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Summary of Recovered Reentry Debris

This page lists the major pieces of recovered debris from space hardware reentries over the years. If you are aware of recovered debris not appearing here, please e-mail a description of the debris, and provide references to supporting evidence, e.g., news articles, government reports, photographs, etc. We will add sufficiently corroborated events to our list.

The first forty-four items listed below were adapted from: Senate Committee on Aeronautical and Space Sciences, "Convention on International Liability for Damage Caused by Space Objects: Analysis and Background Data," U.S. Government Printing Office, May, 1972. Item 45 is adapted from: Perry, Robert, "A History of Satellite Reconnaissance Volume IIIA - Gambit," January 1974 (NRO Approved for Release 17 September 2011).

Event	Remarks
1. An unknown number of pieces of debris from a space object were reported to have fallen in South Africa in September 1960.	May have resulted from unsuccessful attempt to launch an Atlas/Able.
2. An unknown number of rocket motor and propellant tank pieces were reported to have fallen in Cuba in November 1960.	Believed to be sub-orbital debris from failure of a Thor booster used to launch the Transit-IIIA satellite on 30 November 1960.
3. In March and June 1962 eleven pieces of stainless steel skin (average mass 2.7 kg) and one sustainer rocket engine spherical pressure bottle (0.56 m diameter, mass 21.7 kg) were found in Brazil and South Africa.	Identified as pieces from Atlas booster for Mercury MA-6 mission, launched 20 February 1962.
4. In July 1962 a spherical pressure vessel about 0.4 m in diameter was found near Porto Alegre, Brazil.	Part of a U.S. Air Force test satellite.
5. In September 1962 a cylindrical metal piece (diameter 0.15 m, mass 9.5 kg) fell on a street intersection in Manitowoc, Wisconsin.	Identified as part of Soviet Sputnik IV, launched 15 May 1960.
6. In October 1962 three pieces of stainless steel skin (average size 0.9 x 1.2 m) and one piece of aluminum with steel nut, bolt, and washer attached (about 5 x 5 cm, mass 0.22 kg) were found in the Ivory Coast and Upper Volta.	Identified as pieces from Atlas booster for Mercury MA-8 mission, launched 3 October 1962.
7. In April and June 1963 two spherical pressure vessels were found near Broken Hill, New South Wales, Australia.	Believed to be from U.S. Agena rocket stage used to launch U.S. Air Force test satellites on 14 December 1962 and 7 January 1963. Both rocket stages reentered from orbit in January 1963.
8. In May 1963 a piece of stainless steel skin (0.42 m ² , mass 2.7 kg) was found near Concordia, Argentina.	Identified as part of the Atlas booster for Mercury MA-9 mission, launched 15 May 1963.

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| 9. | In May 1963 a piece 0.3 x 0.38 m was found about 200 km north of Pretoria, South Africa. | Believed to be part of a Soviet spacecraft. |
| 10. | In March 1964 a metal spherical pressure vessel (mass 11 kg) fell near Belem, Brazil. | Believed to be part of a DoD Agena rocket stage. |
| 11. | In March 1964 an undetermined number of fragments fell in British Columbia, Canada. | Believed to be of Soviet origin. |
| 12. | In May 1964 a charred piece of electronic equipment (mass 79 kg) was found near La Fria, Venezuela. | Identified as part of a DoD satellite launched 27 April 1964, which reentered 26 May 1964. |
| 13. | In December 1964 and January 1965 a metal sphere (diameter 0.84 m), an aluminum cylinder (4 x 1.5 m) and four fragments of a rocket nozzle were found in northern Argentina. | Identified as pieces from a DoD Titan III booster stage, possibly from a Trans-stage launched 10 December 1964, which reentered 13 December 1964. |
| 14. | In January 1965 a piece of woven asbestos sheet was found in Malawi. | Identity not confirmed. |
| 15. | In early 1965 an object having the appearance of a space fragment was reported washed ashore on Abaco Island in the Bahamas. | Possibly from the Atlas-Mariner I booster which was destroyed by the range safety officer shortly after launch on 22 July 1962, and landed in the designated ocean impact area. |
| 16. | In June 1965 three pieces believed to be space fragments were found in the Madiya Pradesh and Kota districts of India. | Believed to be pieces from a DoD Titan IIIC development test launched 18 June 1965. |
| 17. | In September 1965 a titanium sphere (diameter 0.5 m), called the Merkanooka ball, was found in Australia. | Identified as a tank used for drinking water in Gemini V spacecraft launched 21 August 1965, components of which reentered in late August 1965. |
| 18. | In December 1965 three metal spheres fell near Seville, Spain. | Believed to have been parts from Soviet Luna 8 rocket stage, launched 3 December 1965, parts of which reentered on 5 and 6 December 1965. |
| 19. | In March 1966 a piece of plastic shroud (about 1.2 x 1.5 m) was found in Australia. | Identified as part from Echo II, launched 25 January 1964, one part of which reentered 23 February 1966. |
| 20. | In April 1966 a helium pressure sphere (diameter 1 m, mass 113.3 kg) was found by crew of Brazilian fishing boat at sea off coast of Brazil. | Identified as part of S-IVB stage of Saturn booster sub-orbital test that was launched 26 February 1966, and landed in the designated ocean impact area. |
| 21. | In May 1966 a piece of lightweight metal (0.5 x | Identified as parts of S- |

- 0.3 m), an oval-shaped metal piece (0.4 x 0.2 m), a black beehive-shaped piece (10 x 12 cm), and four pieces of fragile wire were found in the Rio Negro District of Brazil.
- IVB stage of Saturn development test (SA-5) launched 29 January 1964, which reentered 30 April 1966.
22. In June 1966 a fragment believed to have returned from space was found in Colombia.
- Identified as part of Atlas booster used to launch Agena target vehicle either for Gemini 8 or Gemini 9A (launched 16 March and 1 June 1966). Probably from Gemini 9A target vehicle booster.
23. In July 1966 a piece of lightweight metal (4.7 x 2.6 m) and a piece of aluminum (3.3 x 5.1 m) were found in Peru and Zambia, respectively. In August and November 1966 a truncated cone metal piece (5.4 kg) and a smaller piece were found in Swaziland.
- Identified as pieces from S-IVB stage of Apollo-Saturn development test (AS-203) launched 5 July 1966.
24. In October 1966 a titanium spherical pressure vessel (diameter 0.37 m, mass 13.6 kg) was found near Tomahawk, Wisconsin.
- Identified as Soviet in origin.
25. In January 1967 a metal sphere (diameter 0.58 m, mass 15.8 kg) was found in Peru.
- Identified as part of Delta booster used to launch Biosatellite-1 on 14 December 1966.
26. In February 1967 two spherical pressure vessels were found in Mexico. One sphere was titanium with a diameter of 0.6 m and a mass of 30 kg; the other sphere had a diameter of 0.36 m.
- Believed to be Parts from the upper stage or experiments associated with a U.S. Air Force Titan IIIC.
27. In July 1967 a titanium sphere (diameter 0.6 m), a flat metal piece with bolts, and a titanium sphere (circumference 0.98 m) were found in Mexico.
- Identified as parts from Agena target vehicle launched 11 November 1966, in connection with Gemini XII mission.
28. In September 1967 a spherical pressure vessel (diameter 0.6 m) was found in Saudi Arabia.
- Identified as part of Delta booster used to launch Explorer 35 on 19 July 1967.
29. In December 1967 a metal piece (1 x 1.8 m, mass 10 kg) was found in Finland.
- Believed to be part of a Soviet vehicle.
30. In February 1968 a metal fragment (1 x 3 m, mass 57.5 kg) and in June 1970 a metal sphere (diameter 0.9 m) were found in Colombia.
- Identified as parts of lunar module descent stage used in Apollo V test mission, launched 22 January 1968.
31. In March 1968 a triangular cone-shaped piece (0.3 x 1.2 m, mass 10-15 kg) a metal disc (10-12 cm in diameter), and a small oval-shaped metal piece fell in the Gandaki Zone of Nepal.
- Believed to be of Soviet origin.
32. In April 1968 a metal sphere (diameter 0.6 m, mass 29 kg) was found near Mudgee, Australia.
- Identified as pressure vessel from Delta booster used to launch Biosatellite-II on 7 September 1967.
33. In April 1968 several pieces of plastic material in panel sections (0.23 x 0.23 m) were found in Angola.
- Identified as pieces of insulation from 3rd stage of Apollo VI booster, launched 4

- April 1968.
34. In August 1968 a metal sphere (diameter 0.71 m, mass 20 kg) was found in eastern Colombia. Believed to be of U.S. origin.
 35. In September 1968 a spherical pressure vessel (diameter 0.37 m, mass 14.5 kg) was found near Nome, Alaska. Identified as Soviet in origin.
 36. In June 1969 numerous fragments (about 10 kg each) fell on a Japanese freighter off De Kastro Fort U.S.S.R. Pieces believed to be of Soviet origin.
 37. In July 1969 a small fragment (about 30 cm long) fell on the deck of a German ship in the Atlantic Ocean. Other pieces fell in the water near the ship. Identified as debris from the first stage of the Saturn booster used to launch Apollo 11 on 16 July 1969.
 38. In September 1969 a metal pressure sphere (diameter 0.38 m, mass 13.8 kg) was found near Ostersound, Sweden. Believed to be of Soviet origin.
 39. In December 1969 a cylindrical piece (about 1 m in diameter) washed ashore near Marie Galante, Martinique. Believed to be from the shroud of an Atlas booster that had been jettisoned in the designated ocean impact area.
 40. In April 1970 a metal fragment was found in the West Cape area of South Africa. Believed to be part of Soviet spacecraft.
 41. In July 1970 a spherical pressure vessel was found near Lai, Chad. Probably part of a Soviet vehicle.
 42. In August 1970 five oblong pieces of steel (0.6-0.8 m long, mass about 70 kg each) and one flat steel plate (1.2 x 1.2 m, mass 290 kg) fell in Kansas, Texas, and Oklahoma. Identified as parts from Soviet Cosmos 316, launched 23 December 1969, which reentered 28 August 1970.
 43. In March and April 1971 three spherical pressure vessels were found in North Dakota. Determined to be of U.S. origin.
 44. In April 1972 four titanium pressure spheres (diameter 0.38 m, mass 13.6 kg each) were found in an area near Ashburton, New Zealand. A fifth sphere was found six years later near Eifelton, New Zealand. Probably from Soviet Cosmos 482, launched 31 March 1972, part of which reentered 2 April 1972.
 45. In May 1972 numerous fragments fell on farmland about 75 miles north of London, England. The debris included a spherical titanium pressure vessel (diameter 0.3 m), circuit boards, and glass pieces forming a pie-shaped wedge (0.25 m edge). Identified as debris from Gambit-3 No. 35 (Gambit 4335), launched 20 May 1972, which reentered the same day due to mission failure.
 46. In January 1978 numerous fragments fell in the Northwest Territories of Canada. The debris consisted largely of rods (2 x 10 cm, average mass 55 g), and cylinders (10 x 40 cm, mass 3.6 kg) constructed mostly from beryllium. Identified as debris from Soviet Cosmos 954, launched 18 September 1977, which reentered 24 January 1978.
 47. In July 1979 numerous tanks, spheres, heat exchangers, and other debris fell over southwestern Australia, including towns of Esperance, Balladonna, and Rawlinna, and extending into central Australia. Identified as debris from Skylab, launched 14 May 1973, which reentered 11 July 1979.
 48. In June 1988 a titanium pressure sphere (diameter 0.37 m) was found in region of Marble Bar, Australia. Probably from Soviet Foton 4, launched 14 April 1988, reentered 28 April 1988.

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| 49. In February 1991 numerous fragments fell on and around the town of Capitan Bermudez, Argentina. | Identified as debris from Soviet Salyut 7/Cosmos 1686, launched 19 April 1982, which reentered 7 February 1991. |
| 50. In December 1994 a metal plate (2.4 x 2.4 m, mass 20 kg) was found in Cosala, Mexico. | Probably from Russian Cosmos 2267, launched 5 November 1993, which reentered 28 December 1994. |
| 51. In January 1997 a steel propellant tank (1.7 x 2.7 m, mass 270 kg) landed near Georgetown, Texas. A titanium pressure sphere (diameter 0.58 m, mass 32 kg), and a composite combustion chamber (0.76 m long, average width 0.25 m) landed near Seguin, Texas. A lightweight fragment of charred woven material (10 x 13 cm) struck a woman in Turley, Oklahoma. She was not injured. | Identified as debris from 2nd stage of Delta II booster, used to launch Midcourse Space Experiment on 24 April 1996. Stage reentered 22 January 1997. |
| 52. In April 2000 a steel propellant tank (1.7 x 2.7 m, mass 270 kg), a titanium pressure sphere (diameter 0.58 m, mass 32 kg), and a composite combustion chamber (0.76 m long, average width 0.25 m) landed near Capetown, South Africa. | Identified as debris from 2nd stage of Delta II booster, used to launch GPS IIA-25 on 28 March 1996. Stage reentered 27 April 2000. |
| 53. In October 2000 a metal fragment (10 x 18 cm) was found near Wichita, Kansas. | Probably part of 4th-stage casing from Russian Proton booster, used to launch three Glonass navigation satellites on 13 October 2000. The casing reentered on 14 October 2000. |
| 54. In January 2001 a titanium rocket-motor casing (diameter 1.2 m, length 2 m, mass 70 kg) was found in Saudi Arabia, 240 km west of Riyadh. | Identified as debris from 3rd stage of Delta II booster used to launch GPS IIA-20 on 13 May 1993. Stage reentered 12 January 2001. |
| 55. In March 2002 a titanium pressure sphere (diameter ~1 m, mass 49 kg) landed in a home in Kasambya, Uganda. No damage or injuries were reported. | Identified as debris from 3rd stage of Ariane 3 booster used to launch GStar 1 and Telecom 1B on 8 May 1985. Stage reentered 27 March 2002. |
| 56. In August 2002 a large sphere (diameter ~0.5 m, mass ~10 kg) landed near the village of Manzau, Angola. | Probably debris from 3rd stage of Ariane 4 booster used to launch Atlantic Bird 2 satellite on 25 September 2001. Stage reentered 11 August 2002. |
| 57. In April 2003 a composite-overwrapped sphere landed on a farm near Mataquesquintla, Guatemala. | Probably debris from Centaur stage of Atlas IAS booster used to launch Intelsat 806 satellite on 28 February 1998. Stage reentered 27 April 2003. |
| 58. In January 2004 a titanium rocket-motor casing (diameter 1.2 m, length 2 m, mass 70 kg) was | Identified as debris from 3rd stage of Delta |

- found near San Roque in Argentina. II booster used to launch GPS IIA-23 on 26 October 1993. Stage reentered 20 January 2004.
59. In July 2004 a metal pressure sphere (diameter ~0.5 m, mass ~30 kg) landed near Cabeça da Vaca, Brazil. A metal fragment (length ~1 m) landed near Batalha, Brazil. Probably debris from 2nd stage of Delta II booster, used to launch Mars Exploration Rover B (Opportunity) on 8 July 2003. Stage reentered 25 July 2004.
60. In January 2005 a titanium rocket-motor casing (diameter ~1 m, length ~2 m) was found near Bangkok, Thailand. Identified as debris from 3rd stage of Delta II booster used to launch GPS IIR-6 on 10 November 2000. Stage reentered 13 January 2005.
61. In March 2008 a composite-overwrapped sphere (diameter ~0.5 m, mass ~10 kg) landed on a farm near Montividiu, Brazil. Identified as debris from Centaur stage of Atlas V booster used to launch WGS-2(F1) satellite on 10 October 2007. Stage reentered 22 March 2008.
62. In July 2008 a metal rocket-motor casing was found in Australia. Identified as debris from 3rd stage of Delta II booster used to launch INSAT-1D on 12 June 1990. Stage reentered 5 September 1990.
63. In February 2010 a steel propellant tank (1.7 x 2.7 m, mass 250 kg), and two titanium pressure spheres (diameter 0.6 m, mass 30 kg; diameter 0.4 m, mass 10 kg), landed in Mongolia. Identified as debris from 2nd stage of Delta II booster, launched on 25 September 2009. Stage reported to have reentered 19 February 2010.
64. In February 2011 several metal objects were found in Malawi. Probably debris from 3rd stage of GSLV booster used to launch INSAT-4CR on 2 September 2007. Stage reentered 7 February 2011.
65. In March 2011 a titanium rocket-motor casing (diameter ~1 m, length ~2 m) was found near Artigas, Uruguay. Identified as debris from 3rd stage of Delta II booster used to launch GPS IIR-10 on 21 December 2003. Stage reentered 3 March 2011.
66. In March 2011 a metallic sphere (diameter ~0.76 m, mass ~36 kg) was found near Baggs, Wyoming. Probably a helium pressure tank from 2nd stage of Zenit 3F booster used to launch Elektro-L satellite on 20 January 2011. Stage reentered 19 March 2011.
67. In February 2012 a metallic sphere (diameter ~0.7 m, mass ~30 kg) was found near Mata Roma, Brazil. Identified as a helium pressure tank from 3rd stage of Ariane 4 booster used to launch

Thaicom 3 and BSat
1a satellites on 16 April
1997. Stage
reentered 22
February 2012.

NOTICE: The materials about Upcoming Reentries are for informational purposes only and should not be used as a substitute for specific technical advice or opinions related to your particular facts and circumstances.

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