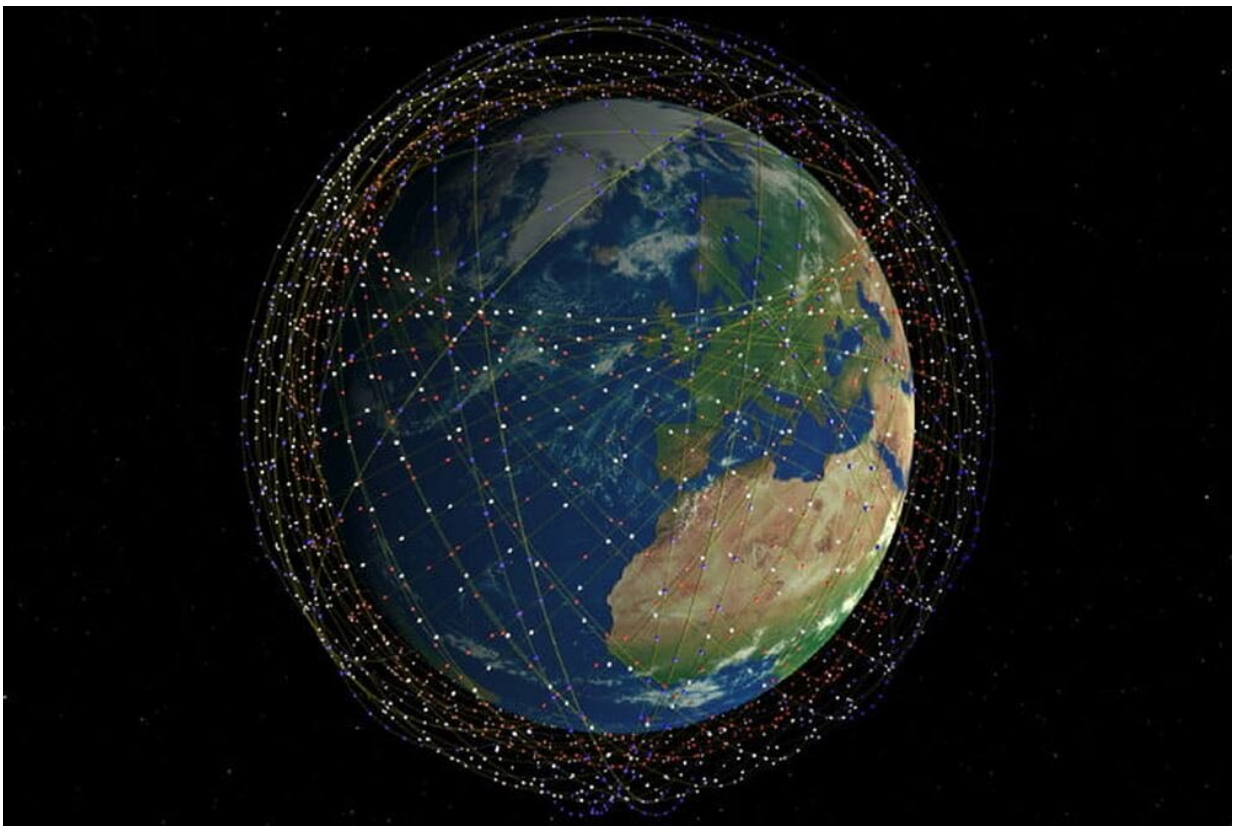
The new generation of Starlink satellites remain above the accepted brightness threshold

August 15 2022, by David Dickinson



An artist's conception of the Starlink constellation encircling the Earth. Credit: SpaceX

It's one of the stranger sights of the modern Space Age. Recently, we

found ourselves under the relatively dark skies of southern Spain. Sure enough, within a few minutes, we caught sight of a chain of flashing "stars" winking in and out of view in quick succession.

Starlink trains are now a familiar sight, the boon and bane of the modern era. While SpaceX's mega-satellite promises to become a true disruptor in the worldwide internet game, it also has the potential to add to the burden of light pollution in the night sky. Will there soon come a time in the not-too-distant future when moving artificial "stars" outnumber real ones?

The rise of Starlink

The problem for astronomers didn't really become apparent until the first launch of 60 Starlink satellites in May 2019. To date, SpaceX has launched Starlink batches at a breakneck pace, with over 2,900 total deployed and 2,286 still in orbit and in service as of early August 2022. SpaceX ultimately wants to put 12,000 Starlinks in low Earth orbit (as currently approved by the FCC) with provisions for a possible 30,000 more. The Starlink internet service went live in late 2020. Unlike the nascent Iridium constellation—which really only found niche applications—Starlink is already proving its worth. For example, Starlink is currently keeping the internet on in Ukraine during the ongoing Russian invasion.

The main concern in professional astronomy is the impact on current and upcoming all-sky surveys, such as the Vera C. Rubin telescope. This survey will scour the sky nightly down to a faint +22nd magnitude. A recent article in *Nature* notes that the 1.5-meter Zwicky Transient Facility (ZTF) telescope at Palomar sees Starlink streaks on 18% of its deep-sky images. A recent International Astronomical Union statement called for operational Starlinks to fall below +7th magnitude.

SpaceX has attempted to address the issue, with varying degrees of success. This has included painting the coffee-table-sized satellites black, adding visors, stickers, and angling them edge-on to the sun during twilight passes. VisorSat helped to lower Starlinks down by about a magnitude… but the newer generation of Starlinks do not incorporate this feature, as a visor would interfere with the new line-of-sight laser communications between satellites.

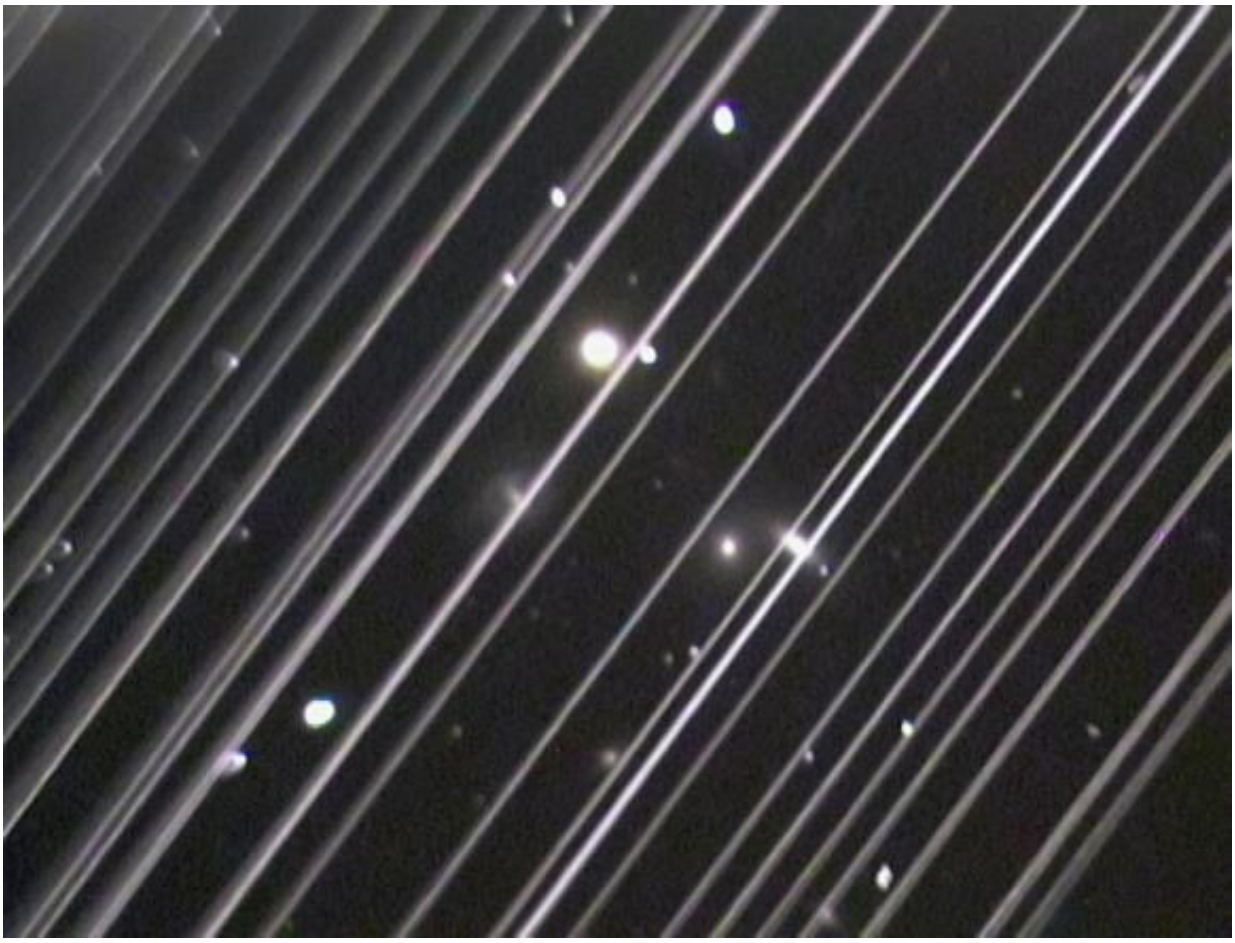
Of course, light pollution isn't really anything new, and the problem predates Starlink. The current problem many a stargazer has noticed is that despite mitigation efforts, the Starlink trains are still bright, especially on initial orbital deployment before they're placed in higher operational altitudes.

Starlink satellites awaiting deployment shortly after launch. Credit: SpaceX

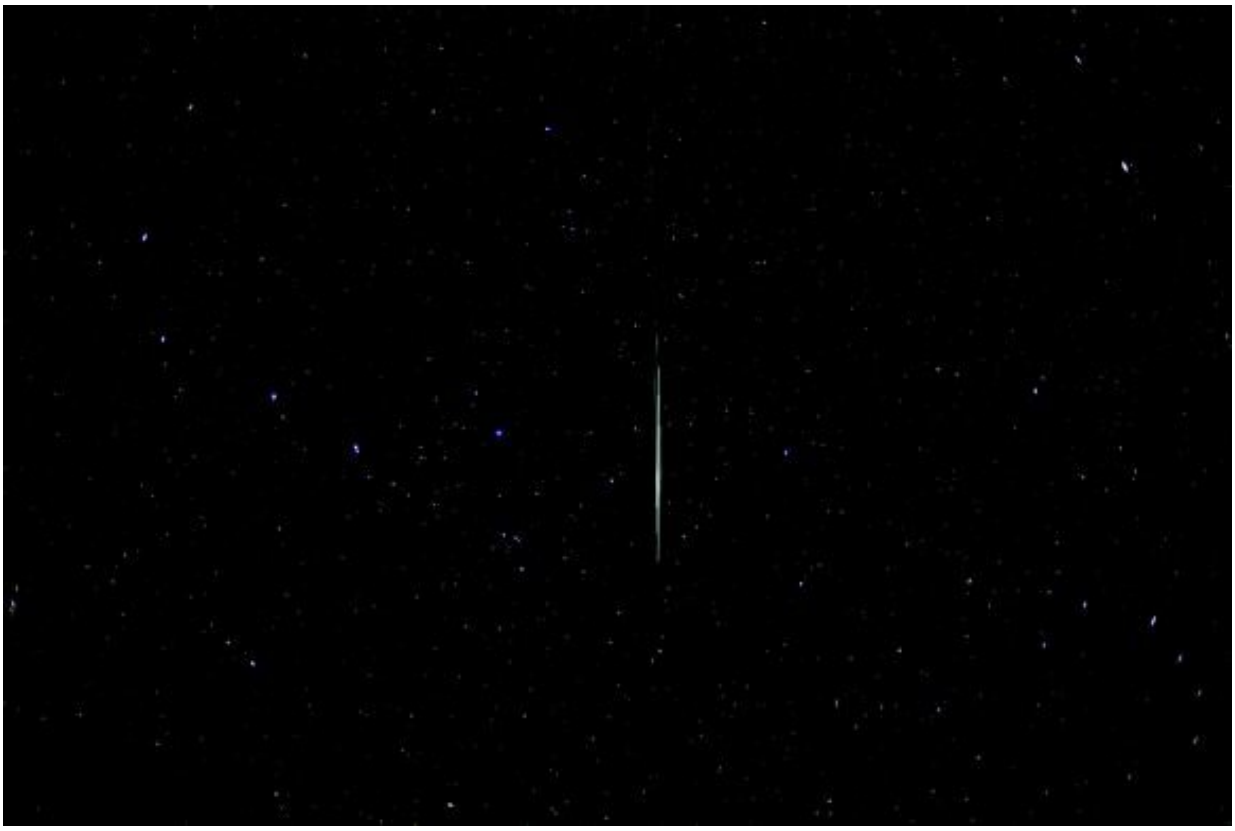
Also, the attrition rate for Starlink seems pretty high: already, 218 satellites have reentered, including most of the Group 4-7 batch that fell prey to space weather shortly after launch in February 2022. SpaceX has carried a breakneck launch cadence in 2022, launching an amazing 21 batches thus far this year alone.

And there's more to come. OneWeb has already deployed 218 satellites for its own constellation, though the Ukraine War has also stalled the worldwide launch campaign to get it operational by the end of 2022. Amazon's Kuiper constellation will also begin deployment in late 2022/early 2023. Also, SpaceX has recently acquired Swarm's Internet-of-Things satellites and filed to use 2Ghz band technology in the near future… expect to see future Starlink terminals to shrink and become more mobile, and possibly even become a built-in feature on future smartphones.

A recent report out of a Black Hat Security conference in Las Vegas also alerted users and SpaceX in to the possibility of hacking Starlink, though the company is already hard at work on patching this vulnerability.



An image of the NGC 5353/4 galaxy group made with a telescope at Lowell Observatory, showing Starlink streaks through the image. Credit: Victoria Gurgis/Lowell Observatory



A Starlink train over Arizona. Credit: Rob Sparks

A Starlink satellite train crossing the sky. Credit: Mary McIntyre

Hopefully, Starlink won't give any companies that have long wanted to place "ads in space" any ideas. We've already seen attempts to put artwork in space, courtesy of Orbital Reflector. Perhaps, the U.S. Department of Defense could lend a hand, and reveal how the classified Lacrosse-5 satellite pulls a "vanishing act" on occasion. Or perhaps, AI (Artificial Intelligence) will simply find a way to identify and erase Starlink streaks in images (astrophotographers have already pioneered a similar technique to erase satellite streaks).

To be sure, our personal opinion on the rise of the Starlink satellite constellation is nuanced. As an avid stargazer, I've seen the troubling

trend of a brighter night sky lengthen drives to find dark sites long before the advent of mega-satellite constellations… but if I can live and work in remote rural Spain thanks to a mobile Starlink hookup, I see a definite advantage to those strange-moving satellite trains overhead.

Provided by Universe Today

Citation: The new generation of Starlink satellites remain above the accepted brightness threshold (2022, August 15) retrieved 27 April 2024 from https://phys.org/news/2022-08-starlink-satellites-brightness-threshold.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.