

# 2012 DA14

## Summary:

Discovered by amateur La Sagra Observatory (Spain) on Feb 23, 2012. At time of discovery it had a 0% chance of impacting Earth during its next flyby on Feb 15, 2013, but a 0.033% of impacting sometime during 2026-69. As usual, conspiracy websites started predicting an impact during its 2013 flyby.

At the time of discovery its size was estimated at 28-75m and its orbit was of the Apollo type. The flyby of 2013 was estimated to be at a distance of no less than ~3.5 Earth Radii (as reported by JPL).

| Parameter  | Epoch       | Aphelion (Q) | Perihelion (q) | Semi-major axis (a) | Eccentricity (e) | Period (p) | Inclination (i)  | Longitude ascending node ( $\Omega$ ) | Mean anomaly (M) | Argument of perihelion ( $\omega$ ) |
|------------|-------------|--------------|----------------|---------------------|------------------|------------|------------------|---------------------------------------|------------------|-------------------------------------|
| Units      |             | AU           |                |                     |                  | (days)     | ( $^{\circ}$ )   |                                       |                  |                                     |
| Pre-flyby  | 2012-Sep-30 | 1.110        | 0.8935         | 1.001               | 0.1081           | 366.2      | 10.33 $^{\circ}$ | 147.2 $^{\circ}$                      | 299.9 $^{\circ}$ | 271.0 $^{\circ}$                    |
| Post-flyby | 2013-Apr-18 | 0.9917       | 0.8289         | 0.9103              | 0.0894           | 317.2      | 11.60 $^{\circ}$ | 146.9 $^{\circ}$                      | 231.0 $^{\circ}$ | 195.5 $^{\circ}$                    |

# 2012 DA14 Flyby of 2013

## **Headlines (note sensationalist language):**

- [Discovery.com](#): How to Watch Asteroid 2012 DA14 Zoom Past Earth
- [TheWatchers.adorraeli.com](#): Near-Earth asteroid 2012 DA14 to make extremely close approach in February 2013
- [Sott.net](#): Newly-Discovered Asteroid 2012 DA14 could hit Earth in February 2013
- [Esa.int](#): Near-miss asteroid will return next year
- [DailyMail.co.uk](#): Asteroid that could do as much damage as 1,000 atomic bombs will whizz past today (and could knock out your TV signal)
- [NationalGeographic.com](#): Approaching Asteroid May Get Close Enough to Smash Satellites
- [Aljazeera.com](#): Asteroid 2012 DA14 won't hit us... but what if it did?
- [HuffingtonPost.com](#): Asteroid 2012 DA14 Won't Hit Earth, NASA Says, But Don't Rule Out Satellites
- [Telegraph.co.uk](#): Asteroid 2012 DA14 brushes by Earth
- [TheGuardian.co.uk](#): Asteroid 2012 DA14 fly-by: No chance of impact but a close call
- [BBC.co.uk](#): Asteroid 2012 DA14 in record-breaking Earth pass
- [BigThink.com](#): Asteroid 2012 DA14 Won't Kill Us (Yet), But Ought to Scare Us Into Action
- [Science20.com](#): Doomsday Prophets Excited About Asteroid 2012 DA14, First Apocalypse Of 2013

# 2012 DA14 Flyby of 2013

Although the text of the stories was factually correct and many experts were quoted minimising the threat of future impacts and downplaying the threat to Earth or even satellites during the 2013 flyby, most news outlets chose to use sensationalist(ish) headlines.

JPL published a news item on March 6, 2012 with all then-known information about the asteroid and a graph of the path the asteroid would follow during its 2013 flyby, clearly showing it would pass within the geosynchronous satellite orbit but well away from Earth.

The Minor Planet Center published a blog post on March 12, 2012 titled *Clearing Up the FUD\* on 2012 DA14* in response to the “impact-mania” on the internet, and even on TV news.

\*FUD: Fear, Uncertainty and Doubt

# 2012 DA14 – Personal Experience

I was interviewed a number of times during the weeks leading up to the 2013 flyby. Many interviews went something like this:

Journalist: Is 2012 DA14 going to hit Earth on Feb 15, 2013?

Me: No.

Journalist: Are you sure?

Me: Yes.

Journalist: Do other astronomers agree with you?

Me: All asteroid astronomers agree with the predictions of the MPC, yes.

Journalist: What if there's something you haven't accounted for or you've made a mistake?

Me: It's unlikely that everyone performing these calculations would've made the same mistakes and overlooked the same problems such that they all get the same answer.

Journalist: But what if the asteroid were to change course at the last moment? Have you taken into account that could happen?

Me: The asteroid is on an elliptical orbit dictated by the Sun's gravity, obeying the laws of orbital motion. It isn't going to veer off course at the last moment; there is no way for it to do that.

Journalist: Are astronomers sure of this?

Me: [sigh] Yes, we are.

# Chelyabinsk

## Summary:

On Feb. 19, 2013, shortly after 09:00 local time, a ~17m asteroid entered the atmosphere over the Southern Urals in Russia and exploded at a height of ~29km near the city of Chelyabinsk. The resulting shockwave broke windows and collapsed some structures, which caused injuries to ~1,200 people. Fragments of the asteroid, most no larger than 1cm, rained upon the area surrounding Lake Chebarkul and were quickly collected by local residents. A 6m hole in the ice cover of the lake was found and a 1.5m meteorite piece weighing 654kg was recovered in October from the lake bottom.

Unique to this meteor was the fact it was captured on dozens, if not hundreds, of security and car dashboard-mounted cameras, which allowed the asteroid's trajectory to be estimated.

# Chelyabinsk – Official Statements

## **JPL news item released+updated on Feb 15:**

### *Russia Meteor Not Linked to Asteroid Flyby*

- Size estimate: 15m (updated to 17m)
- Mass estimate: 7,000 ton (updated to 10,000)
- Energy release estimate: 30 kT (updated to “nearly 500 kT”)

*"We would expect an event of this magnitude to occur once every 100 years on average," said Paul Chodas of NASA's Near-Earth Object Program Office at the Jet Propulsion Laboratory in Pasadena, Calif. "When you have a fireball of this size we would expect a large number of meteorites to reach the surface and in this case there were probably some large ones."*

*The trajectory of the Russia meteor was significantly different than the trajectory of the asteroid 2012 DA14, which hours later made its flyby of Earth, making it a completely unrelated object. The Russia meteor is the largest reported since 1908, when a meteor hit Tunguska, Siberia.*

# Chelyabinsk – Headlines

## **Most were something like this:**

*Exploding Meteor Injures Hundreds in Russia*

## **Exceptions:**

- FoxNews.com: *About 1,100 injured as meteorite hits Russia with force of atomic bomb*
- Independent.co.uk: *A cosmic coincidence, but the Chelyabinsk meteor and 2012 DA14 are reminders of the deadly power of small asteroids*
- USAToday.com: *NASA: Largest meteor in more than 100 years*

# Chelyabinsk – News Stories

## **Most:**

Majority of stories start off with the human narrative of the event, transition to the damages, and end with some science, quoting the first scientist the author could get a hold of. Science is correct in general and the facts are presented without hype. The story is told without sensationalism or fear mongering. Most stories explain that this meteor had nothing to do with the close flyby of asteroid 2012 DA14 that would take place a few hours later.

## **Exceptions:**

Vladimir Zhirinovsky, the leader of the ultra-nationalist Liberal Democratic Party, was quoted as saying “Those are not meteors, it is Americans testing their new weapon” by DailyMail.co.uk, APA.az, BBC.co.uk, and others.