

The case for space environmentalism

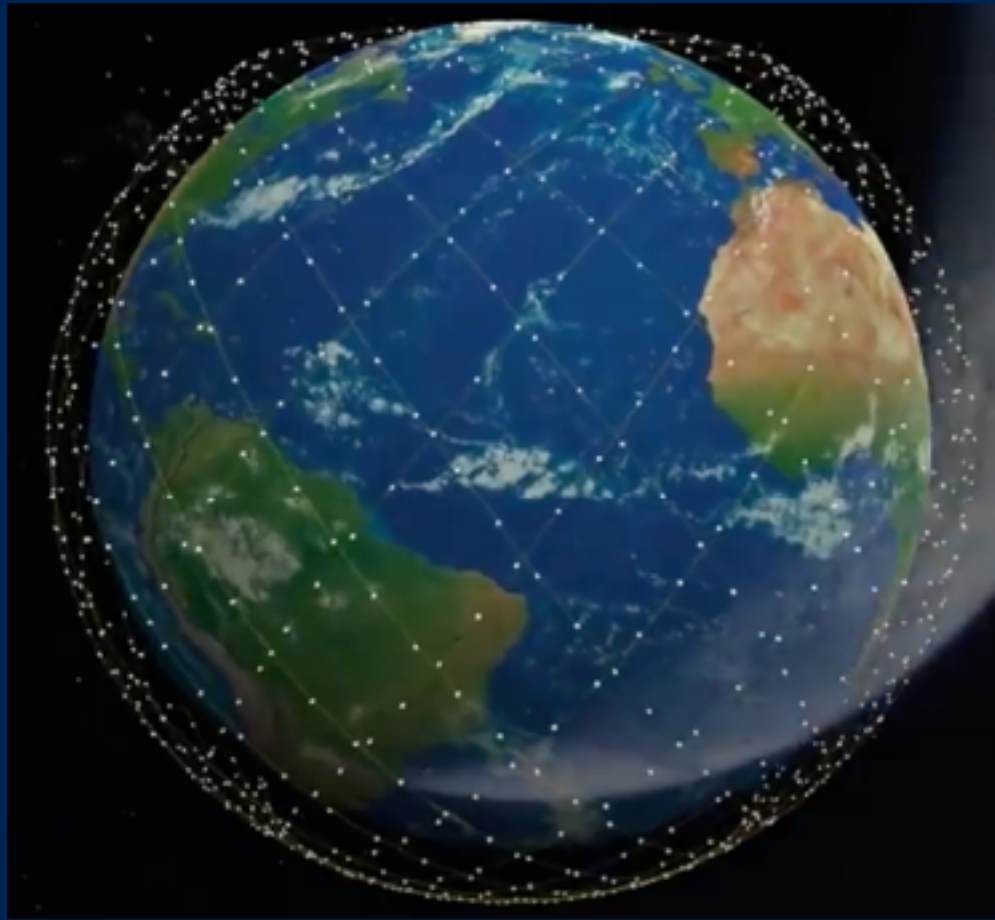
Andy Lawrence^{1✉}, Meredith L. Rawls², Moriba Jah^{3,4}, Aaron Boley⁵, Federico Di Vruno⁶, Simon Garrington⁷, Michael Kramer^{8,9}, Samantha Lawler¹⁰, James Lowenthal¹¹, Jonathan McDowell¹² and Mark McCaughrean¹³

The shell bound by the Karman line at a height of ~80–100 km above the Earth's surface and geosynchronous orbit at ~36,000 km is defined as the orbital space surrounding the Earth. It is within this region, and especially in low Earth orbit, where environmental issues are becoming urgent because of the rapid growth of the anthropogenic space object population, including satellite 'mega-constellations'. In this Perspective, we summarize the case for considering the orbital space around the Earth as an additional ecosystem, subject to the same care and concerns, and the same broad regulations as the oceans and the atmosphere, for example. We rely on the orbital space environment by looking through it, as well as by working within it. Hence, we should consider damage to professional astronomy, public stargazing, and the cultural importance of the sky, as well as the sustainability of commercial, civic, and military activity in space. Damage to the orbital space environment has problematic features in common with other types of environmental issue. First, the observed and predicted damage is incremental and complex, with many contributors. Second, whether or not space is formally and legally seen as a global commons, the growing commercial exploitation of what may seem to be a 'free' resource is in fact externalizing the true costs.

Andy Lawrence
SUPA Astro Theme Meeting
May 17 2022



Dark Energy Survey: P.Marenfeld/NOIRLab/AURA



Starlink

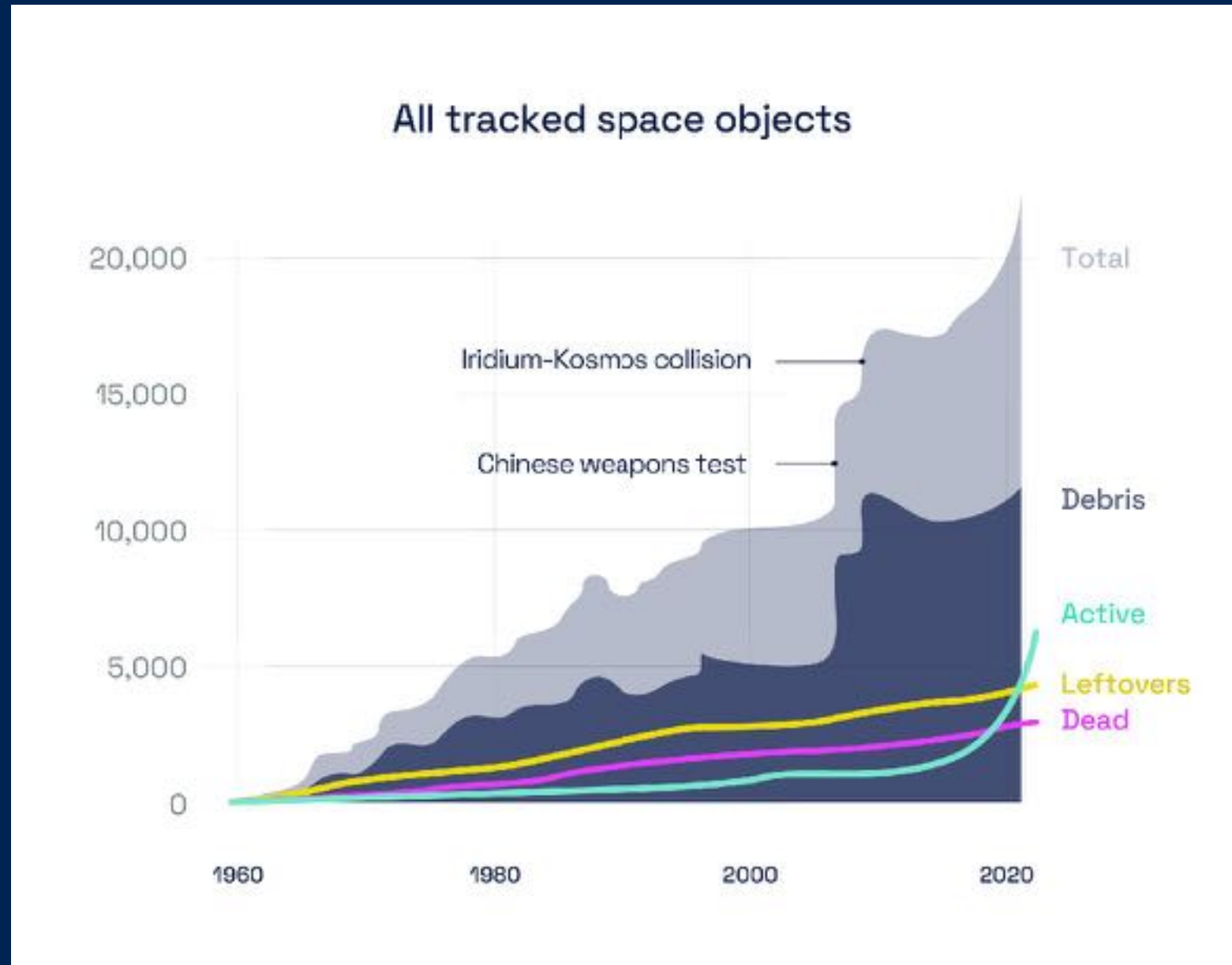
Satellite streaks aren't new



UK Schmidt plate, c.1980

So what's
new?

The rate
of change





Not just
Starlink!!

There Will Be More.

The Space Junk Problem

Getty Images



Liability
issues
will
grow



StartRocket promo



LOSING THE SKY

Andy Lawrence

Foreword
by Dr Brian May

ORAL ARGUMENT HAS NOT YET BEEN SCHEDULED

In City

United States Court of Appeals
For the District of Columbia Circuit

**VIASAT, INC.; DISH NETWORK CORPORATION;
THE BALANCE GROUP,**
Appellants,

v.

FEDERAL COMMUNICATIONS COMMISSION,
Appellee.

SPACE EXPLORATION HOLDINGS, LLC,
Intervenor for Respondent

ON APPEAL FROM THE FEDERAL COMMUNICATIONS COMMISSION
IBFS FILE NO. SAT-MOD-20200417-00037

BRIEF OF PROFESSOR ANDY LAWRENCE AS *AMICUS CURIAE*
IN SUPPORT OF VACATUR

PERSPECTIVE

<https://doi.org/10.1038/s41550-022-01655-6>

nature
astronomy

 Check for updates

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Classic signs of an Environmental Problem

- Your actions have an effect on others
- True costs are externalised
- Problems are incremental and complex

JASON report quote:

A company who wanted to launch a dump truck full of sand into the same orbit as the International Space Station would have no formal barriers to doing so in many countries around the world.

Regulation scorecard

Broad Principles	✓	Outer Space Treaty
Competence to launch	✓	in most countries..
Use of radio spectrum	✓	ITU
GSO interference	✓	
Liability	—	“diplomatic channels”
Minimising Debris	—	non-binding guidelines
LEO advertising	— ✗	in some countries..
Atmospheric Pollution	✗	some legal challenges underway
Sky Pollution	✗	
LEO interference	✗	

FIN