

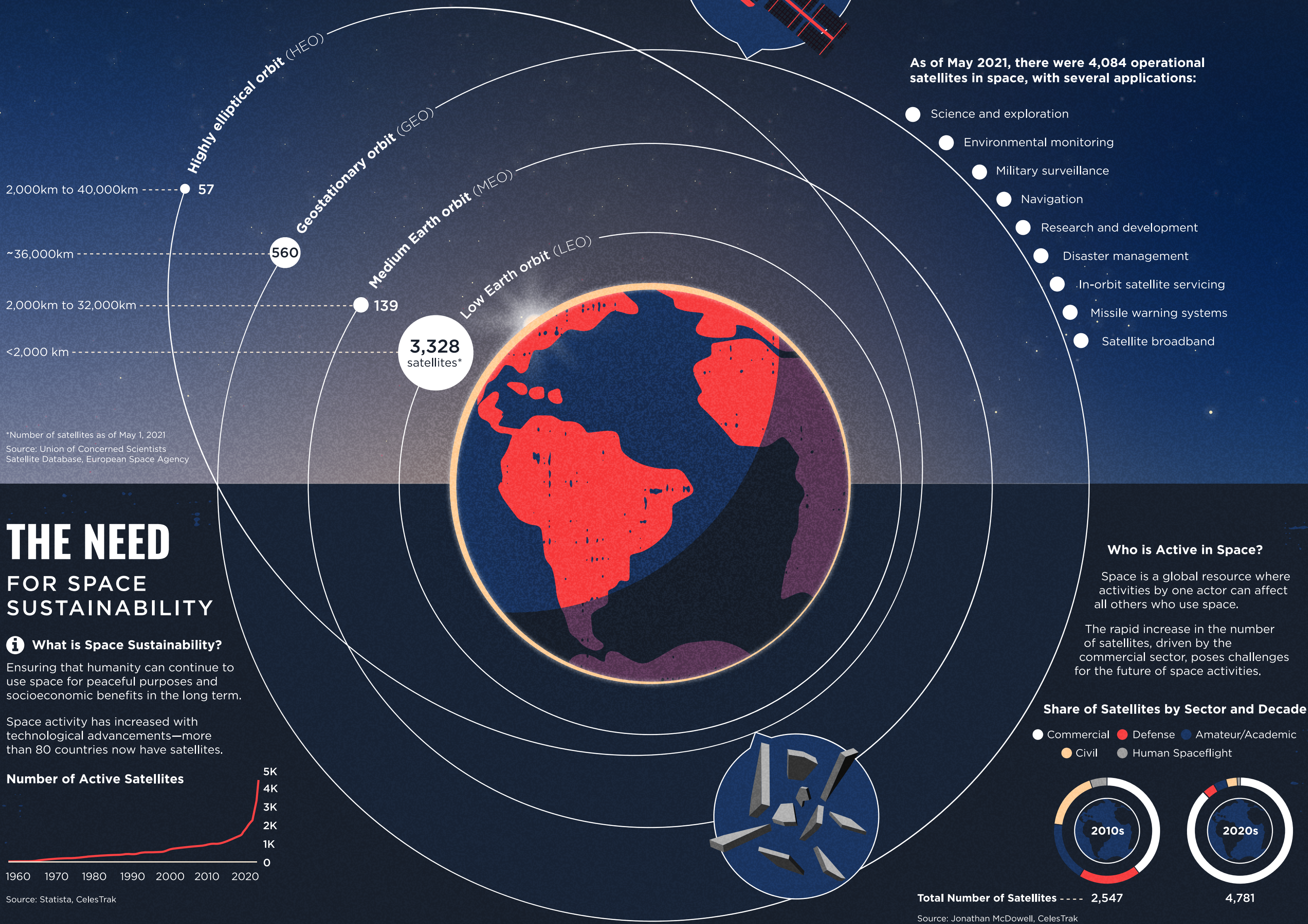
SPACE SUSTAINABILITY

PRESERVING THE USABILITY OF OUTER SPACE

HOW WE USE SPACE

SATELLITES AND THEIR ORBITS

Thousands of satellites orbit the Earth at different altitudes, enabling many of the technologies we use on a daily basis.

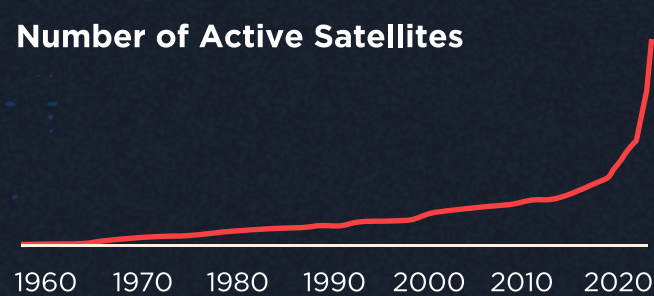


THE NEED FOR SPACE SUSTAINABILITY

What is Space Sustainability?

Ensuring that humanity can continue to use space for peaceful purposes and socioeconomic benefits in the long term.

Space activity has increased with technological advancements—more than 80 countries now have satellites.



3 CHALLENGES TO SPACE SUSTAINABILITY

1 SPACE JUNK

Space junk or orbital debris refers to defunct satellites, rocket bodies, and fragmented objects in space that no longer serve a useful purpose. There are millions of debris objects in space, travelling at high impact speeds.



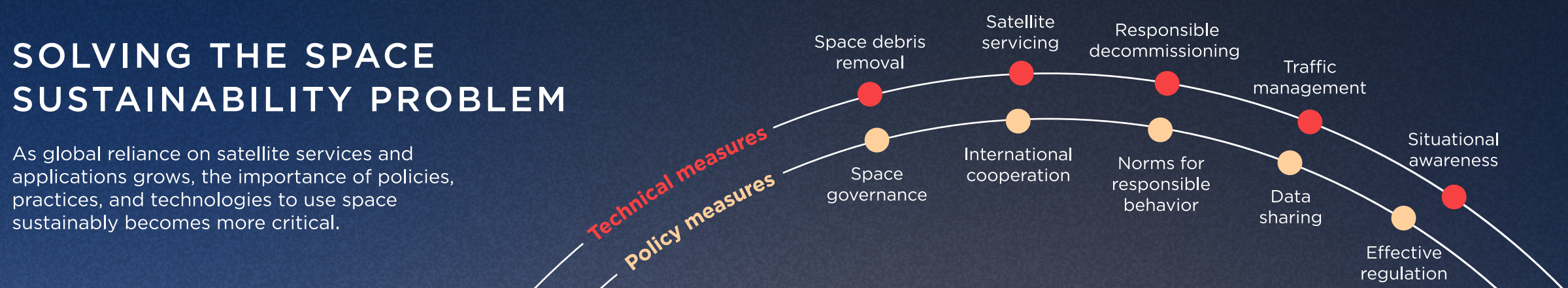
8,800 metric tons --- The mass of debris objects in space.
29,000 km/h --- Speed at which space junk can travel.

Increasing space debris poses a threat to active satellites and human spaceflight, especially as orbits get more crowded.

Source: European Space Agency, NASA

SOLVING THE SPACE SUSTAINABILITY PROBLEM

As global reliance on satellite services and applications grows, the importance of policies, practices, and technologies to use space sustainably becomes more critical.



2 ORBITAL CROWDING

The space in Earth's orbits is limited. Satellite constellations—large networks of satellites that surround the Earth—are becoming more common.

Examples of Planned Satellite Constellations*



Physical crowding of orbits with satellites and debris can lead to a chain reaction, known as **the Kessler syndrome**.

Physical congestion and electromagnetic interference from orbital crowding has adverse effects on communication and security in space.

*as of August 10, 2021
Source: NewSpace Index, Lynk Global

Space holds vast benefits to humanity that we leverage through satellites.

However, the orbits in which satellites travel constitute a limited natural resource because there is a finite amount of space becoming increasingly crowded with satellites and space junk.

Managing this resource for the future requires the world to look towards sustainable management of space through policy and technical capacity.

Who is Active in Space?

Space is a global resource where activities by one actor can affect all others who use space.

The rapid increase in the number of satellites, driven by the commercial sector, poses challenges for the future of space activities.

Share of Satellites by Sector and Decade

- Commercial
- Defense
- Amateur/Academic
- Civil
- Human Spaceflight



Total Number of Satellites --- 2,547

4,781

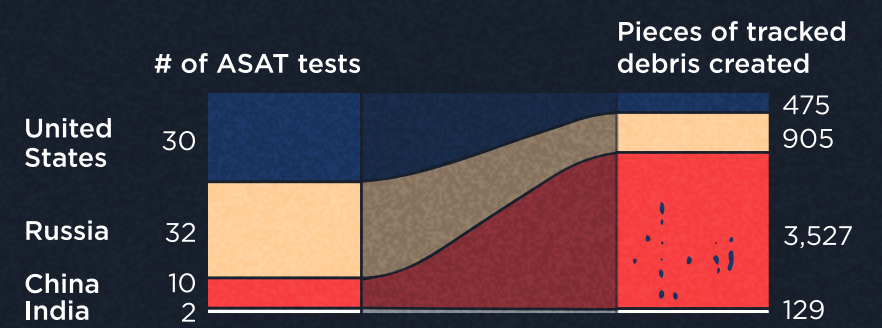
Source: Jonathan McDowell, CelesTrak

3 SPACE SECURITY

Militaries are developing capabilities to disrupt, degrade, or destroy satellites for national security reasons. Such actions could have unforeseen consequences for other actors in space.

Debris Generated by Anti-satellite (ASAT) Tests

Since 1959, China, India, Russia and the U.S. have carried out more than 70 tests collectively.



Besides the debris that is large enough to be tracked, deliberately destroying satellites can create thousands of objects too small to track.

Source: Secure World Foundation

Space is critical for modern life and the technologies we use daily. Space sustainability is of key importance to maintaining these benefits for the future.

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SECURE WORLD FOUNDATION

Promoting Cooperative Solutions for Space Sustainability