Consequences of the Collision of Iridium 33 and Cosmos 2251

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The first accidental hypervelocity collision of two intact satellites occurred on 10 February 2009 at an altitude of 790 km.

- The collision occurred in a region of high spatial density, i.e., high concentration of objects.


The U.S. Space Surveillance Network has tracked more than 1400 new debris in the orbital planes of the two spacecraft.

- Many more debris smaller than 10 cm have also been detected.
Simulation of Debris Clouds
Composite Debris Tracked by US SSN

Data as of 1 June 2009
Tracked Debris from Iridium 33

- **Total number of debris**: 430 (as of 1 June 2009)
• Total number of debris: 1009 (as of 1 June 2009)
Spread of Debris Orbital Planes
Differences in Debris Characteristics

- The debris from Iridium 33 and Cosmos 2251 exhibit markedly different area-to-mass distributions, probably due to the greater use of composite materials in Iridium 33.
Projected Debris Orbital Lifetimes

- Based upon standard solar cycles.
Summary

• The collision of Iridium 33 and Cosmos 2251 was the most severe accidental fragmentation on record.

• More than 1400 debris larger than 10 cm were produced.

• If solar activity returns to normal, half of the tracked debris will reenter within five years.
  
  – Only 35 cataloged debris had reentered by 1 June 2009

• Some debris from both satellites will remain in orbit through the end of the century.