

## Impact Hazard Communication Risk Study: 2007 VK184

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### Overview

The 130-meter sized 2007 VK 184 was discovered in early November 2007 by the NASA-funded Catalina Sky Survey (CSS) at the University of Arizona.

According to NASA, 2007 VK 184 was known to pose “the most significant risk of Earth impact over the next 100 years” with a rating of 1 in the Torino Scale, and a 1-in-1800 chance of impact in June 2048 with up to four potential impacts. Analysis was based on 101 observations that took place between 12 Nov 2007 and 11 Jan 2008,<sup>1</sup> when the asteroid moved beyond view.

It was sighted nearly six years later in March 2014 by Dr. David Tholen of the University of Hawaii who provided the new tracking data to the Minor Planet Center. NASA JPL’s “Sentry” system retrieved the observations and issued a when a new impact hazard assessment which concluded that no closer encounters are predicted for the foreseeable future. Given these observations, the NEO Program Office removed it from the Impact Risk Page.

### Coverage

Media coverage of 2007 VK 184 focused on the initial discovery of the object in late 2007/ early 2008 and then on its demotion from a viable threat earlier this year. The object was mentioned in the intervening years in articles covering other objects, as one of few that represented non-negligible threats.

#### *Discovery*

On 30 December 2007 an Australian newspaper, The Age, reported the discovery in “Space rock on way, but don't panic yet” by Daniel Dasey.

(<http://www.theage.com.au/news/national/space-rock-on-way-but-dont-panic-yet/2007/12/29/1198778767701.html>)

- The asteroid has a “faint chance of ploughing into the Earth,” having “earned a rare hazard rating of ‘one’ on the Torino scale, the international barometer of space object impact risk.”
- “While asteroid experts last week warned of the tremendous damage such a collision would cause, they were hopeful the risk of impact would diminish as more was discovered about VK184's path.” Australia-based astronomer Gordon Garradd is quoted on this point.
- “NASA's Near Earth Object Program website says VK184 is travelling at 19 kilometres a second. It has a 1-in-3030 chance of hitting the planet in 2048. The object's Torino scale rating of one (out of a possible 10) signifies it has a tiny chance of collision with Earth and that there is no cause for public concern.”

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<sup>1</sup> See <http://web.archive.org/web/20131017014439/http://neo.jpl.nasa.gov/risk/2007vk184.html> for an archive of the specifications on the NASA JPL website.

- "If the object struck Earth it would be up to three times worse than the asteroid that hit Russia in 1908."

Also on 30 December 2007, an Indian portal, One India, quoted The Age's report in "Space rock may strike Earth in 2048." (<http://news.oneindia.in/2007/12/30/space-rock-may-strike-earth-in-2048-1198992699.html>)

On 2 January 2008, Josh Hill posted on a blog of the Daily Galaxy (a science news website) an item entitled "Near-Earth-Object Impact Risk Weighed."

([http://www.dailygalaxy.com/my\\_weblog/2008/01/feasible-impact.html](http://www.dailygalaxy.com/my_weblog/2008/01/feasible-impact.html))

- "Scientists have recently discovered one such asteroid that while low on the damage scale (low being a relative term considering the size of our planet) is currently high on the risk meter."
- "What's interesting though is that it has earned itself a rating of 1 on the Torino scale."
- "NASA believes that 2007 VK184 will eventually be retracted to a warning level of 0, when more information is known. This will take time though, with further observations providing more detailed information on the asteroids [sic] trajectory, and Earth's likelihood of intersecting with said trajectory."
- "By way of describing what could happen, if the asteroid were to impact Earth, it would be greater than the 1908 asteroid that hit Russia."

#### *References in other coverage*

Motivated by the fly-by of 2009 DD45, on 6 March 2009, The New York Times opinion page posted a set of commentaries from astronomers and other NEO professionals under the title of "The Lure of Rocks from Outer Space."

([http://roomfordebate.blogs.nytimes.com/2009/03/06/the-lure-of-rocks-from-outer-space/?\\_php=true&\\_type=blogs&\\_r=0](http://roomfordebate.blogs.nytimes.com/2009/03/06/the-lure-of-rocks-from-outer-space/?_php=true&_type=blogs&_r=0))

- In his contribution, "The Torino Scale Shows We're Safe," NASA NEOO's Donald Yeomans mentions 2007 VK 184: "Of the 260 objects listed on the table, only one object — 2007 VK184 — has a score of 1, which is defined as representing no unusual level of danger, where 'the chance of collision is extremely unlikely with no cause for public attention or public concern.' The rest have a score of zero."

Prompted by a cosmic impact on Jupiter, on 28 July 2009, Space.com posted a story on the likelihood of impact on Earth. "Could Earth Be Hit, Like Jupiter Just Was?" was written by Charles Choi. (<http://www.space.com/7062-earth-hit-jupiter.html>)

- 2007 VK 184 is the only one of all tracked NEOs that "poses any significant chance of hitting the Earth."
- "If this roughly 425-foot-wide (130 meters) asteroid hit our planet, it would strike with an energy of roughly 150 million tons of TNT, or more than 10,000 times that of the atom bomb dropped on Hiroshima."
- "Roughly 100 telescopic observations made so far suggest that 2007 VK184 has a 1-in-2,940 chance of hitting Earth 40 to 50 years from now. However, if the past is any guide,

further observations to refine computations of its orbit very likely will downgrade its probability of hitting Earth to virtually nothing, [Donald] Yeomans said."

On 12 December 2012, International Business Times posted "Asteroid Toutatis Passes Close By, But It's Not Riskiest Threat To Earth." (<http://www.ibtimes.com/asteroid-toutatis-passes-close-its-not-riskiest-threat-earth-934455>)

- Roxanne Palmer mentions both 2007 VK184 and 2011 AG5 as the only asteroids with a Torino Scale score above 0: "2007 VK184, which is 426 feet wide, has just a 1 in 1,820 chance of colliding with us in June 2048."

On 7 August 2013, Smithsonian Magazine posted "These 1,397 Asteroids Are Pretty Darn Close to Earth, But NASA's Not Worried." (<http://www.smithsonianmag.com/smart-news/these-1397-asteroids-are-pretty-darn-close-to-earth-but-nasas-not-worried-25002544/>)

- Rachel Nuwer mentions 2007 VK184, which "registers at even the lowest reading on the Torino Impact Hazard Scale, at a measly 1." While "2007 VK184 'merits careful monitoring,' according to NASA...that's [sic] doesn't faze the agency's scientists."

On 18 October 2013, British political and cultural magazine, "New Statesman" published "Hurrah, we've found an asteroid that might kill us all in 2032." (<http://www.newstatesman.com/sci-tech/2013/10/hurrah-weve-found-asteroid-might-kill-us-all-2032>)

- In the context of the discovery of 2013 TV135, Ian Steadman mentions 2007 VK 184, "the other asteroid ranked at a danger level of one out of ten," and references the NASA NEO Sentry Risk Table.
- "2007 VK184 has a better shot of of [sic] an impact, at one in 1,750, but those are still, quite literally, astronomical odds."

*No longer a threat*

On 2 April 2014, NASA/ JPL NEOO posted a news item entitled "Asteroid 2007 VK184 Eliminated as Impact Risk to Earth." (<http://neo.jpl.nasa.gov/news/news183.html>) After discussing its initial discovery, the article focuses on how the observations on March of 2014 led to the removal of the asteroid from the Impact Risk Page.

Other coverage of this announcement included:

- "Asteroid 2007 Vk184 Crossed Out as Potential Menace for the Planet" (7 April 2014) NEO Shield ([http://www.neoshield.net/en/news-and-events/news/asteroid\\_eliminated\\_as\\_potential\\_menace.htm](http://www.neoshield.net/en/news-and-events/news/asteroid_eliminated_as_potential_menace.htm))
- "Asteroid 2007 VK184- Eliminated As An Impact Risk To Earth" Prx.org (<http://www.prx.org/pieces/120836-51-asteroid-2007-vk184-eliminated-as-an-impact-ri>)

**Analysis**

Even when it was discovered in 2007, few media sources covered the story of 2007 VK 2814. Aside from a couple of blog items and community forum posts asking about the possibility of impact, it seems this case did not elicit as much public attention as others have.

On a positive note, the references that are still discoverable online did quote NASA and other astronomers and accurately portrayed the likelihood that the threat level assigned to the asteroid would be reduced once more measurements could be made. However, it seems most were quoting the NASA NEOO risk table directly (or other sources that interpreted this information) as there seems to not have been narrative articles focused on 2007 VK 184 from official sources (such as NASA, the Minor Planet Center, etc.)

The few articles listed here suggest two persisting challenges when communicating impact risk. The first of these is probability of impact. The stories sampled here (and others, including blog posts) stated probabilities ranging from 1-in-1820 to 1-in-3030. This happened even when most referenced a NASA source. It is not clear what other sources there were for the probability of impact. While the difference is negligible, this suggests a lack of understanding of this piece of information. A second discrepancy, although not as prevalent, was evident in the examples used to explain the extent of potential damage. At least one of the stories sampled here referred to the amount of energy released and compared it to many times that of an atomic bomb; others multiplied the effects of the 1908 Tunguska incident.

This case may offer an opportunity to examine how probabilities and potential impacts are communicated in the future. Other findings may be derived from a larger sample that includes print sources.