LeoPulse

LEOLABS

Edition 5: February 2023

In 2019, 800 functional satellites were operating in low Earth orbit (LEO), now there are over 5,000. LeoPulse is your guide to this rapidly changing environment — providing crucial data and expert analysis to help uncover the challenges and solutions for today's dynamic space era.

Coverage of the Southern Hemisphere is critical for Space Domain Awareness

It takes **~90 minutes** for a satellite in LEO to orbit the Earth; **~45 minutes** of that journey is a mystery due to the lack of global radar coverage in the Southern Hemisphere. As the traffic in LEO grows, we need to reduce the time elapsed between observations (i.e., the revisit rate) to monitor activities, from potential collisions and satellite maneuvers to proximity operations and anti-satellite weapon tests.

The US Space Surveillance Network (SSN), which has historically provided indentification and tracking services, needs to be augmented with a dedicated, modern, and more geographically distributed radar network.

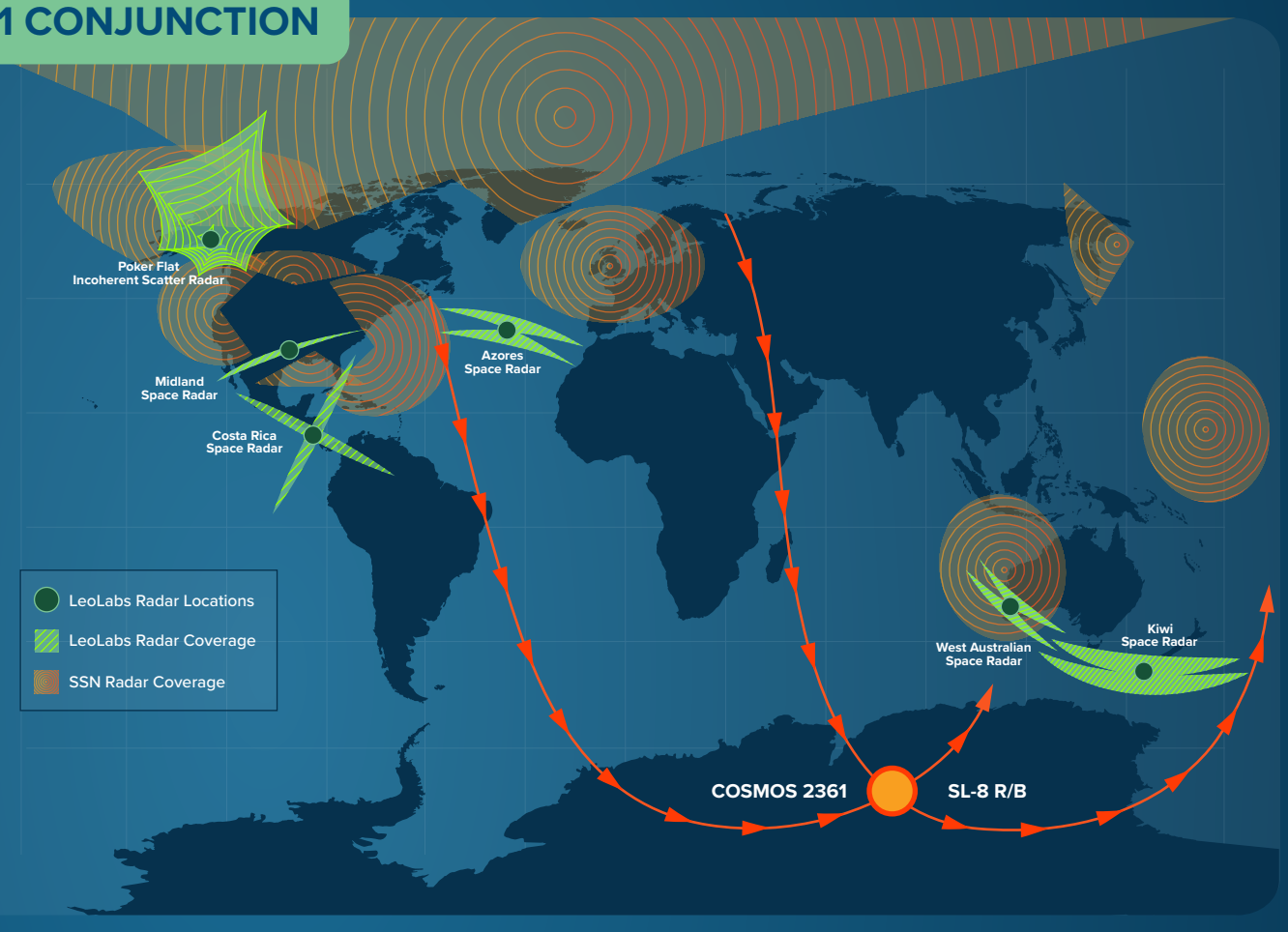
By adding the Kiwi Space Radar (KSR) and the West Australian Space Radar (WASR) to LeoLabs global radar network and to the SSN, we can reduce revisit rates. For the majority of cases, we can do so for a subset of high interest objects by **35%**.

EXAMPLE: SL-8 AND COSMOS 2361 CONJUNCTION

A recent close approach illustrates the importance of Southern Hemisphere coverage.

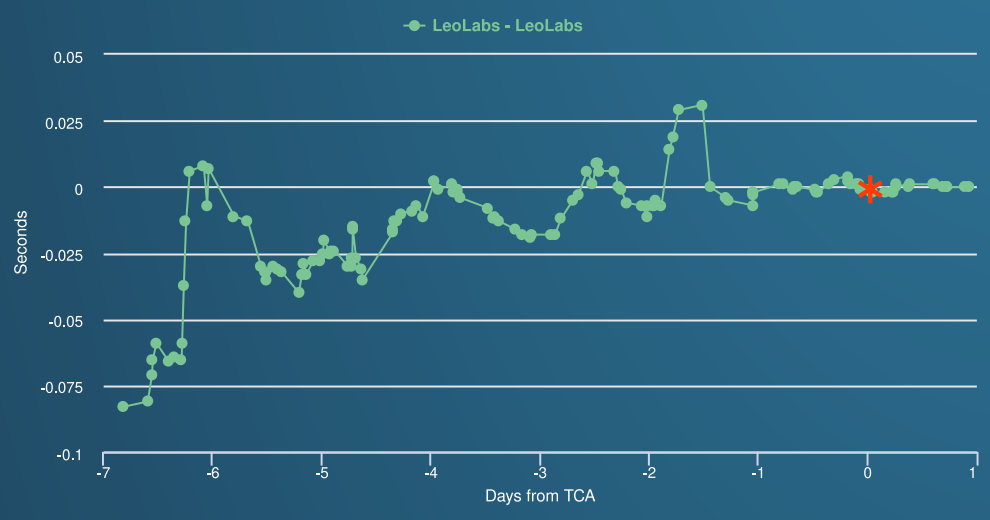
On 27 January 2023, a derelict SL-8 rocket body and a Cosmos satellite narrowly missed each other over Antarctica.

Our system was able to reduce the position uncertainty to just tens of meters as the TCA grew closer. In addition, we were able to calculate a relatively flat "miss distance" and a probability of collision (Pc) value 100 times larger than the SSN's. These data points were largely the result of the consistent and reliable measurements provided by our radars in the Southern Hemisphere.



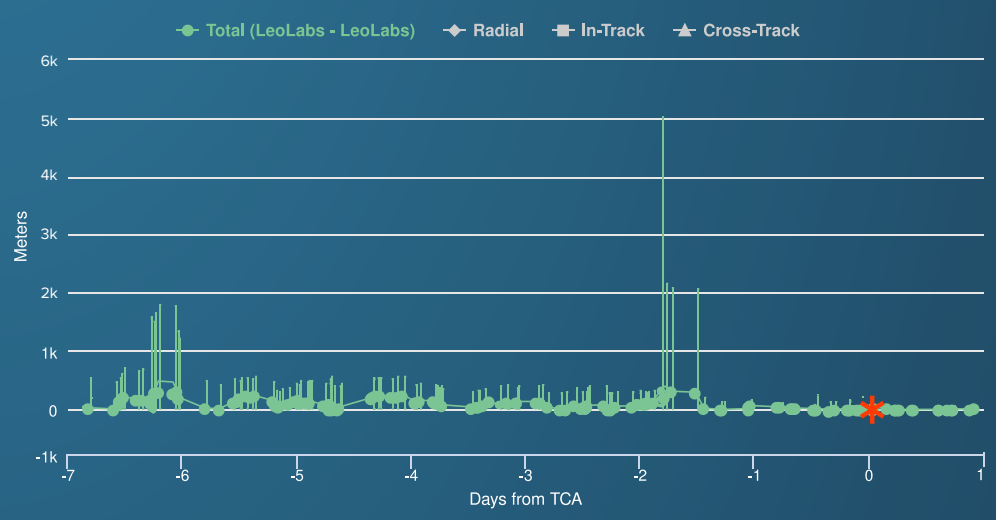
TCA CHANGE FROM LATEST CDM

The Time of Closest Approach (TCA) relative to the TCA in the latest CDM



MISS DISTANCE

The predicted distance between the objects at the Time of Closest Approach (TCA)



This event affirms that **more radar coverage means more clarity.**

We'll continue to increase coverage of the Southern Hemisphere, as well as the Northern Hemisphere and equatorial regions, to augment existing networks and help secure LEO.

Reference note: The findings shared in this infographic are derived from the hundreds of thousands of data products LeoLabs' global network of phased array radars collect daily, as well as the analysis and insights pulled together by our team of experts. For specific reference information, please email us.

About LeoLabs: LeoLabs is transforming the way satellite operators, commercial enterprises, and federal agencies across the world launch and track missions in low Earth orbit. Through LeoLabs Vertex™, its exclusive space operations stack, LeoLabs delivers the information superiority needed to succeed in today's space race.

Updated February 2023

For more information, please email us at **contact@leolabs.space**