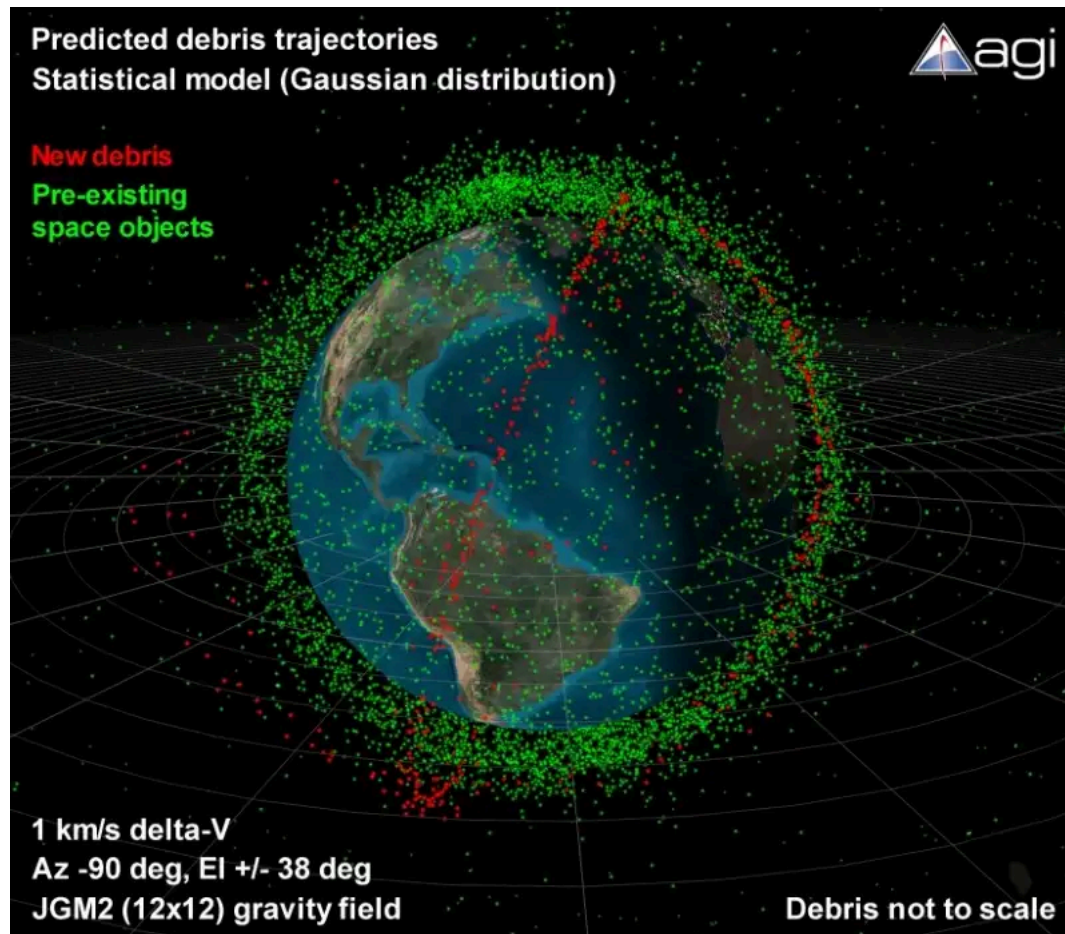


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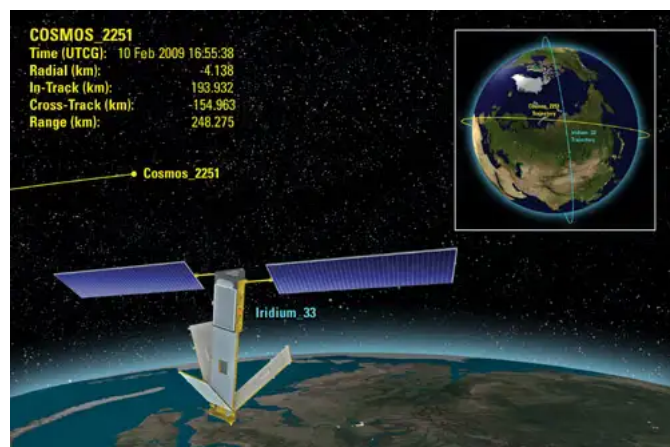
Satellite collision 'more powerful than China's ASAT test'

By Paul Marks

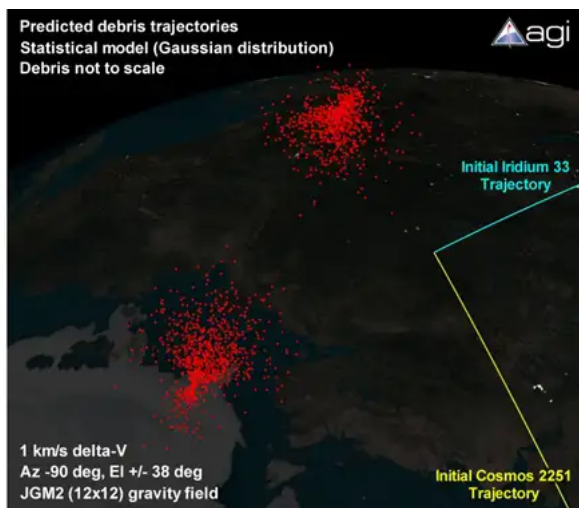
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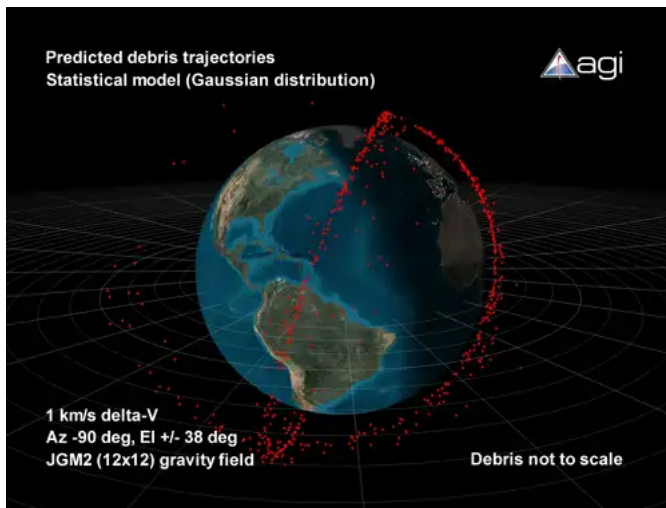
▲ The newly created debris (red) will join existing debris (green) in low-Earth orbit (Illustration: Analytical Graphics, Inc, www.agi.com)



▲ The two satellites were travelling on nearly perpendicular paths (Illustration: Analytical Graphics, Inc, www.agi.com)



▲ The crash may have created two clouds of debris that would continue to follow the basic trajectories of their parent satellites (Illustration: Analytical G



▲ The debris will spread out as these clouds orbit the Earth (Illustration: Analytical Graphics, Inc, www.agi.com)

Space weapons are dangerous – but out-of-control, defunct satellites can do just as much damage, if not more.

So says a leading space scientist who has calculated that Tuesday's [collision](#) [/article/dn16584-satellite-collision-creates-copious-spac](#) 2251 spacecraft expended a great deal more destructive energy than China's infamous [anti-satellite missile test](#) [/article/dn10999-anti-](#)

In 2003, space debris expert Hugh Lewis and colleagues at the [University of Southampton](#) [http://www.southampton.ac.uk/ses](#) in the UK break-up owing to a collision with just 1 kilogram of space junk (*Acta Astronautica*, doi:10.1016/S0094-5765(02)00290-4).

Now, based on initial analysis of Cosmos 2251's orbital data, mass and velocity, he has estimated some of the dynamics involved in last week's collision. To be completely obliterated, a spacecraft must suffer a direct hit with an energy of 40 joules for every gram of its mass.

In China's anti-satellite (ASAT) test, a defunct weather satellite called Fengyun-1C was destroyed by a missile that imparted an estimated 10,000 joules per gram of its mass (known for certain.)

But the Iridium and Cosmos satellites collided at 42,120 kilometres per hour, Lewis calculates, imparting 50,000 joules per gram of their mass. **10,000 tennis balls**

The resulting "unprecedented" debris field, says Lewis, is still being analysed by space agencies. But he expects it to create an extra 10,000 tonnes of debris, a number created in the ASAT test.

"There was more energy here than in the Chinese ASAT test so it's possible we'll see more debris," Lewis says.

Nicholas Johnson, chief scientist for orbital debris at NASA's Johnson Space Center in Houston, Texas, says the exact amount of debris generated is still being estimated.

"If they collided main body to main body, that would create the maximum amount of debris," Johnson told **New Scientist**. "It is possible about the different ways that two cars can collide and how that affects the extent of damage."

Further collisions

Worryingly, the new debris will raise the collision risk for other Iridium satellites. That's because the 65 remaining satellites in the Iridium constellation. "The debris cloud that is forming will create a torus [doughnut] of high-density debris that Iridium satellites will now need to pass through." In his 2003 study, Lewis estimated that the further collision risk to other Iridium satellites over the month following a collision rose by a factor of 1 in millions.

"So whilst it's too early to say for sure, the risk to other Iridium satellites now looks like it's going to be significantly higher than the background risk."

'Unfortunate but inevitable'

Observers expected a collision sooner or later, given the number of dead and defunct satellites beyond anyone's control in various orbits. satellites – the rest are dead craft, spent rocket stages and debris.

"It was unfortunate but inevitable", says Crowther, the UK delegate on the [Inter-Agency Space Debris Coordinating Committee](http://www.intersatellite.org/)  <http://www.intersatellite.org/> operators to deploy measures to mitigate debris creation.

Such measures include ensuring end-of-life craft have the capacity to either be de-orbited – burned up in the atmosphere – or have fuel reserves to maintain orbit for a long time.

'Critical infrastructure'

"The concern now is the orbital lifetime of the Iridium and Cosmos 2251 debris. It will take many tens of years to decay," Crowther says.

"Given we rely so much on space-based assets for communications, navigation and Earth observation as part of our critical national infrastructure adds.

Lewis agrees: "I think now this has happened, it's much more likely that governments are going to take this issue seriously."

