A galaxy of opportunities

Space: ESG's next frontier

The new space economy should expect to meet the global demand for sustainability.

With the space industry expected to exceed a trillion dollars in value by 2040, it should be no surprise to see its ESG (environmental, social, governance) credentials come under scrutiny. The rapid buildup of satellites and other objects in orbital space raises serious questions about the degradation of this common asset through space debris and light pollution, as well as the challenge of flight safety and space traffic management. Prince William opined publicly in 2021 that the world's greatest minds should be 'fixed on trying to repair this planet, not trying to find the next place to go and live.' While perhaps unfairly applied to the entire new space sector, his words carried an obvious truth: if commercial space is to fulfill its potential, it will have to show it can walk the talk when it comes to ESG principles.

Space for earth

Fortunately, the commercial space sector has much to offer when it comes to sustainability. The new space economy is about much more than tourism, and includes the deployment of satellites for telecommunications, earth observation, and navigation, as well as the extraction of resources from asteroids and the moon. While launches are carbon intensive, this is offset by what space technologies offers to earth in pursuit of our ever more ambitious environmental goals.

Earth observation technologies are already indispensable tools on many fronts of 21st-century environmentalism, deployed for numerous causes including monitoring climate change, measuring the world's forests, stopping illegal deforestation, fishing, and poaching, tracking the spread of forest fires, and managing nascent natural disasters.

Many essential climate variables now tracked can in fact only be measured from space. More futuristically, space-based solar power holds the promise of vastly reducing energy production emissions on earth, a goal national and international space agencies are actively pursuing.

In addition, the World Economic Forum has advocated for the construction of an 'Earth Operations Centre' in space to leverage data, expertise and capabilities and ultimately help succeed in meeting the climate change challenge. Such efforts all depend on the continued health and dynamism of the space economy, so by investing in such technologies, organizations can help create a more sustainable future for our planet.

There will likely be negative externalities from commercial space, just as there are from all sectors. As the industry grows, so will its footprint.

All stakeholders must assess their impact and demonstrate credible mitigation plans, as well as promoting the potential benefits of their technologies. With its tremendous resourcing, vaulting ambition and scientific sophistication, the space industry can expect to be held to a high standard by governments, investors, and the public — including in space itself.

The new space economy is about much more than tourism, and includes the deployment of satellites for telecommunications, earth observation, and navigation, as well as the extraction of resources from asteroids and the moon.

Grant McDonald
Global Head of Space
KPMG International

© 2023 Copyright owned by one or more of the KPMG International entities. KPMG International entities provide no services to clients. All rights reserved.

Space for space

As more and more satellites are launched and awareness of space activities increases, focus on the industry's off-earth footprint is expected to intensify.

Like our oceans and our atmosphere, our orbital space environment is a common asset that the entire world depends on and has a stake in, and it is also susceptible to degradation through environmental abuse. A portion of the damage the industry has done to our atmosphere and oceans were done in ignorance before earlier generations perhaps fully understood them. But commercial space can get sustainability right from the start.

The risks are already well-known — thousands of tons of debris already litter orbital space, and with the projected exponential growth of activities and assets, there is a high risk of further space debris buildup, to the point of impeding future space missions — the very definition of unsustainability. In addition, the buildup of satellites and other objects in orbital space threatens to interfere with earth-based stargazing activities of all kinds through invasive light and radio signal pollution.

All participants in the space ecosystem, government, industry, and new space entities, need to take responsibility for the long-term viability of space exploration as well as the quality of the orbital space environment, by identifying, prioritizing, and promoting responsible uses of space resources.

No time to go solo

The global nature of environmental phenomena and globally distributed supply chains mean that sustainability challenges are often highly complex to solve, spanning multiple geographic and political boundaries. Brokering the kind of international, multi-stakeholder collaboration necessary to deal with climate change has required humanity to build new ways of cooperating between countries, disciplines, and sectors. The same co-operative spirit will be required in commercial space, where long-term viability will depend on the actions of a plethora of stakeholders, including space agencies, commercial entities, research establishments, regulators and policymakers.

To develop the technologies, materials and rules that can keep commercial space exploitation sustainable, space agencies should share data and resources with private companies, while both will need to collaborate with research institutions and regulators. In coming together to share resources, knowledge, and expertise in pursuit of common challenges, these stakeholders can form an ecosystem that is greater than the sum of its parts.

Ultimately it is the ecosystem itself that must meet the sustainability challenge — no individual organization can do it alone.

All ecosystems need active management. In the case of the new space ecosystem, regulators have a key role to play. Only appropriate regulatory frameworks can help guarantee stakeholders prioritize sustainability in their business plans, operations, and resource allocations, ensuring that commercial space exploitation actively limits its own debris, manages resource scarcity, and mitigates its environmental impact on and above the earth. Platforms such as the UN's Office for Outer Space Affairs (UNOOSA), the World Economic Forum's Space Sustainability Rating, and the Inter-Agency Space Debris Coordination Committee (IADC) provide key nodes for the elaboration of new thinking and exchange of best practice for relevant areas like data sharing, orbit choice, and collision avoidance.

Expect questions; have answers

The commercial space industry can expect more intense scrutiny as it expands, especially on ESG sustainability grounds. Companies already in, proposing to enter, or doing business with operators in this sector must be able to clearly explain how they plan to mitigate any potential environmental harms associated with their activities, as well as how their use of space resources is compatible with the enjoyment of those resources by future generations.[1]

Companies in all sectors looking to adopt leadership positions in sustainability should consider how space-based technologies can help them hone or expand existing efforts. How are you contributing to the sustainability challenge in space?

All participants in the space ecosystem, government, industry, and new space entities, need to take responsibility for the long-term viability of space exploration as well as the quality of the orbital space environment, by identifying, prioritizing, and promoting responsible uses of space resources.

Brian Miske
Managing Director, KPMG Ignition
KPMG in the US

[1] Relevant sources:
https://arxiv.org/pdf/2204.10025.pdf
https://www3.weforum.org/docs/WEF_Space_and_Net_Zero_2021.pdf
https://www3.weforum.org/docs/WEF_GFC_Six_ways_space_technologies_2020.pdf

© 2023 Copyright owned by one or more of the KPMG International entities. KPMG International entities provide no services to clients. All rights reserved.

Space debris by the numbers

Rocket launches since
1957: 6,380

Break-ups, explosions or collisions:
650

Space objects in orbit:
>10,800 tons

Satellites that rocket launches have placed into orbit: **15,430**

In space:
10,280

Debris objects tracked by Space Surveillance Networks: **32,860**

Source: European Space Agency Last update: 27 March 2023
https://sdup.esoc.esa.int/discosweb/statistics/

NASA recently launched TEMPO, the "Tropospheric Emissions: Monitoring of Pollution" instrument as a hosted payload on a commercial satellite. This high-resolution air quality control tool will provide unprecedented resolution down to a level for monitoring major air pollutants, including ozone, nitrogen oxide, and sulfur dioxide over the continental North America. TEMPO will provide important data to analyze forms of pollution, including automobile exhaust, the impact of light pollution on ozone, and much more. Over time TEMPO should be able to issue improved air quality alerts. As NASA Administrator Bill Nelson said. "The TEMPO mission is about more than just studying pollution — it's about improving life on Earth for all. By monitoring the effects of everything from rush-hour traffic to pollution from forest fires and volcanoes, NASA data will help improve air quality across North America and protect our planet."[2]

The Space Economy plays a key role in helping the transformation to a low carbon economy through the use of satellites to collect data which monitor climate risk exposures and greenhouse gas emissions. We will continue to see the development of new space technology solutions to help global decarbonisation efforts.

Mike Hayes
Global Climate Change & Decarbonization Leader
KPMG International

[2] https://www.nasa.gov/press-release/nasa-s-high-resolution-air-quality-control-instrument-launches

© 2023 Copyright owned by one or more of the KPMG International entities. KPMG International entities provide no services to clients. All rights reserved.

How KPMG professionals can help

Strategy

Government space — Collaborating with state and federal governments on key space matters including policy and program design, implementation, and economic analysis.

Defence space — Working with defence space organizations and strengthening relationships between defence and other government departments, international partners and allies in support of access to the space domain. Developing defence space policy and architecture and supporting the current and future growth of a skilled space workforce and industry.

Cross-sector capabilities — Helping to perform a whole-of-space-sector analysis and assessing the various capabilities that can support government, industry and academia.

Deals and funding — Supporting cross-functional due diligence, mergers, acquisitions and divestitures as well as introducing and educating investor communities looking to engage in the space sector.

Data and Technology

Engineering and asset management — Performing engineering and asset management assessments of complex space systems, enabling reliability, maintainability, compliance, and cost- effective operations.

Technology and cyber security — Defining informational, operational and emerging technology strategies, architectures and roadmaps across critical infrastructure, space and non-space technologies.

Space data — Translating the potential benefits and use cases of space-based remote sensing and communications data to enable downstream on-Earth applications.

Operations

Supply chain optimization — Collaborating with organizations strategically and operationally to help analyze, plan, build, model, and run optimized wide-ranging operations.

Legal and regulatory — Helping to navigate the complexities of the legal and regulatory compliance requirements of operating in space.

Human capital and workforce development — Understanding the dynamic labor market to help deliver insights and decision support to shape the incoming and outgoing workforce.

Contact us

Grant McDonald
Global Head of Aerospace & Defense
KPMG International
+1 246 233 7866
grantmcdonald@kpmg.bb

Brian Miske
Managing Director
KPMG Ignition,
KPMG in the US
+1 201 505 3547
bmiske@kpmg.com

Mike Hayes
Global Climate Change & Decarbonization Leader
KPMG International
+353 877 441 656
mike.hayes@kpmg.ie

Some or all of the services described herein may not be permissible for KPMG audit clients and their affiliates or related entities.

kpmg.com/socialmedia

The information contained herein is of a general nature and is not intended to address the circumstances of any particular individual or entity. Although we endeavor to provide accurate and timely information, there can be no guarantee that such information is accurate as of the date it is received or that it will continue to be accurate in the future. No one should act on such information without appropriate professional advice after a thorough examination of the particular situation.

© 2023 Copyright owned by one or more of the KPMG International entities. KPMG International entities provide no services to clients. All rights reserved.

KPMG refers to the global organization or to one or more of the member firms of KPMG International Limited ("KPMG International"), each of which is a separate legal entity. KPMG International Limited is a private English company limited by guarantee and does not provide services to clients. For more detail about our structure please visit kpmg.com/governance.

The KPMG name and logo are trademarks used under license by the independent member firms of the KPMG global organization.

Designed by Evalueserve | Publication name: A galaxy of opportunities — Space: ESG's next frontier | Publication number: 138667-G | Publication date: May 2023