestories.com/asset/view/Asteroid-2012-DA-14->



Asteroids - What Are They?

Video clip from NASA/JPL (Jet Propulsion Laboratory). Online, courtesy NASA web site.

View this asset at: <http://www.awesomestories.com/asset/view/Asteroids-What-Are-They->



Asteroid 2012 DA 14 - Animated Trajectory

Video compilation by NASA/JPL (at CalTech). Online, courtesy NASA web site.

View this asset at:

<http://www.awesomestories.com/asset/view/Asteroid-2012-DA-14-Animated-Trajectory>

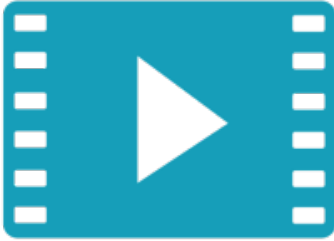


Asteroid 2012 DA 14 - Closest Approach to Earth

Images courtesy of Gingin Observatory/Tonello - video online courtesy NASA/JPL.

View this asset at:

<http://www.awesomestories.com/asset/view/Asteroid-2012-DA-14-Closest-Approach-to-Earth>



NASA's Predictions - What's Up for February

NASA/JPL video, online courtesy NASA/JPL.

View this asset at:

<http://www.awesomestories.com/asset/view/NASA-s-Predictions-What-s-Up-for-February>



Russian Meteor - Before and During Disintegration

Video images from Meteosat-9, a weather satellite. Online, courtesy ESA (European Space Agency).

The ESA provides more information about this satellite and the images it captured on February 15, 2013:

A joint venture of the European Space Agency and the European Organization for the Exploitation of Meteorological Satellites, Meteosat-9 was launched in 2005 to keep watch on Earth's weather from space. The satellite also took video of the fireball.

View this asset at:

<http://www.awesomestories.com/asset/view/Russian-Meteor-Before-and-During-Disintegration>