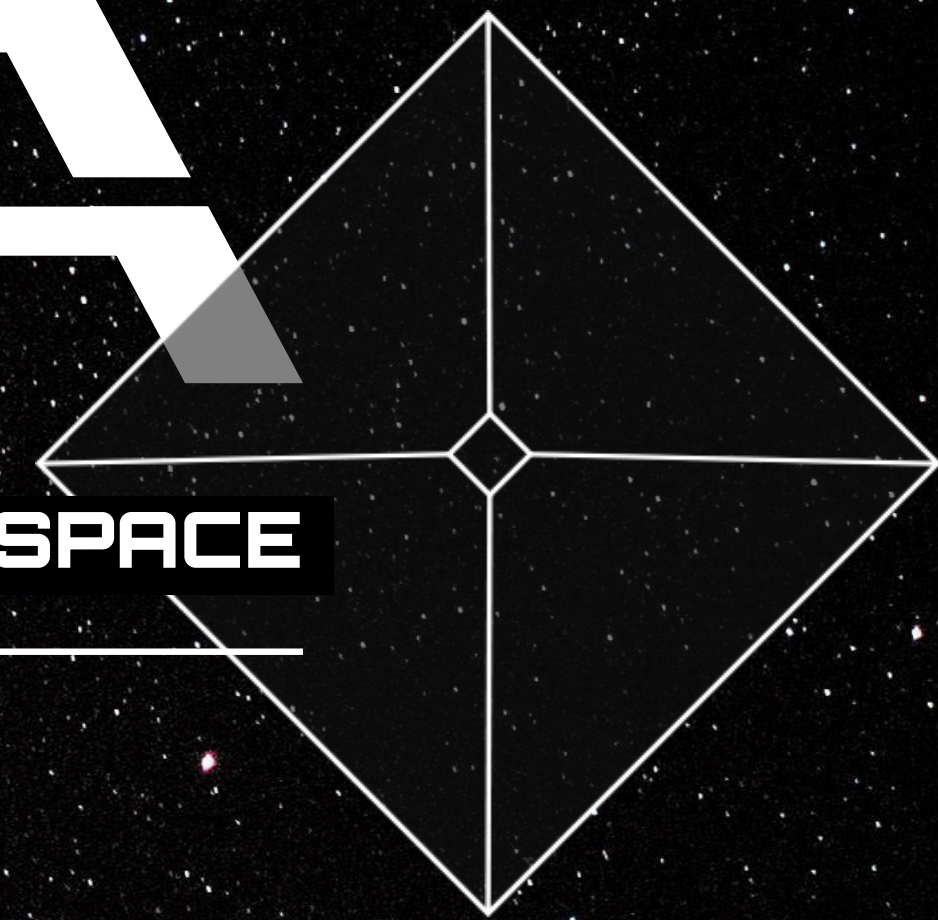
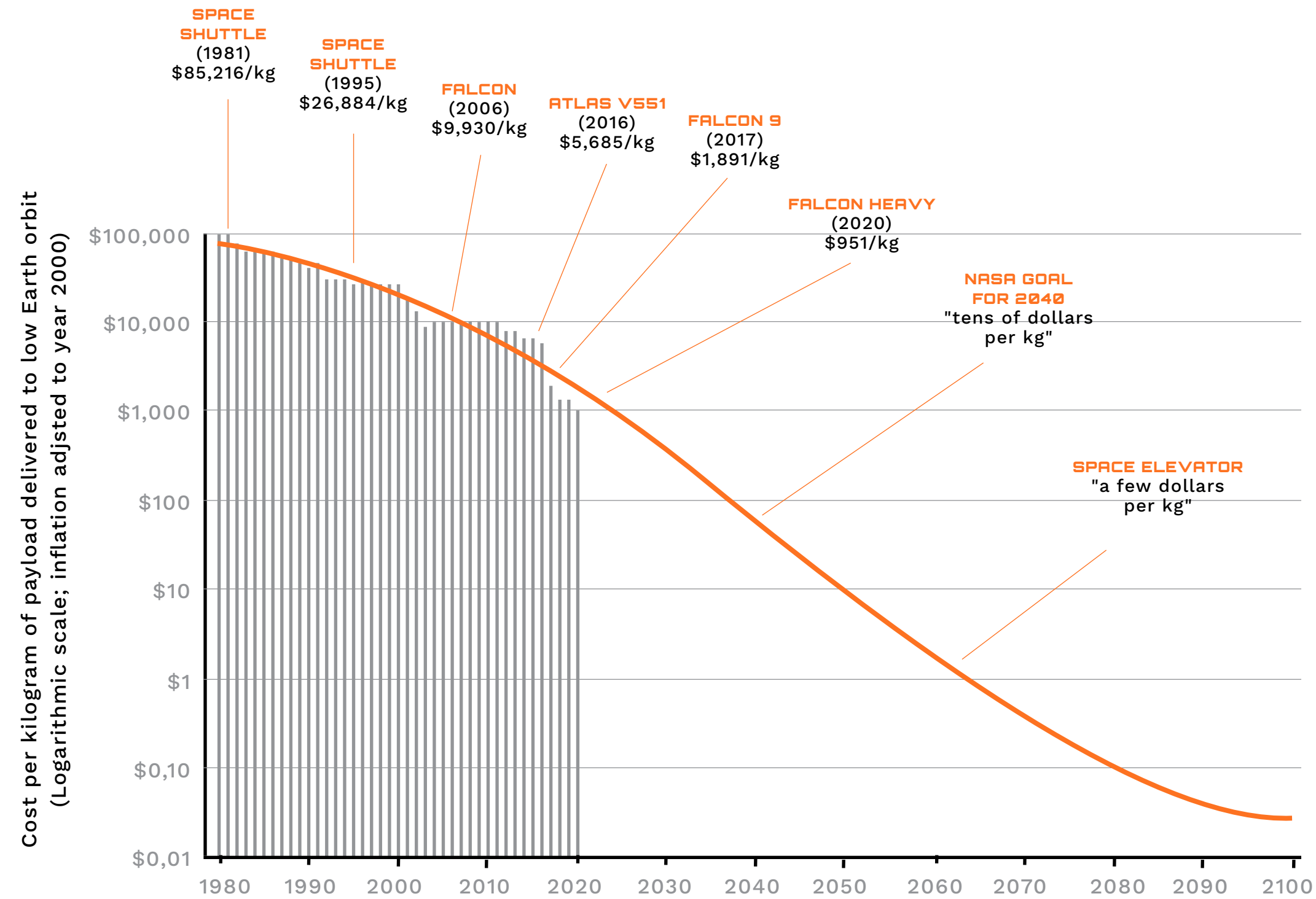




SOLAR SAILS FOR DEEP SPACE

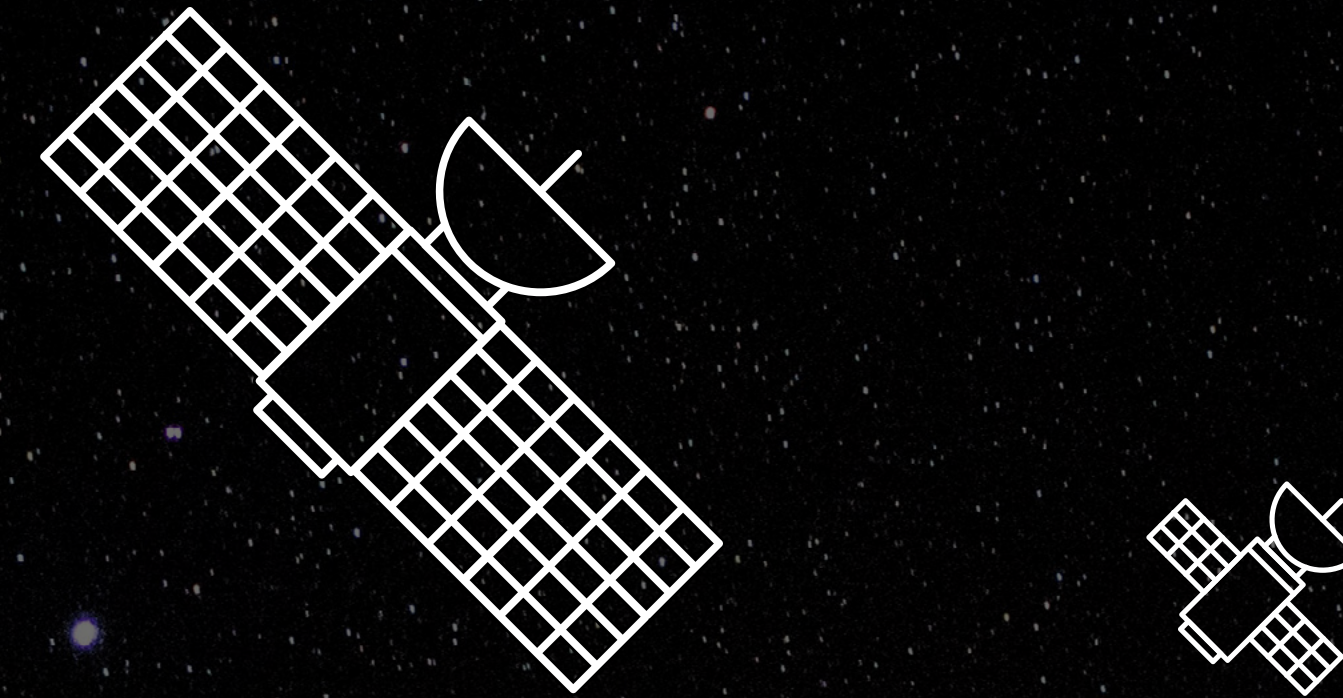


FINALLY ACCESSIBLE



Large reduction in launch cost

<https://www.futuretimeline.net/data-trends/6.htm>



EARTH OBSERVING-1
2000s
1.4 m x 1.4 m x 2 m
600kg
\$200M

SEAHAWK-1
2020s
0.1 m x 0.1 m x 0.3 m
4kg
\$0,5M

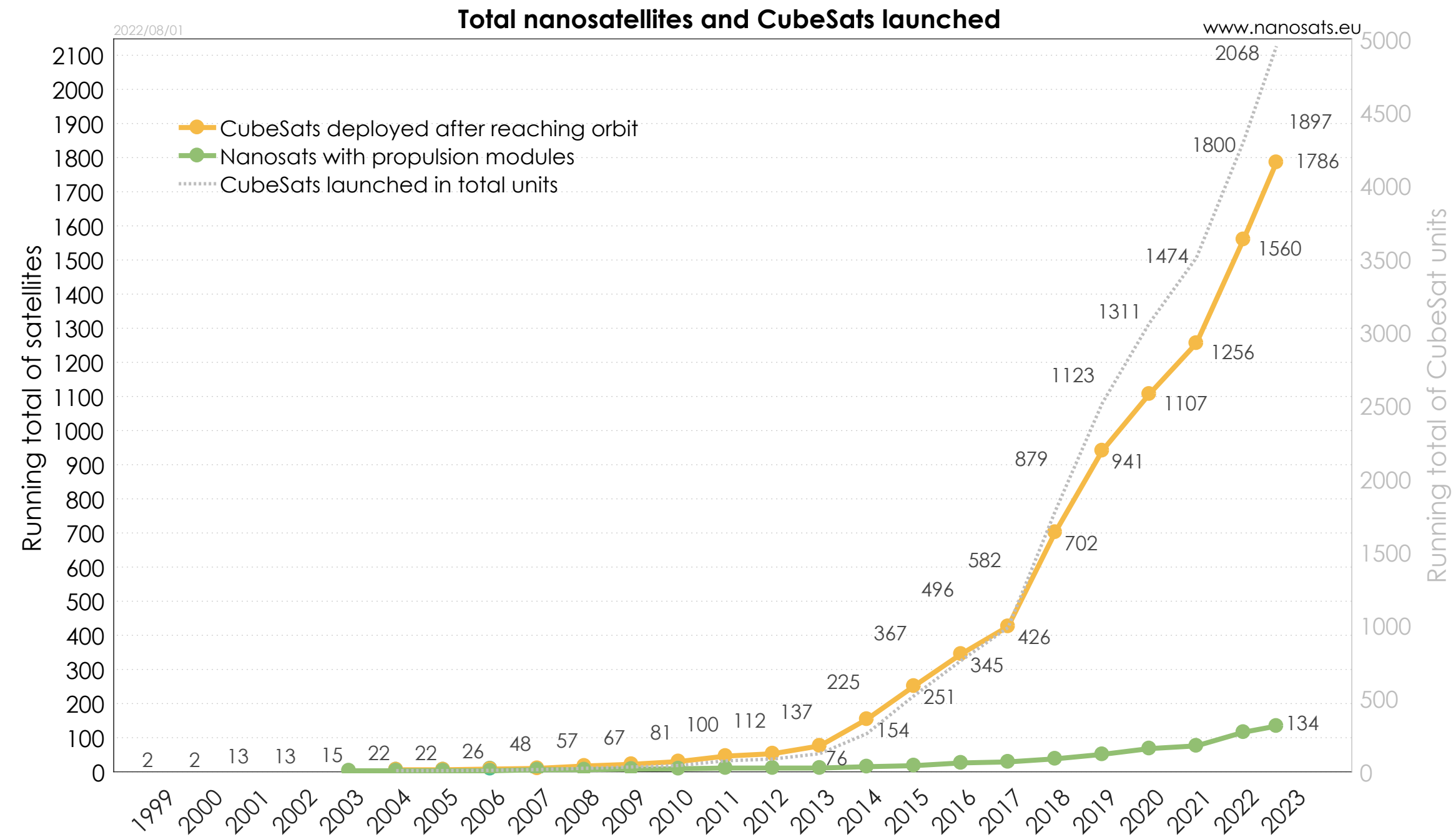
<https://earth.esa.int/web/eoportal/satellite-missions/e/eo-1>

<https://directory.eoportal.org/web/eoportal/satellite-missions/s/seahawk-1>

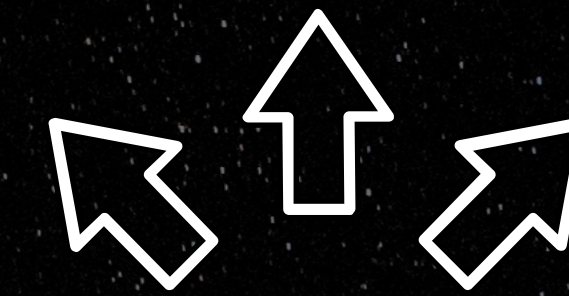
And cheaper and smaller satellites



GENERATING AN EXPLOSION OF COMMERCIAL ACTIVITIES



<https://www.nanosats.eu/#figures>



Private funding is chasing massive commercial opportunities: **more than 10.000 satellites will be launched in the next years* + \$400B global space economy (2020)****

*<https://satellitepromie.com/news/over-12000-satellites-to-be-launched-in-next-10-years-nsr/>

**<https://www.pwc.fr/fr/assets/files/pdf/2020/12/en-france-pwc-main-trends-and-challenges-in-the-space-sector.pdf>



**HOWEVER, THE DROP IN COSTS IS FOR
NEAR-EARTH ACTIVITIES**

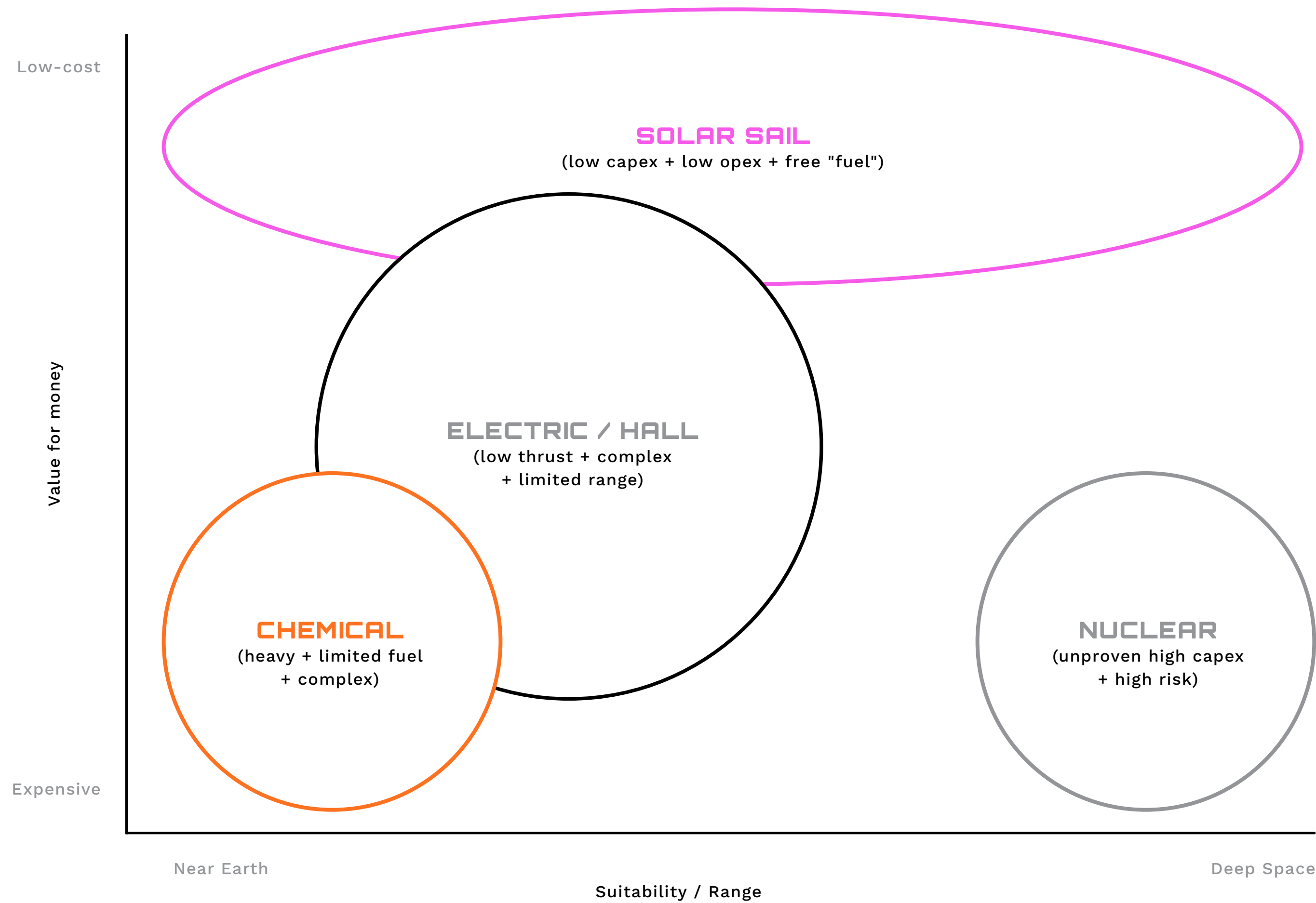


98% of satellites are in near Earth orbit*

*<https://www.mckinsey.com/industries/aerospace-and-defense/our-insights/large-leo-satellite-constellations-will-it-be-different-this-time>



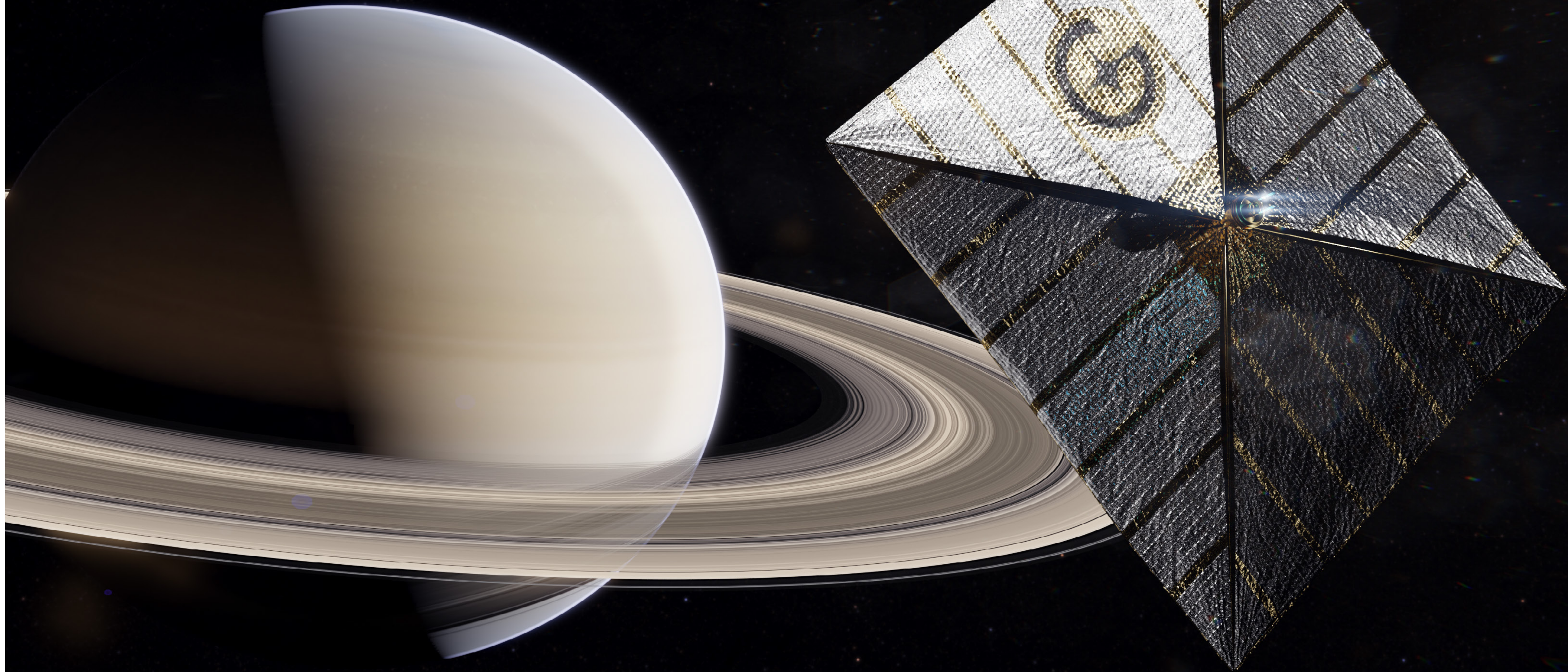
BECAUSE IN-SPACE PROPULSION REMAINS EXPENSIVE AND LIMITED



Existing solutions have to carry own fuel, limiting applicability and distance

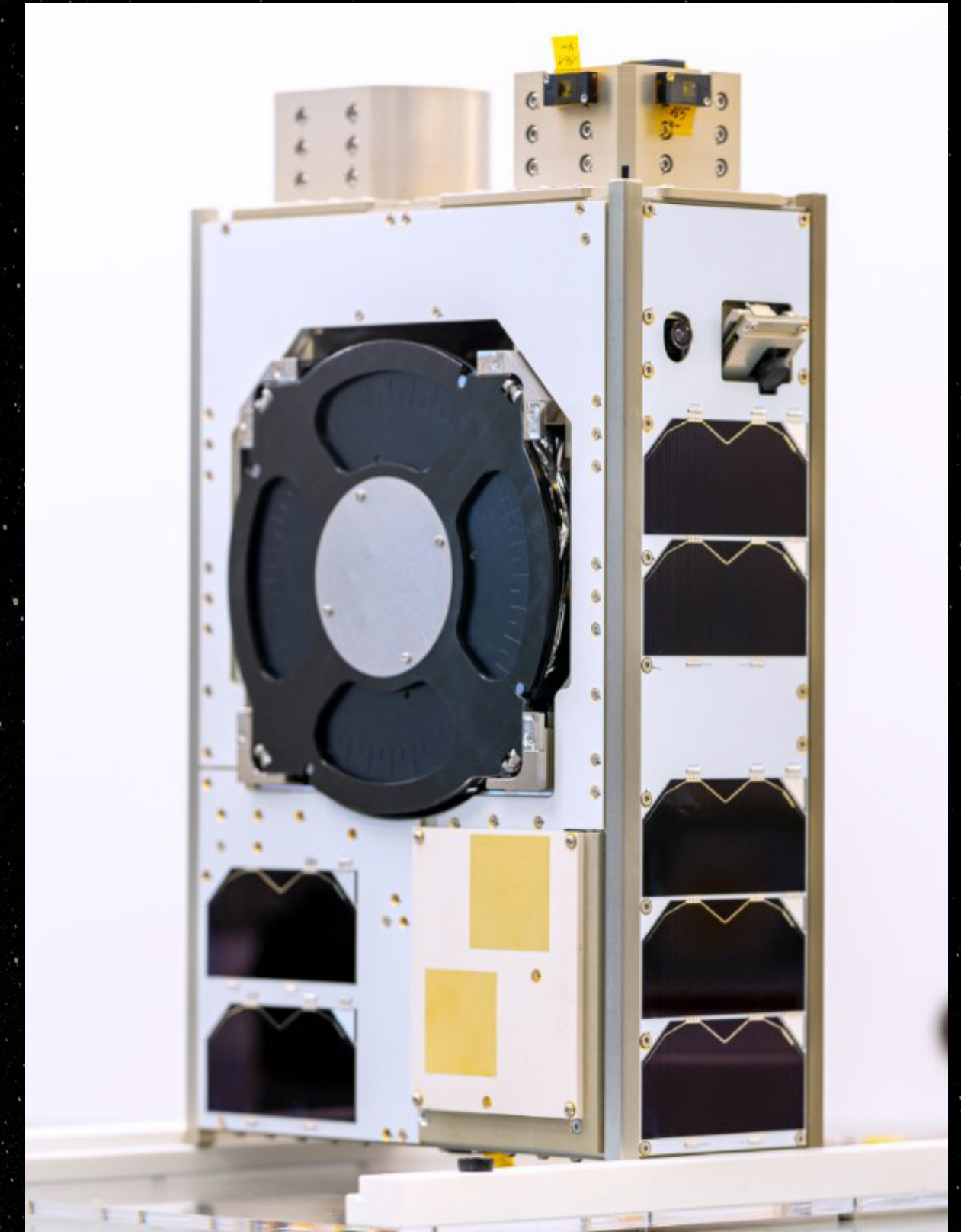


**GAMA : ALLOWING FREE
& UNLIMITED PROPULSION**



FAST ITERATION

Gama Alpha in <2 yrs - 73 m2 sail from 6U



FM Integration CNES

04/2022

Gama Alpha

08/2022



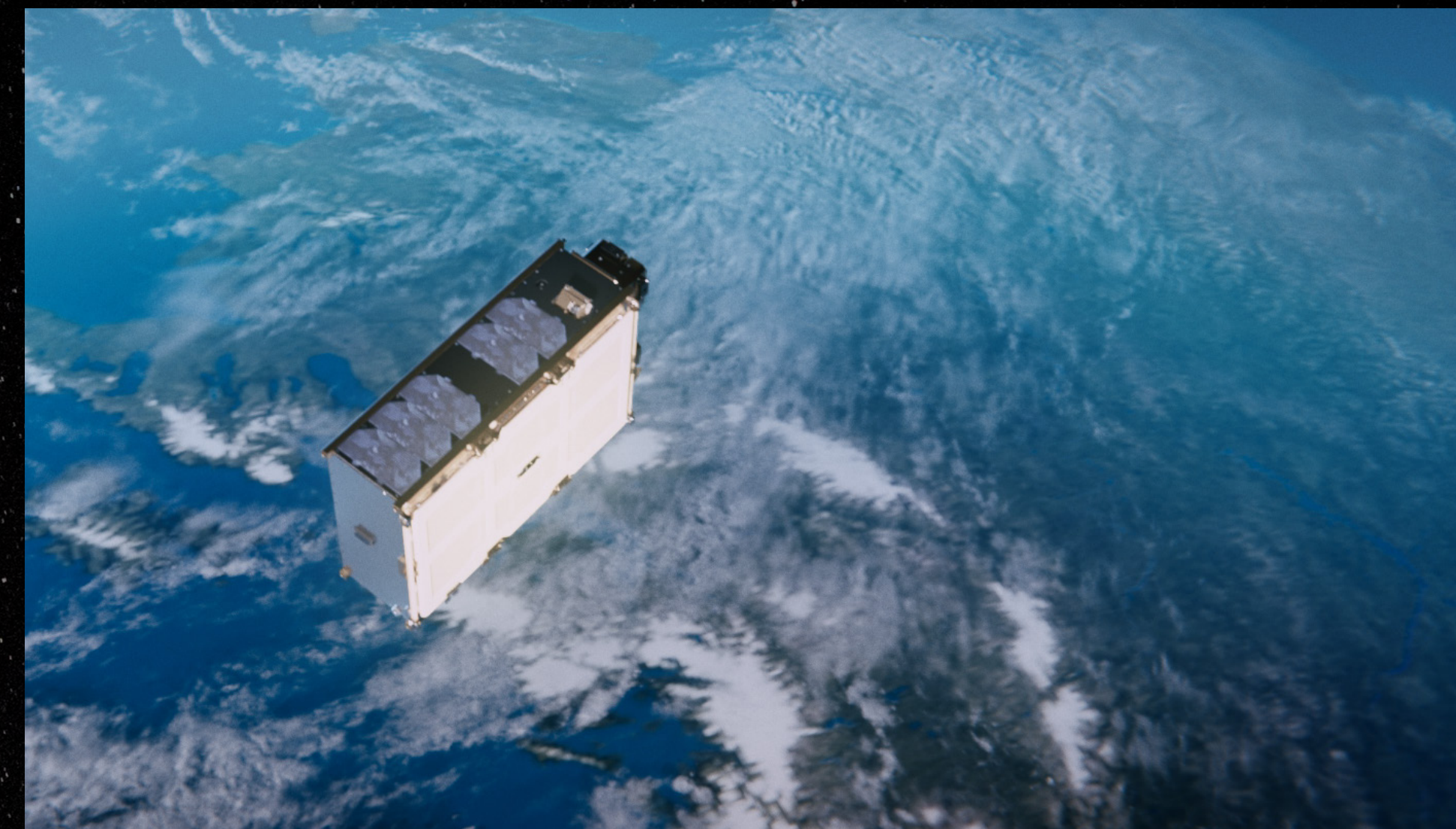
2023 = SPACE HERITAGE

Gama Alpha is in orbit - 3rd Jan 2023



SpaceX launch

01/2023



Gama Alpha commissioned

01/2023

