

Conjunction of the Fortnight (15 October 2024)

What Happened:

On 5 August 2024, an abandoned Russian SL-8 rocket body (RB) passed within ~30 m of the defunct Japanese payload (PL) Servis 1 at ~1,000 km resulting in a probability of collision of ~4%.

Conjunction Analysis Report

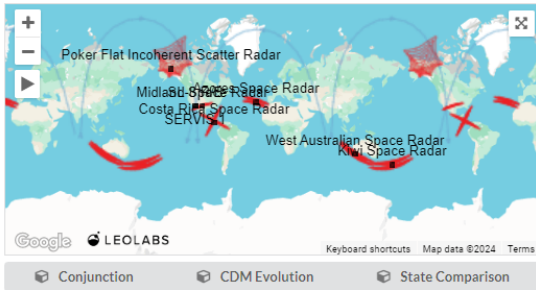
SL-8 R/B and SERVIS 1 at 2024-08-05 13:06:41 UTC

Print Report

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| Object 1 | SL-8 R/B |
| Catalog Number | L4516 |
| NORAD ID | 16292 |
| Maneuverable | Unknown |

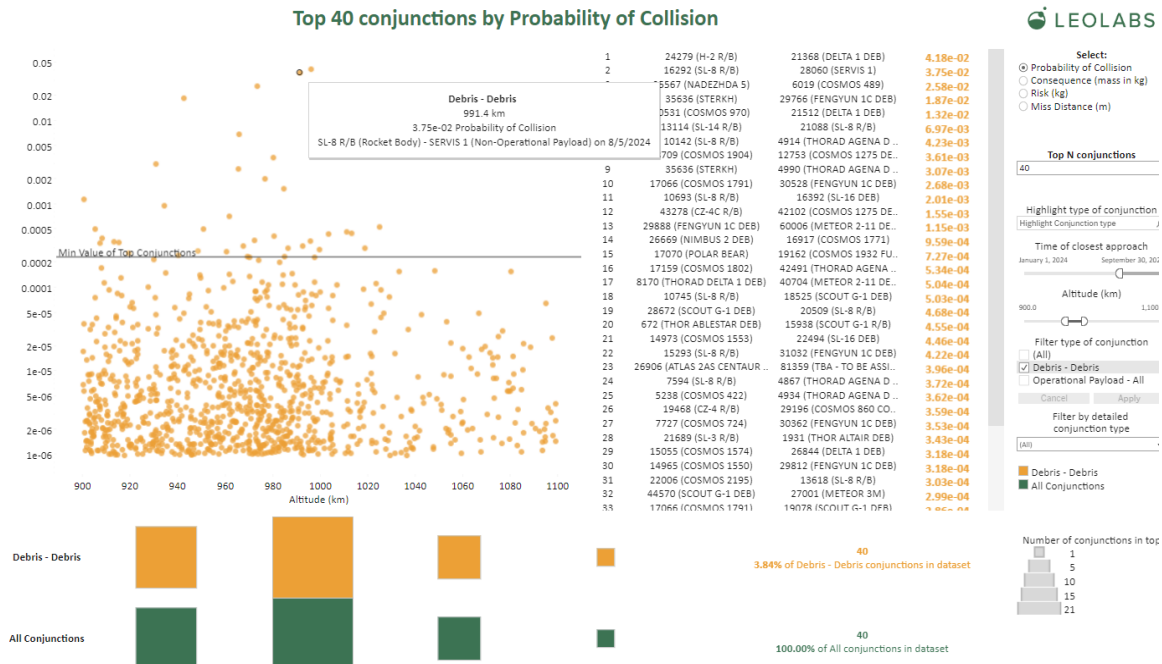
| | |
|----------------|----------|
| Object 2 | SERVIS 1 |
| Catalog Number | L5664 |
| NORAD ID | 28060 |
| Maneuverable | Unknown |



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|----------------------------|--|
| Conjunction ID | 2866686586 |
| Time of Closest Approach | 2024-08-05 13:06:41.423000 UTC (2 months ago) |
| Miss Distance | Total: 31.8 m (+34.8/-27.2 m) |
| | R: 15.4 m (± 14.6 m) |
| | I: -27.4 m (± 37.4 m) |
| C: 4.7 m (± 23.4 m) | |
| Collision Probability | 3.8e-2 |
| Combined Hard Body Radius | 9.34 m (Object 1: 3.20 m, Object 2: 6.14 m) |
| Relative Speed | 2.473 km/s |
| Event Altitude | 999 km |
| CDMs Generated | 88 |
| Last Updated | 2024-08-06 11:59:26 UTC |

Significance of this Event:

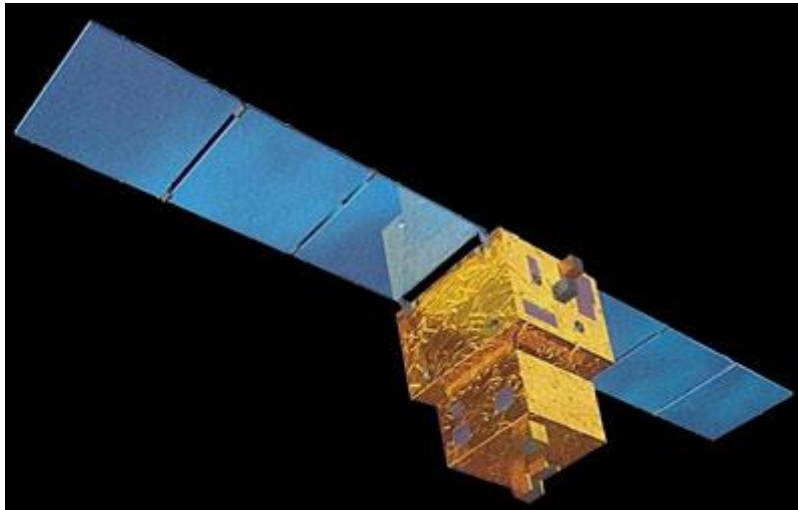
This conjunction was found by querying our LeoMap tool for the highest PC conjunction between two intact derelicts in 2024 in the 900 to 1,100 km altitude range (see graphic below). It was the 2nd highest PC event in this range this year involving debris only (i.e., excludes events involving operational PLs).



This specific event, not surprisingly, involves an SL-8 RB. From our LeoCat tool, we know there are 258 RBs in this region of which 155 are SL-8 RBs (each having a mass of 1,434 kg). This specific SL-8 was launched in 1985, at the beginning of President Ronald Reagan's second term.

Note, the highest PC event involved an RB and a fragment. While this event is relevant to space safety and space sustainability concerns, its consequences would likely be much less than a collision event between two intact derelicts. Further, this region centered around 975 km has been identified as the most likely region to have a collision between two intact derelicts; indeed, the graphic above shows that in just nine months there have been a significant number of close approaches. In a future analysis, we will examine if this rate of close approaches is increasing here or in other regions in LEO.

The Servis 1 payload (PL) was launched in 2003 and has a dry mass of 840 kg. An artist's rendition of the Servis spacecraft is shown below.¹



The total mass involved in this conjunction was ~2,300 kg. If these two objects had collided center of mass on center of mass, this event could have generated up to ~3,000 cataloged fragments. In addition to the 258 abandoned RBs in the 900 to 1,100 km altitude range, there are 327 non-operational PLs. As a result, it is not unexpected to have conjunction events between RBs and non-operational PLs in this cluster.

¹ Source: Gunter's Space Page [SERVIS 1, 2 - Gunter's Space Page \(skyrocket.de\)](http://www.skyrocket.de)