ASTRAIOS

Environmental, Social and Governance Report in the Space Entrepreneurship Ecosystem: Trends, Challenges and Opportunities

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D2.7 *Environmental, Social and Governance Report in the Space Entrepreneurship Ecosystem: Trends, Challenges and Opportunities*

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Abstract

Deliverable 2.7 summarises Task 2400's exploration of Environmental, Social, and Governance (ESG) practices in the European space industry. Over three years, diverse companies — from startups to large firms — participated in three Peer-to-Peer workshops and one-to-one follow-up interviews to share insights on ESG implementation, challenges, trends and opportunities.

The findings highlight ESG's role as a strategic driver for competitiveness, innovation, risk management, and talent attraction and retention in the space sector. Key challenges include fragmented data, regulatory complexity, resource limits, weak cross-departmental commitment and leadership involvement, and transferable skills gaps. Emerging trends show growing standardisation, automation in reporting, focus on diversity and inclusion, circular economy practices, ESG-driven skillset for future space talent, and stronger collaboration between industry and academia.

Final messages stress that ESG should be seen as an essential management tool, and not just as a reporting task. Companies benefit by identifying operational gaps and setting clear goals, while academia must align curricula to address both technical and soft skills. EU policymakers are encouraged to support the sector with clear regulations, less bureaucracy, and funding to help startups and SMEs grow sustainably, fairly and competitively.

This Deliverable offers key actionable insights to support the development of a more resilient, competitive, and sustainable workforce within the European space sector. It also underscores the lasting impact of ASTRAIOS by disseminating these insights through the *ESG Space Industry Practices Book* — a central legacy of this project.

Keywords

Space Industry, Space Programmes, Space Courses, European Space Ecosystem, Space Skills, Space Demand, New Space, Space Market Dynamics, Space Business Trends, Challenges and Opportunities, Lessons from the Field, ESG Space Industry Practices Book, ESG Practices, Sustainability, Environmental Impact, Society, Diversity, Employees Wellbeing, Social Responsibility.

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Abbreviations	Explanation
AZO	Anwendungszentrum GmbH Oberpfaffenhofen
CSRD	Corporate Sustainability Reporting Directive
ESG	Environmental, Social, and Governance
ESG Space Industry Practices Book	Environmental, Social and Governance Space Industry Practices - Closing the Gap Between Sector Needs and Educational Offers for a More Competitive European Space Workforce
GRI	Global Reporting Initiative
HR	Human Resources
IFRS	International Financial Reporting Standards
KPIs	Key Performance Indicators
AI	Artificial Intelligence
EO	Earth Observation
GEO	Geostationary Earth Orbit
MEO	Medium Earth Orbit
OECD	Organisation for Economic Co-operation and Development
UN	United Nations
UN SDGs	United Nations Sustainable Development Goals

Figure 1: Abbreviations

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1. INTRODUCTION

1.1 Executive summary

1.1.1 Acknowledgements

The valuable insights from the companies participating in Task 2400 played a central role in shaping the outcomes presented in this report. Through their engagement in workshops, surveys, and interviews, they provided essential insights of Environmental, Social and Governance (ESG) practices within the European space sector. Their input was instrumental in identifying challenges, opportunities, trends and skills needs relevant to the future of space workforce.

Appreciation is also extended to the consortium partners whose collaboration supported the successful implementation of this work. AZO recognises the collective effort that enabled the development of this deliverable and expresses gratitude to all project partner contributors for their role in advancing a more competitive, inclusive, resilient and sustainable European space ecosystem.

1.1.2 ASTRAIOS

The ASTRAIOS project aims to bridge the gap between current educational offerings and the evolving needs of the space industry by identifying existing space-related education and training opportunities across Europe and projecting future skills demand.

Through close collaboration with industry, academia, and policymakers, ASTRAIOS works to align education and training pathways with the competencies required for the next generation of space professionals. This alignment is essential to fostering innovation, boosting competitiveness, and ensuring Europe remains a global leader in the space sector.

1.1.3 Overview of Task 2400

Task 2400 was designed to provide an in-depth exploration of ESG practices across the European space industry, with a focus on aligning industry needs with academic curricula. As outlined in the Grant Agreement, this task aimed to map how ESG practices are integrated into the space industry and identify how these practices can help shape the future of the European space workforce.

Task 2400 was designed as a Peer-to-Peer learning journey among the space industry implementing ESG practices, uniting a diverse mix of space and, to a lesser extent, non-space companies — from startups and SMEs to established corporations — spanning different European regions, governance models, technologies, services, and societal impacts. Over three years, AZO Anwendungszentrum GmbH Oberpfaffenhofen (hereinafter, AZO) successfully engaged eleven committed space entities (see Section 2.6), which actively contributed to three interactive Peer-to-Peer learning workshops and individual follow-up interviews. Together, they shared experiences, challenges, trends and successes in implementing ESG initiatives, fostering valuable knowledge exchange and capacity building across the space entrepreneurship ecosystem.

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Importantly, all companies involved joined this project voluntarily and without remuneration, underlining their strong commitment to advancing ESG in the space sector and share their valuable lessons learnt.

Driven by pressing global factors such as climate change, social inequalities, rapid digitalisation, and the post-COVID landscape, ESG has become increasingly relevant for the EU space sector. Task 2400 identified how companies are responding to these drivers, and how ESG can be used as a strategic tool to improve competitiveness, sustainability, and talent development within the space industry.

The main objectives of this task were to:

- Analyse and document ESG practices within the space sector to identify common challenges, opportunities, new trends, best ESG practices, skills gaps and lessons learnt.
- Produce two key outputs:
    - Deliverable D2.7 – Environmental, Social and Governance Report on the Space Entrepreneurship Ecosystem: Trends, Challenges and Opportunities: a comprehensive overview of the findings from the Peer-to-Peer learning workshops and follow-up interviews.
    - Environmental, Social and Governance Space Industry Practices - Closing the Gap Between Sector Needs and Educational Offers for a More Competitive European Space Workforce (hereinafter, the *ESG Space Industry Practices Book*): a storytelling-driven book showcasing space industry´s best ESG practices, storylines to inspire action and highlight how ESG drives positive change in the workforce, including the alignment between space curricula and skills demanded by the industry.
- Foster dialogue and collaboration between companies and academia to align educational curricula with the evolving needs of the space industry, including both technical and soft skills. Forming a community of ESG practitioners and closer connection with academia.
- Strengthen the impact of ESG practices by demonstrating their value for improving corporate performance, talent development, and societal and environmental impacts.

As such, this Deliverable summarises the activities and findings of Task 2400. It consolidates the knowledge generated throughout the process and documents the journey and collective effort made by AZO managing the companies and contributing ASTRAIOS partners, showcasing the activities, discussions, and insights gathered from January 2023 to December 2025.

AZO, as the task leader, worked closely with the consortium partners to design and deliver a structured programme of activities since the very beginning. In June 2023 AZO gathered the task contributors to define the objectives, the action points and responsibilities, the process (timeline), approach, expectations for partners and companies, and the final output (see Annex 1.1) to collaboratively deliver:

- Three Peer-to-Peer Workshops: These online workshops took place at key Task 2400 milestones (M12, M18, and M30), each focusing on a different aspect of the industry´s ESG practices. They featured interactive exercises via the Miro platform, along with discussions and presentations aimed at capturing company ESG experiences, exchanging best practices, skills gaps and generating lessons learnt together with actionable insights.

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- Individual One-on-One Follow-Up Interviews: In addition to the workshops, AZO conducted one-on-one interviews to gather more in-depth insights, capturing detailed ESG practices information and missing skills that were not fully expressed in group settings.

It is important to highlight that following the Peer-to-Peer learning workshops, AZO conducted one-on-one follow-up interviews with companies that expressed interest in further sharing their ESG journey. These interviews aimed to enrich the learning process by underscoring the most engaged and representative voices from the Peer-to-Peer process, offering a more personal and in-depth opportunity to share ESG insights and experiences. To conclude the learning exchange process, AZO brought together ten companies to reflect on their ESG practices and share key takeaways in the *ESG Space Industry Practices Book*, ensuring a comprehensive end to the collaborative journey. Please note that one of the companies involved in this task was unable to participate in the *ESG Space Industry Practices Book* due to their internal approval constraints.

1.1.4 Context

ESG implementation is increasingly becoming a critical differentiator for companies striving to remain competitive and resilient in today's rapidly evolving global economy. Beyond regulatory compliance, ESG offers a comprehensive framework to assess environmental impact, social responsibility, and governance practices — ensuring that growth is pursued responsibly, strategically, and sustainably.

In the space sector, ESG is emerging as a business necessity, not just a "nice-to-have." With its highly visible role in global innovation and its critical contributions to fields like telecommunications, climate monitoring, and navigation, the space industry faces unique pressures to operate transparently and sustainably. Integrating ESG principles helps companies align with European Green Deal objectives, meet rising regulatory demands (see Section 3), and strengthen trust among investors, clients, employees, and the wider public.

ESG practices cover a broad spectrum of activities[1]:

- **Environmental:** From reducing greenhouse gas emissions and improving energy efficiency to sustainable resource use and responsible waste management.
- **Social:** Fostering diversity, equity, and inclusion (DEI), protecting human rights, improving working conditions and engaging meaningfully with local communities.
- **Governance:** Ensuring transparency and accountability through strong board structures, ethical decision-making and risk management.

While the implementation of ESG practices is still largely voluntary, the pressure to act is increasing. Investors, policy makers, and society are increasingly expecting companies to take responsibility, not just for financial performance, but for their impact on the world. Corporate strategies need a shift towards a more conscious,

[1] *Robin Pradal, PwC, Short Introduction to ESG practices (See Annex 1.10) and Novisto – The Importance of ESG Practices in Business (Part 1 & 2, 2023) - see under References Section on Page 57.*

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resilient, fair, competitive and sustainable model of leadership if they want to sustain their businesses and talent.

European space companies are increasingly adopting ESG practices, driven by market demand, regulatory pressures, and the need for talent retention. As younger generations prioritise working for companies with strong ethical and sustainable practices, these companies face mounting internal pressure to deliver on their ESG commitments.[2] At the same time, the geopolitical landscape is shifting. Emerging global tensions and evolving defence priorities risk diverting political attention and financial resources away from ESG initiatives. This creates a challenging environment for ESG-forward companies, which must balance their commitment to ESG practices with the need to adapt to new, pressing geopolitical and financial realities.

Collaboration between industry, policymakers, and academia is crucial for maintaining Europe's momentum in building a competitive, resilient and sustainable space ecosystem. AZO played a key role in uniting diverse European space companies, fostering an open environment to share ESG experiences, challenges, and solutions. This collaborative approach highlighted industry ESG practices and skills gaps, helping to bridge the divide between current sector´s needs and the skills required for the next generation of space professionals.

[2] *Companies Insights collected at the Peer-to-Peer Learning Workshops and Follow Up Peer-to-Peer Interviews - see under Peer-to-Peer Learning Workshops Section on Page 17 and Peer-to-Peer Learning Workshops and Follow-Up Interviews Results on Page 29.*

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2. TASK 2400 IMPLEMENTATION AND OUTPUTS

To effectively showcase and analyse ESG practices within the space entrepreneurship ecosystem, the task contributors, in collaboration with the task lead AZO, implemented a series of targeted activities designed to ensure the successful completion of this task:

2.1 AZO developed and distributed multiple scouting surveys for each Peer-to-Peer learning workshop (see Annex 1.2), designed to gather insights on ESG practices from both space and non-space organisations, entities, and industry stakeholders prior to the online workshops. This approach brought diverse ESG perspectives to the table, fostering a richer and more meaningful exchange among entrepreneurs.

2.2 Promotional activities were conducted across the networks of AZO, EASN, and project industry partners to actively engage stakeholders with ESG experience, as well as, to a lesser extent, those without direct experience but with a demonstrated interest or affinity for ESG initiatives (see Annexes 1.4 and 1.5).

2.3 The Peer-to-Peer learning workshops were designed to foster the development of an ESG-focused space industry community, facilitate the exchange of best practices, and provide a platform to discuss challenges, opportunities, emerging trends, and skills gaps in ESG implementation. One workshop was held each year to maintain momentum and ensure continuity:

- First Workshop (Introduction): 11 December 2023.
- Second Workshop (Deep Dive): 25 April 2024.
- Third Workshop (Wrap-Up): 28 May 2025.

2.4 Follow-up Peer-to-Peer interviews were conducted with participants to collect deeper insights and provide an opportunity to further examine ESG practices and skills gaps (see Annex 1.3).

2.1 Scouting Surveys

The scouting process involved a targeted questionnaire for each workshop, designed to assess participants' experience with ESG, their interest in the topic, and their potential contributions. In addition to ESG experience, the selection focused on diversity in company size, maturity, sector (space downstream, upstream, or non-space), and geographical distribution across the EU. Ultimately, participants were chosen not only for their ESG expertise but also for their willingness to learn, share insights, and bridge the gap between space curricula and the industry sector.

To support targeted outreach and data collection, three tailored surveys (see Annex 1.2) were designed to reflect the specific objectives of each workshop and capture input from a broad spectrum of space industry actors:

- **Survey 1 – Mapping Awareness and Interest towards ESG Practices:**

This survey gauged initial awareness and interest towards ESG, collecting baseline data on companies' knowledge, motivations, size, sector, focus, and location. A total of nineteen responses were received.

- **Survey 2 – Exploring ESG level of experience:**

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Targeting companies with practical ESG experience, this survey collected insights into successful initiatives and challenges to identify best practices and common barriers before the workshops. It received seventeen responses.

- **Survey 3 – Validating and Finalising ESG practices Insights and Skills Gaps:**

This survey, aimed at attracting additional participants with expertise in ESG and different perspectives on skill gaps, sought to finalise our findings at the concluding workshop. It also provided valuable input for the *ESG Space Industry Practices Book* and received nine responses.

For the final workshop, while the focus was on bringing back familiar participants, AZO and the task contributors made a strategic decision to expand invitations, aiming to inject fresh ESG perspectives and generate new ideas and experiences for ongoing ESG discussions.

Overall, the combination of a structured scouting process campaign and three tailored surveys allowed us to build a participant pool that was both representative and dynamic in reflecting ESG practices across the space industry. Although the total number of participants was small, the depth, clarity, and quality of the insights shared were exceptionally high, providing strong validation to the obtained results. By balancing ESG expertise with diversity in company size, maturity, sector focus, and geography (see Section 2.3.1), the Peer-to-Peer learning workshops successfully brought together stakeholders capable of sharing best ESG practices, addressing challenges, skills gaps and introducing opportunities and new trends. This approach not only ensured discussions were rooted in practical experiences but also enriched them with diverse viewpoints, strengthening the foundation for the *ESG Space Industry Practices Book* and supporting the broader integration of ESG practices within the European space entrepreneurship ecosystem.

2.2 Promotional Activities

To engage a diverse range of participants, EASN, together with the project industry network partners led by AZO, implemented a series of targeted email campaigns (see Annex 1.4) prior to each Peer-to-Peer learning workshop. The aim was to reach startups, scale-ups, SMEs, and big corporates with Human Resources (HR) teams across the European space sector—and beyond—with varying levels of ESG experiences and interests.

Each email campaign was tailored to its target audience, highlighting the specific value and benefits of participating in the Peer-to-Peer learning process:

- **Corporate Mailing:** focused on attracting large industry players, ESG community members, and Human Resources teams. It highlighted the strategic importance of ESG and the opportunity to influence decision-makers, policymakers, and academia. This mailing also emphasised the role of HR professionals in identifying skill gaps within companies, particularly when implementing ESG reporting. It offered an opportunity for corporate participants to share insights about the skills needed for future workers and how these needs are evolving in line with their ESG modus operandi.

- **Scale-ups Mailing:** targeted companies with moderate to strong ESG experience, encouraging them to share successful initiatives, network with peers, and gain visibility and influence through their participation.

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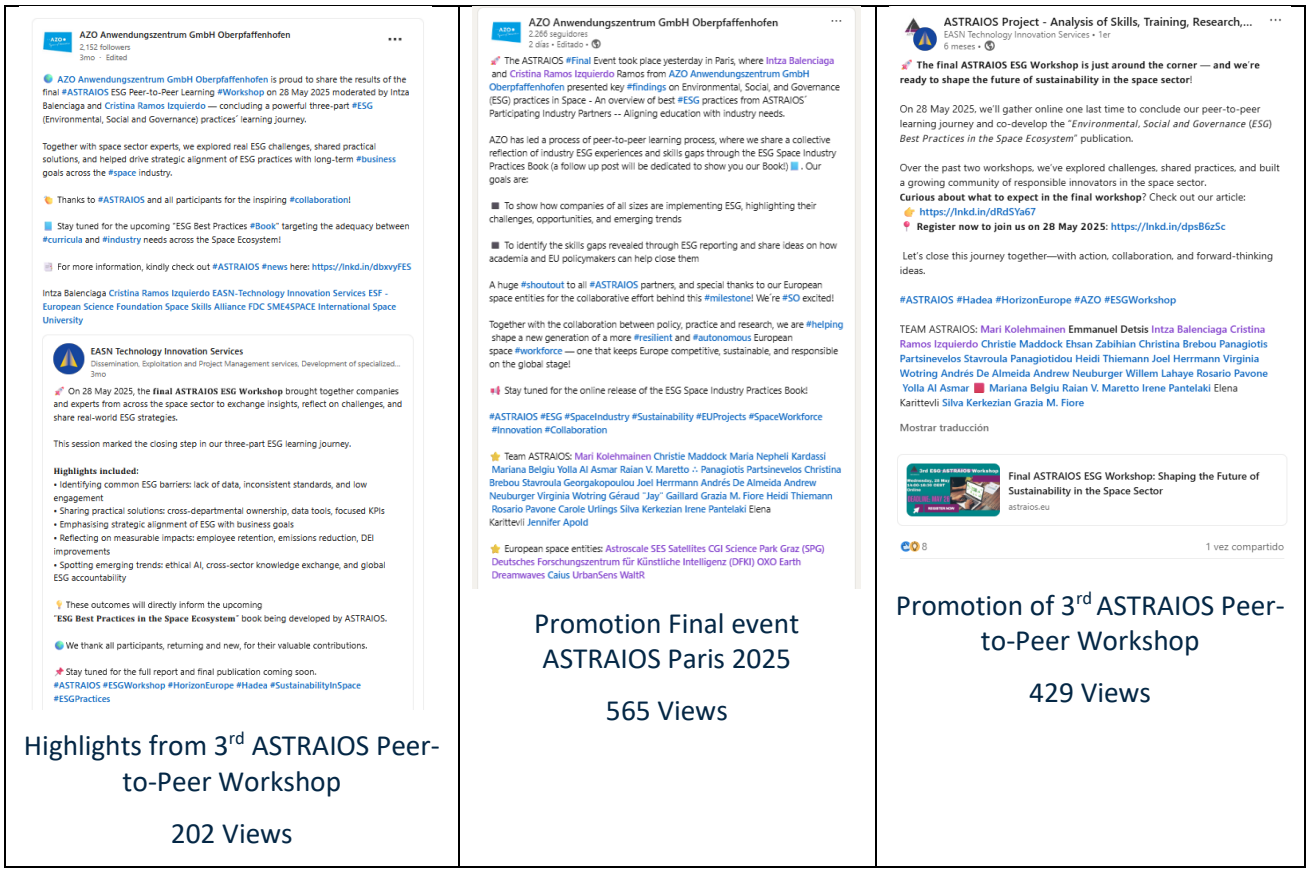
- **Startups Mailing:** aimed at early-stage companies with little or no ESG experience, offering a chance to learn, expand their ESG knowledge to foster its implementation, and grow their networks, while featuring their testimonials and plans in the *ESG Space Industry Practices Book*.

Simultaneously, a social media campaign was launched to enhance visibility and reach a broader audience in each Peer-to-Peer learning workshop, promoting the workshops and emphasising the importance of ESG in the space industry. The most viewed posts are illustrated in Figure 2 below (see Annex 1.5).



Highlights from 3rd ASTRAIOS Peer-to-Peer Workshop

202 Views

Promotion Final event ASTRAIOS Paris 2025

565 Views

Promotion of 3rd ASTRAIOS Peer-to-Peer Workshop

429 Views

Figure 2: Top Three Most-Viewed Posts from the Last Peer-to-Peer Workshop

This dual approach of targeted email outreach and social media engagement played a crucial role in attracting participants, building an ESG-focused community, and ensuring a broad representation of companies within Task 2400.

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2.3 Participating Entities and ESG Practices

2.3.1 Geographical Distribution

The diversity of entities participating in the activities of the ASTRAIOS project focusing on ESG practices reflects a broad European representation, offering valuable insights into how ESG practices are being integrated across various national contexts. As shown in Figure 4 (below), Germany accounted for the largest share of participants (27%), followed by Austria at 18%. The remaining countries — including the UK, Italy, Luxembourg, Greece, France, and the Netherlands — each contributed equally at 9%.

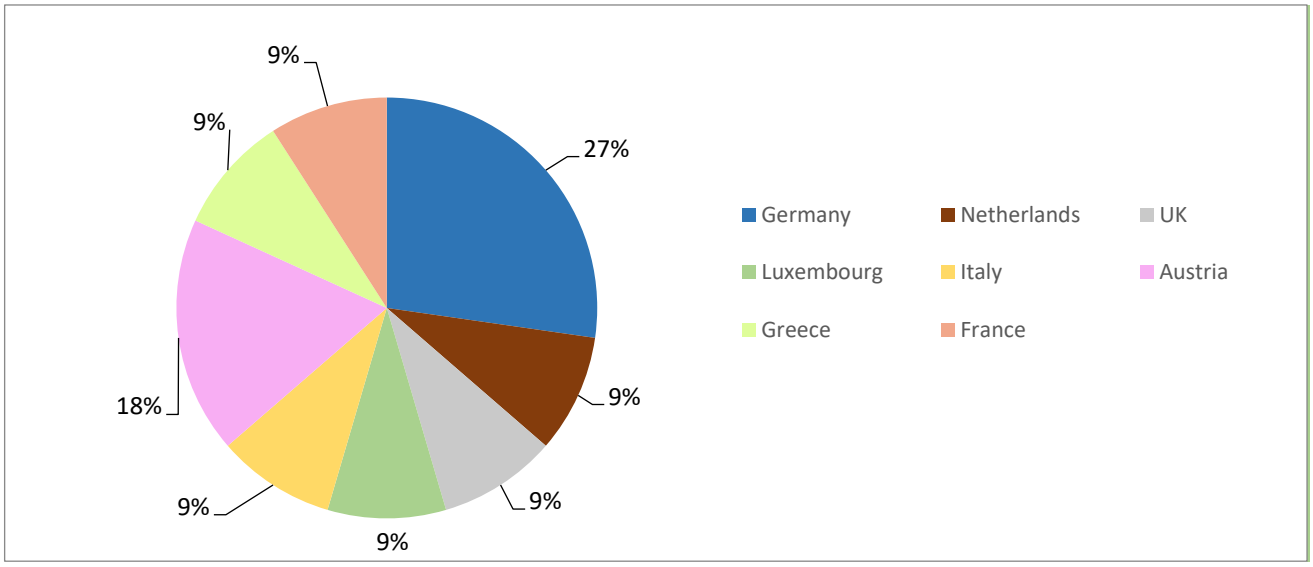

Figure 3: Participant Entities by Country of Origin

This distribution reflects both Germany's large and active space ecosystem as well as the willingness of participating organisations to contribute their time and share their experiences in this task. While these factors resulted in a higher number of German participants, the findings represent the perspectives of the companies we were able to involve rather than a definitive ranking of ESG maturity across Europe. At the same time, the participation of countries, such as Austria, Luxembourg, France, Greece and Italy, bring essential perspectives on how ESG is integrated within different economic, regulatory, cultural, and societal models.

These varied insights highlight the challenges and opportunities faced by companies as they navigate diverse national priorities, funding models, governance structures, and policy frameworks. This diversity also underscores the need for a unified European strategy that encourages cooperation and the adoption of best ESG practices, while contributing to broader global ESG goals.

A key barrier identified by the participating organisations was the lack of a common "ESG language," with fragmented standards complicating cross-border reporting. However, there is strong momentum for standardisation, with both emerging and established companies advocating for a unified ESG framework.

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There is also growing support for AI-driven ESG data platforms to simplify compliance, enhance transparency, and make ESG a more effective competitive tool for the European space sector (see Section 4).

2.3.2 Summary

The entities participating in the ASTRAIOS activities focused on ESG practices were carefully selected to ensure diverse industry representation across Europe, covering a broad range of services, technologies, and growth stages. This diversity offered a comprehensive perspective on their ESG activities, trends, challenges, skills gaps and opportunities. In total, nineteen companies responded to the first scouting survey, five of which were selected to join the consolidated group of eleven companies that remained actively engaged throughout the entire Task 2400 process. The second survey, conducted ahead of the second workshop, garnered seventeen responses, with six new companies joining the core group of eleven. The third survey received nine responses, four of which actively participated in the final Peer-to-Peer learning workshop, contributing valuable insights to the final output.

ESG practices are significantly influenced by a company's country of origin. Regulatory requirements vary widely, with some countries enforcing stricter ESG reporting expectations, while others have minimal guidelines. Additionally, cultural attitudes towards sustainability, governance, and social responsibility differ across European member states.

The table below lists the ten companies that contributed to Task 2400.

Name	Description	Nº employees	Year founded	Experience ESG	Country
UrbanSens	UrbanSens combines EO data with IoT to turn complex research into actionable intelligence, helping utilities, energy providers, and municipalities plan sustainably and improve resilience to environmental challenges.	1-10	2023	2-5 years	Germany
CGI	CGI delivers secure, high-performance IT infrastructure with advanced data centres, managing complex processing and data storage for both internal and client needs.	+1000	1976	5+ years	The Netherlands and worldwide

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Astroscale	Astroscale focuses on the safe, sustainable development of space, helping satellite operators reduce risks, increase returns, and ensure mission success while promoting a sustainable space environment.	101-500	2013	1- 5 years	The UK and worldwide
SES	SES operates a multi-orbit satellite network (GEO and MEO) and extensive ground infrastructure, delivering video and data solutions that connect people globally with enriching content.	+1000	1985	2-5 years	Luxembourg
Oxo Earth	Oxo Earth stands out for its early and deep integration of ESG principles into its core mission, earning recognition in the ESG Space Industry Practices Book. By leveraging EO data, it drives carbon capture and ecosystem restoration for sustainability.	1-10	2023	2-5 years	Germany
Science Park Graz	Science Park Graz supports over 200 high-tech projects, offering expertise and resources to help startups build successful, ESG-driven businesses.	11-50	2002	-1 year	Austria
Deutsches Forschungszentrum für Künstliche Intelligenz GmbH (DFKI)	DFKI, a German research centre focused on human-centric AI, drives ESG innovation through its collaboration with ESA in space and EO. Their significant impact on the industry made them part of the entities´ stories highlighted in the ESG Space Industry Practices Book.	+1000	1988	5+ years	Germany

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Caius	Caius uses satellite and geomorphological data to map forests, protect ecosystems, and promote sustainability, ecotourism, and rural development through innovative AI technology.	2-10	2022	2-5 years	Greece
WaltR	WaltR enhances pollution understanding to drive sustainable, efficient businesses with innovative, digital solutions.	11-50	2018	2-5 years	France
Dreamwaves	Dreamwaves specialises in spatial audio navigation using AR and 3D sound to guide users, enhancing accessibility and mobility.	2-10	2019	2-5 years	Austria

Figure 4: Summary of ASTRAIOS Task 2400 Participating Entities

2.4 Peer-to-Peer Learning Workshops

Over a three-year period, AZO organised a series of three online ESG practices Peer-to-Peer learning workshops, each ranging from one and a half to three hours in duration (see Annex 1.7). These workshops brought together European space stakeholders to exchange insights on how ESG can drive innovation and share best practices on ESG implementation. The Peer-to-Peer learning exchanges gathered a diverse group of organisations, ranging in size, maturity, and ESG expertise, to share their experiences and explore ESG's role in strengthening Europe's competitive edge. Participants discussed challenges such as cross-department collaboration, data management, skills gaps and the need for standardised frameworks, while also showcasing innovative and technical solutions like satellite-based emissions tracking and AI-powered ESG tools. This collaborative process not only provided valuable insights for policy, industry practices, and academic programmes but also demonstrated how ESG can fuel resilience, competition, and sustainable growth within Europe's space industry.

2.4.1 First Peer-to-Peer Learning Workshop

The first Peer-to-Peer learning workshop took place on 11 December 2023, bringing together seven companies and ten participants (see Annex 1.6). The primary objective was to introduce the project, facilitate networking, and engage participants in a dialogue to understand their expectations, goals, and contributions to the Peer-to-Peer process, ultimately shaping the *ESG Space Industry Practices Book*.

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This workshop also served as a platform to exchange initial ideas on ESG practices, challenges, opportunities, and trends, marking the start of a collaborative capacity-building and networking process. The agenda, including the participants´ list (see Annex 1.7), was designed to meet the workshop's goals and foster meaningful dialogue. Participants were primarily start-ups and SMEs with limited experience (2-5 years) in implementing ESG practices, with only two companies having more than five years of experience (see Annex 1.9).

All participants expressed a strong eagerness to learn about ESG in the space industry, share knowledge, and explore potential synergies and partnerships. However, they also highlighted challenges such as the difficulty in achieving tangible results, the constraints of time, resources, and expertise, and the lack of common benchmarks for data collection.

A Miro board (see Annex 1.8) was used to facilitate interactive knowledge sharing, allowing participants to contribute their thoughts, experiences, and insights in a clear and visual format. Miro[3] is an online collaborative whiteboard tool that enables real-time co-creation, making it easy for participants to brainstorm, organise ideas, and provide insights remotely. This interactive approach fostered meaningful exchanges, particularly in discussing first impressions on ESG challenges, trends, and opportunities.

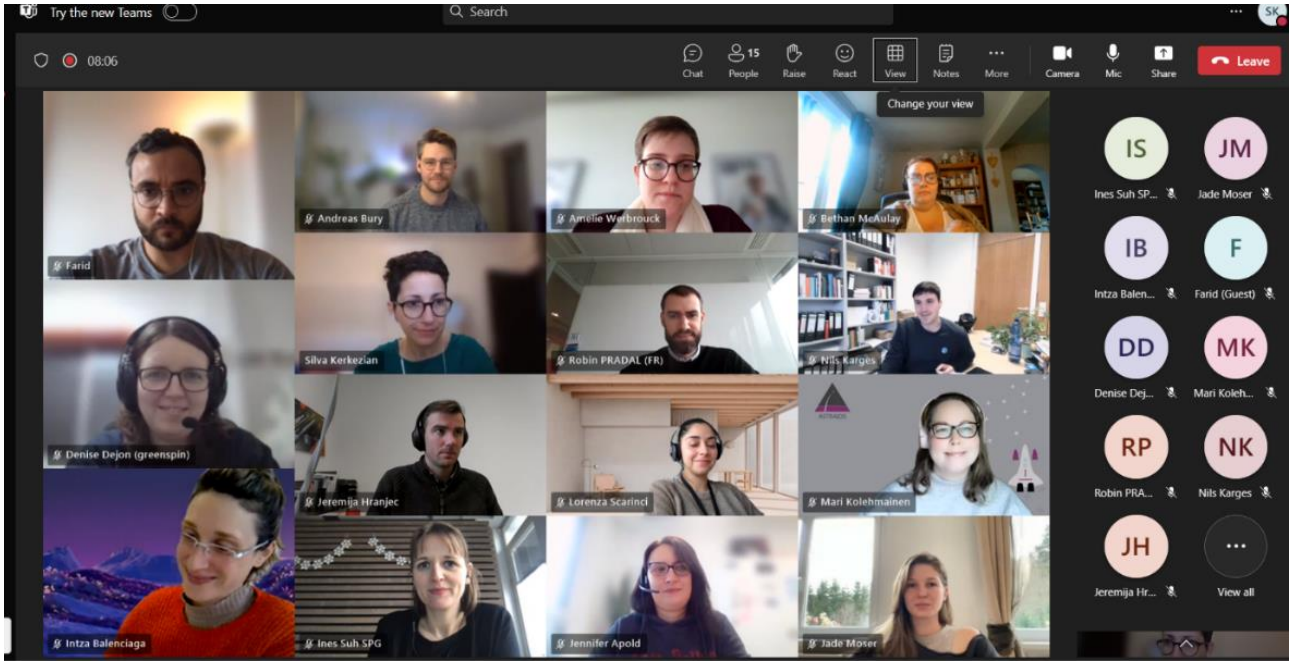

Figure 5: Group Picture of the First Peer-to-Peer Learning Workshop

While the workshop provided valuable insights into common obstacles, it also allowed for the identification of some skills gaps within the sector. However, it is important to note that these gaps were only addressed in a preliminary manner. The participants' feedback revealed early impressions that certain areas of expertise

[3]Miro: https://miro.com/

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were underdeveloped, particularly around the integration of ESG into company culture, the interpretation and management of ESG data, and the ability to set actionable, measurable ESG Key Performance Indicators (KPIs). This initial assessment suggested that there might be a need for further skill-building, especially around the adoption of standardised ESG frameworks and tools. However, a more in-depth exploration of these gaps was necessary in future workshops to confirm the extent of industry´s skills shortages to improve space curricula.

The group also identified several recurring challenges, including integrating ESG into company culture, limited access to quality data, the absence of standardised frameworks, and the difficulty of defining clear KPIs and priorities. Participants also emphasised the importance of stakeholder engagement and transparent communication in advancing ESG efforts (see Annex 1.8).

Despite these challenges, companies recognised significant opportunities in ESG, such as improved transparency, stronger employee engagement, and enhanced organisational well-being. ESG was widely seen as a driver of value creation and competitiveness. Emerging trends also included a heightened focus on inclusion and diversity, energy efficiency, ESG-informed investment decisions, and a growing push for standardisation and a shared ESG language across the sector. Based on the insights gained, AZO concluded that the second online gathering would benefit from the involvement of more experienced companies to deepen the ESG practices dialogue and enhance the Peer-to-Peer learning process (see Annex 1.9).

2.4.2 Second Peer-to-Peer Learning Workshop

The second Peer-to-Peer learning workshop was held on 25 April 2024, with eleven participants representing nine companies. This session marked a shift towards targeting more mature companies with experience in ESG practices. The promotion of the workshop attracted a higher number of companies and fostered stronger engagement among participants (see Annex 1.6).

Participants actively engaged in discussions on emerging trends, current challenges, future opportunities, and shared their best ESG practices. They provided insights on the impact and lessons learnt from the ESG actions they had implemented (see Annex 1.8).

The agenda, including the participants´ list (see Annexes 1.6 and 1.7), was structured to allow more time for feedback on ESG practices and foster deeper discussions. The session began with participants introducing themselves and sharing their experiences and interests related to ESG by means of a Miro board (see Annex 1.8), which ensured an interactive and inclusive participation.

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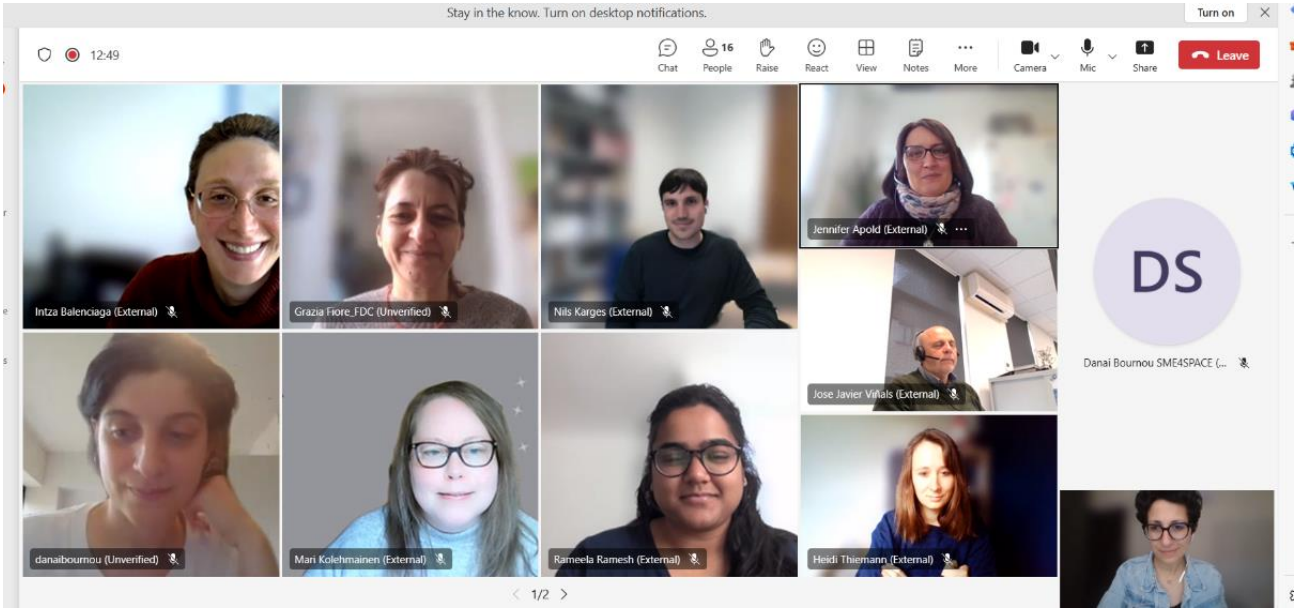

Figure 6: Group Picture of the Second Peer-to-Peer Learning Workshop

Participants had the opportunity to express the difficulties they experienced and success stories, highlighting the following points (see Annex 1.9):

Challenges Encountered in ESG Practices

Participants highlighted several challenges they faced when implementing ESG practices:

- Difficulty in collecting and processing relevant ESG data.
- Lack of expertise and short-term project constraints.
- Dealing with cultural and societal differences across global teams.
- Underestimating the time needed to collect ESG data and engage multiple departments.
- Balancing day-to-day business operations with broader ESG strategies.
- Encouraging colleagues to recognise the importance of ESG.
- Integrating geospatial data with other data sources for consistency and accuracy.
- Aligning various ESG standards and methodologies.
- Lack of a common language or terminology in ESG discussions.
- Reliance on estimated data rather than raw data, limiting ESG reporting accuracy.
- Struggled with greenwashing, insufficient data quality, and a lack of ESG expertise.

Success Stories in ESG Implementation

Despite the challenges, participants also shared their successes:

- Completed the first Life Cycle Assessment (LCA), published annual reports, and fostered partnerships to create a positive societal impact.
- Gained senior leadership and board support, showing growing internal commitment to ESG.

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- Found success in a leadership team that fully supports ESG and integrates it into company culture.
- Used geospatial data to improve ESG reporting accuracy.
- Promoted diversity and interdisciplinary collaboration in the development of robotic technologies.
- Successfully transitioned 100% of its Data Centres to renewable or low-carbon energy.

Key Discussions:

1. ESG Analysis and Implementation Responsibilities

Participants pointed out various best practices for implementing ESG analysis and responsibilities:

- A dedicated ESG team manages activities and coordinates with other departments.
- The Vice President of Operations ensures alignment between ESG efforts and operational priorities.
- ESG tasks are housed within the Finance Department with a governance structure to integrate ESG across core functions.
- External third parties audit certain ESG activities, following a structured timeline.

2. Reasons for Implementing ESG Practices

Participants identified several reasons to adopt ESG practices:

- Positive impact on employee engagement, well-being, and talent retention.
- Creation of value and serving as a market driver.
- Enhancement of corporate culture, appreciated by suppliers, stakeholders, and customers.
- Risk reduction and growth through sustainability.
- Alignment with core values such as being ethical, responsible, and sustainable.

3. Steps and Tools for ESG Analysis

Several companies have already engaged in ESG analysis using various frameworks:

- Collaborates with stakeholders and explores tools to automate ESG data collection, using UN Principles and OECD frameworks.
- Integrates satellite imagery and IoT data with GRI standards and CSRD metrics.
- Works with external consultants and applies UN SDGs as a framework.
- Incorporates SDGs into their ESG strategy.

4. Encouraging More Widespread ESG Reporting

Participants discussed strategies for encouraging broader ESG adoption:

- Align ESG factors with business strategy and create public pressure to increase transparency.
- Encourage global inclusion and balance for sustainability and equity.
- Promote the idea that reporting is the first step toward recognising the impact of ESG efforts.
- Government-funded companies can improve safety, reduce energy consumption, and align technologies to achieve a unified ESG target.

5. Results from ESG Reporting

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Participants shared successful outcomes:

- Enhanced employee diversity through initiatives such as a 9-day fortnight, hybrid work, and employee support policies.
- Strengthened corporate culture by aligning ESG with corporate objectives and gaining a clearer understanding of their societal impact.
- Used sustainable reporting to better understand customer needs and improve service development.
- Increased talent retention strengthened client relationships, and greater stakeholder engagement.

6. Stakeholder Impact and Engagement

Participants discussed the broader impact of their ESG initiatives:

- ESG raises awareness among employees and encourages thoughtful actions that affect communities.
- ESG efforts impact employees, stakeholders, investors, and the broader ecosystem, including suppliers and customers.
- ESG affects the entire value chain, from suppliers to local communities.

7. New Trends in ESG Reporting

Several trends and needs for future ESG practices were identified:

- Development of global, open-access environmental databases and real-time ESG monitoring.
- Incorporating ESG into bids and dedicated funding opportunities, as is common in UK government contracts.
- The importance of laws that ensure sustainability is profitable and not reliant on individual CEOs.
- Need for coherence, transparency, and global alignment in ESG practices.

AZO concluded that, following the success of the second Peer-to-Peer ESG capacity exchange, it was crucial to ensure the process was wrapped up with the companies already involved. At the same time, there was significant value in inviting non-space actors who are implementing ESG practices, to bring fresh perspectives and broaden the scope of the discussions. Learning from the challenges and successes of non-space sectors also offered an important opportunity for space companies to see, reflect and compare effective ESG approaches, reinforcing the Peer-to-Peer learning process. Additionally, it was decided that the subsequent one-on-one follow-up interviews were going to dive deeper into the skills gaps identified by industrial peers, helping to develop targeted messages for academia and EU policymakers.

2.4.3 Third Peer-to-Peer Learning Workshop

On May 28th, 2025, AZO hosted the third and final ESG Peer-to-Peer learning workshop, bringing together professionals from across the space sector and related industries such as IT services, energy, and manufacturing with ESG experience. Participants engaged in meaningful discussions on various ESG practices, participating in collaborative activities, sharing real-world experiences, and highlighting not only the challenges they face but also the impact, lessons learnt, emerging trends, and opportunities within the ESG landscape (see agenda and attendees´ list in Annexes 1.6 and 1.7).

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AZO opened the session by providing a brief recap and status quo of ASTRAIOS's goals, emphasising the critical role of ESG in addressing workforce gaps and challenges within the space industry. Participants were reminded that the findings from interviews, surveys, and workshops will culminate in the *ESG Space Industry Practices Book* and the formal Deliverable 2.7. This final session welcomed both returning participants —such as Astroscale, CGI, DFKI, and SES — as well as a new participant, EwoSmart, that latter brought valuable insights based on their experience implementing environmentally friendly practices. However, since the company joined during the final workshop and did not participate in earlier stages nor demonstrated the willingness for a follow up one-to-one interview, it is not included in the *ESG Space Industry Practices Book*.

The workshop featured a presentation on space-related educational programmes, workforce trends, and mobility patterns across Europe offered by SSA. The presentation also addressed issues such as gender imbalances, regional brain drain, and the need for better alignment of skills between academia and industry (see Annex 1.9).

Participants engaged through the Miro board (see Annex 1.8) and took part in an interactive poll, sharing where they stand in their ESG journeys. The poll covered a range of topics, including experience levels, strategic challenges, reporting frameworks, and the primary motivations for implementing ESG practices. This helped establish a shared understanding of the participants' contexts and common challenges — such as limited resources, data management, and balancing ESG objectives with business priorities. It also highlighted key takeaways, such as the importance of starting small, setting clear expectations from the outset, aligning ESG with business strategy, and involving employees early in the process.

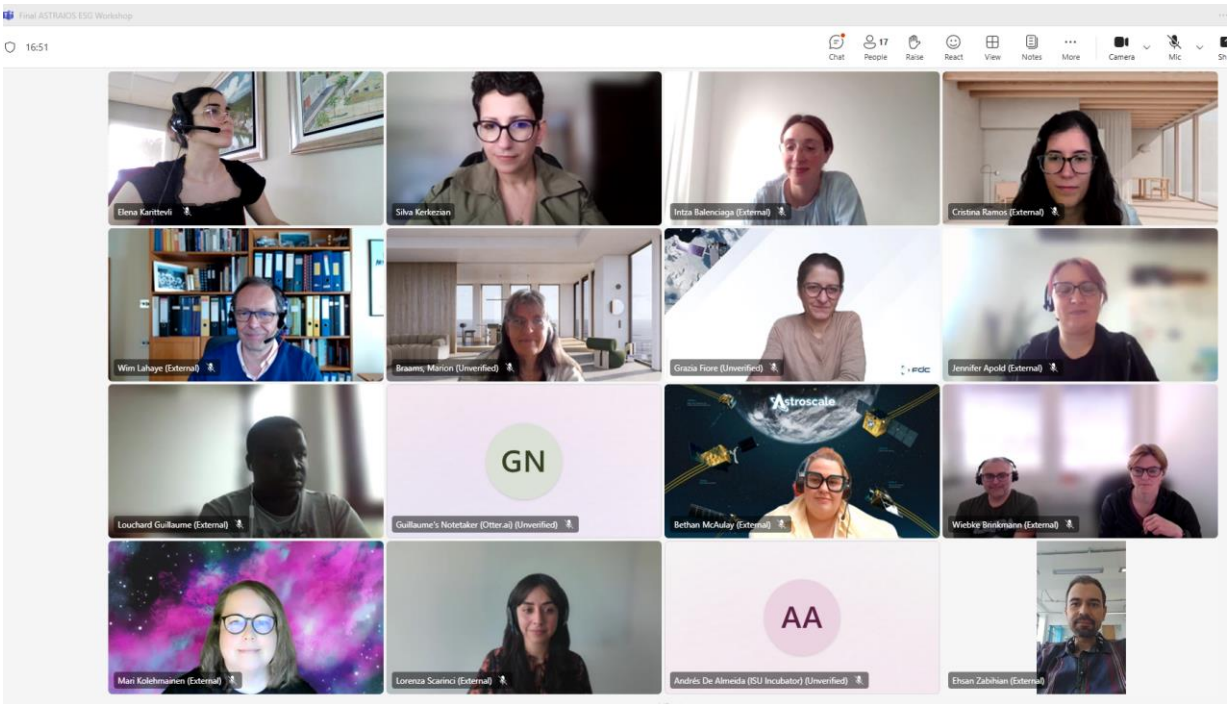

Figure 7: Group Picture of the Third Peer-to-Peer Learning Workshop

The following graphics illustrate some of the results of the participants' responses to the polls (see Annex 1.8):

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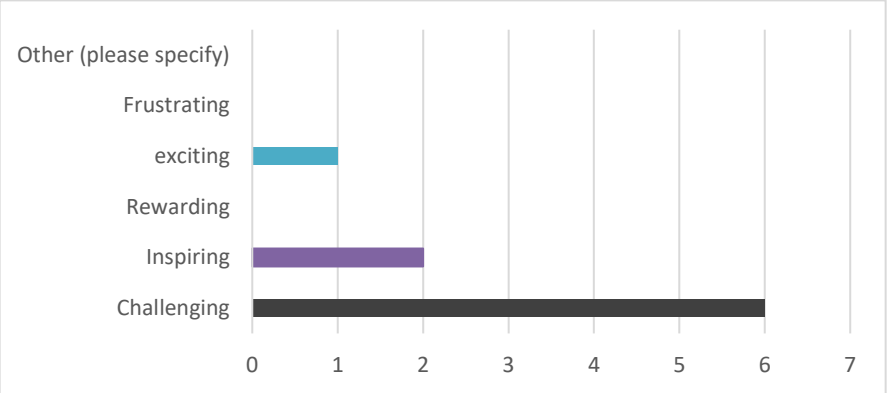

Figure 8: What's one word that describes your ESG journey so far?

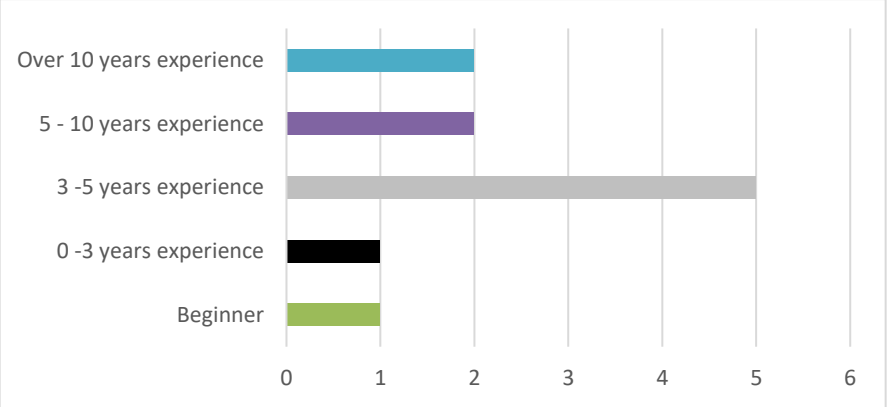

Figure 9: How familiar are you with ESG?

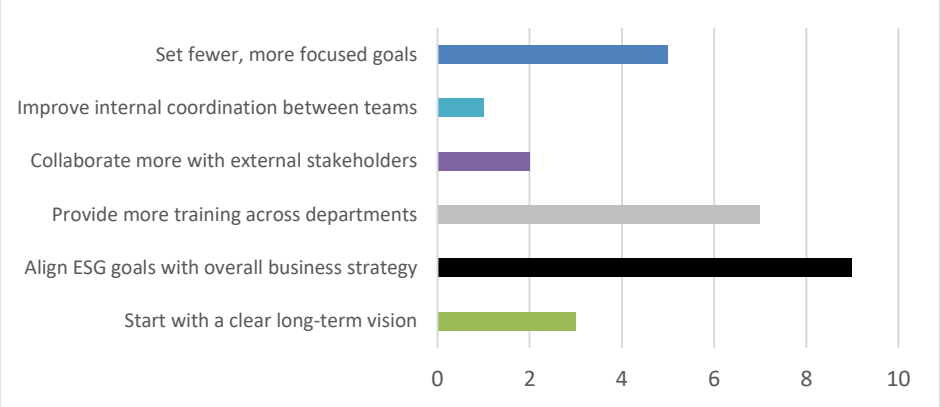

Figure 10: What would you do differently in your ESG journey?

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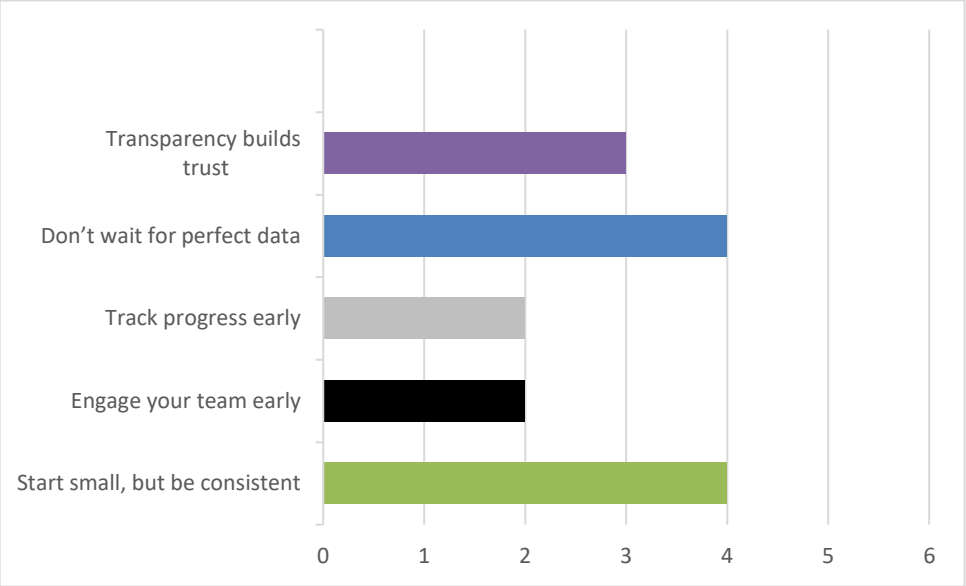

Figure 11: What's one lesson you'd share with others starting ESG?

Figure 12: Which area of ESG is most developed in your company?

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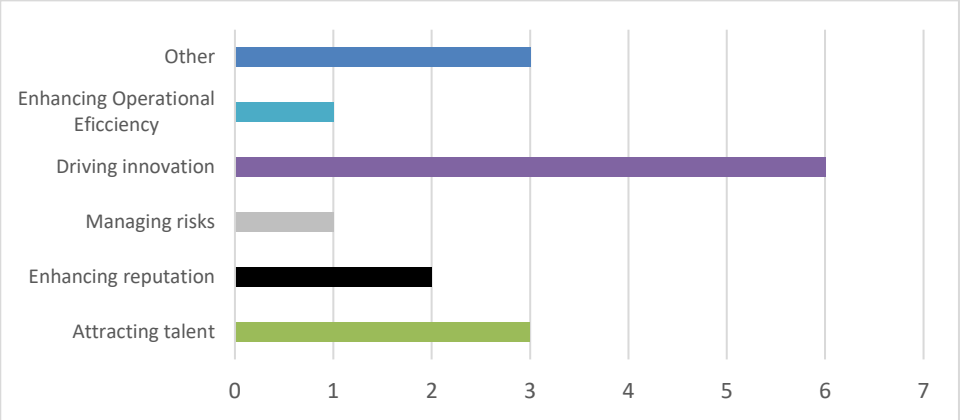

Figure 13: Which of these ESG benefits resonates most with your company's goals?

Participants also engaged in the *Reflect, React & Relate* activity, designed to foster open ESG practices dialogue and collaborative problem-solving. Using the Miro platform, they shared their experiences, identified key challenges in ESG implementation, and explored emerging trends and missing skills. Additionally, they discussed both measurable and more complex, harder-to-quantify impacts of ESG initiatives across the space sector (see in detail Section 2.5):

Challenges Identified:

Participants highlighted various challenges encountered and the corresponding solutions proposed:

- Lack of accurate data.
- Lack of consistent standards.
- Insufficient resources for a committed ESG approach.
- Balancing ESG goals with limited budgets.
- Aligning environmental goals with business strategy across multiple locations.
- Low team engagement; ESG perceived as additional workload.
- Balancing employee expectations with business needs and regulations.
- Fragmented ESG approaches across countries/companies.
- Prioritising emission reductions.
- Client buy-in issues.
- Manual ESG data collection.
- Time-consuming, manual data collection via Excel.
- ESG work constrained by budget.
- Aligning ESG with business strategy.

Lessons Learnt:

- Standardise data collection and communicate purpose clearly to colleagues.
- Advocate for a shift in political approaches to align ESG priorities.
- Deliver smaller, short-term wins to demonstrate value to the broader business.
- Collaborate with partners to reduce internal burdens and costs.

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- Promote alternatives to air travel and engage with local communities.
- Involve departments early in ESG initiatives to increase ownership.
- Align client expectations with ESG objectives.
- Implement a unified global approach. Adopt global ESG reporting.
- Use 95% green energy data centres and advocate for full adoption.
- Emphasise the value and outcomes of ESG work.
- Implement tools to automate and standardise data collection.
- Implement centralised data platforms and ERP systems for consistency and traceability.
- Align ESG project proposals with existing work plans or identify parallel initiatives.
- Assign ESG-related tasks formally within employee responsibilities.
- Coordinate local carbon footprints with territorial emission targets.
- A unified global ESG approach should accommodate local differences in understanding and readiness. Prioritise measurable ESG topics that align with company priorities, avoiding superficial "tick-box" efforts.
- Structured Diversity & Inclusion programmes foster greater representation and inclusivity, empowering young talent.
- Setting a limited number of focused ESG objectives, tied to the business strategy with clear KPIs, helps align environmental initiatives with company goals and turn ESG objectives into shared metrics.

Impacts – Measurable & Difficult to Measure:

Measurable	**Difficult to Measure**
▪ Sustainable procurement and GHG emissions tracking have reduced their environmental footprint. However, air travel remains a major emissions contributor. ▪ Digital inclusion projects have enhanced both their brand and employee engagement. ▪ Promoting flexibility and well-being has likely improved employee retention, though data is incomplete. ▪ On-orbit servicing and sustainable satellite solutions mark a shift towards more sustainable practices, with growing commercial support. ▪ ESG policies have fostered a more inclusive company culture, enhancing employee engagement.	▪ The impact of sustainable procurement practices on supplier ESG evaluations is harder to quantify but strengthens ethical sourcing commitments. ▪ Emissions from imported goods (e.g., from China) are challenging to track and control. ▪ The broader impact of ESG efforts on company culture remains challenging to assess comprehensively. ▪ The full impact of diversity, equity, and inclusion (DEI) practices on organisational culture is still being evaluated. ▪ The wider societal impact of bridging the digital divide is harder to quantify but has created a stronger sense of community within the company.

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Figure 14: Insights Participating Entities Measurable & Difficult to Measure

Trends & Opportunities:

Not a Priority Right Now:

- Corporate interest in biodiversity conservation is rising but remains challenging for IT-focused companies to address directly.

Growing Trends & Opportunities:

- Increasing awareness of best practices for employees in space, with more UK initiatives and openness to knowledge-sharing across the industry.
- Expanding collaboration on ESG practices across companies, embedding ESG at all levels of operations and tying it to risk management (e.g., climate change, demographic shifts).
- A growing focus on ethical AI development, with CGI signing an ethical AI pledge and addressing AI's energy consumption challenges.

In conclusion, the discussions during the third Peer-to-Peer workshop highlighted several key themes that became central to the *ESG Space Industry Practices Book*. These included the need for stronger cross-departmental engagement, smarter data management, and increased collaboration with external partners to lighten the load of ESG implementation. Companies also emphasised the importance of expanding ESG accountability globally and identified valuable opportunities for knowledge sharing across sectors. Additionally, aligning ESG strategies with long-term business goals was seen as a critical path forward.

There was a shared recognition that social and environmental factors are becoming increasingly vital within the space sector. To capitalise on this momentum, participants underscored the need for continuous dialogue and collaboration, particularly through Human Resources networks, to exchange best practices and accelerate ESG maturity across the industry. An important topic that emerged was the noticeable skills gap, including a shortage of professionals who combine technical expertise with ESG knowledge, systems thinking, and environmental risk assessment. Participants also highlighted the lack of soft skills such as resilience, emotional intelligence, and adaptability, which are crucial in the high-pressure environment of the space sector.

AZO concluded the session by outlining the next steps, which included one-on-one follow-up discussions with participants from this and previous workshops who were committed to and engaged with the project's final output.

2.5 Peer-to-Peer Learning Workshops and Follow-Up Interviews Results

This section focuses on the eleven companies´ ESG practices that were selected for their active and sustained participation throughout the surveys, Peer-to-Peer workshops, and, most importantly, the follow-up one-on-one interviews. These companies, representing diverse sectors and growth stages, were chosen for their commitment to advancing ESG practices and their individual experiences. They provided valuable lessons on how long-term commitment, structured governance, and cross-departmental collaboration can transform ESG ambitions into measurable impact across the space sector.

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2.5.1 Established Entities

2.5.1.1 Astroscale

Founded in 2013, Astroscale has grown into a global player with offices in the UK, US, Europe, and Japan. The company's mission is to promote responsible satellite operations and ensure the long-term viability of Earth's orbital environment. Astroscale provides a sustainable business model that actively reduces environmental impact across the entire satellite lifecycle, from launch to end-of-life planning.

Through innovative solutions such as greener fuels, reusable launch systems, debris removal, and in-orbit servicing, Astroscale is helping to shape the future of a space sustainable industry.

Key ESG Practices

Astroscale gave a comprehensive overview of the various social and environmental practices implemented.

Their approach to sustainability extends beyond space operations to how they build and grow their business, ensuring minimal environmental impact on Earth as well. Astroscale is committed to changing the industry's traditional "single use" mentality.

Astroscale has implemented several social practices to support employee well-being and work-life balance, particularly focusing on flexibility. Their key initiatives include:

- **Flexible Working Hours:** Instead of a strict working schedule, employees follow core hours, allowing them to manage personal responsibilities, exercise, or quiet work time.
- **Hybrid Work Model:** Employees are expected to be in the office two days per week, but each team has the freedom to structure their in-office days differently.
- **Work from Abroad Policy:** Recognising their diverse workforce (31 nationalities in the UK alone), Astroscale allows employees to work remotely from abroad for extended periods, particularly around holidays.
- **Nine-Day Fortnight:** Employees can opt to work slightly longer hours each day in exchange for a Friday off every other week. The entire company takes the same Friday off to ensure a unified break.
- **Improving life transitions:** Better support for employees going through menopause, improving parental leave policies, and increasing awareness of shared parental leave.

These policies have been gradually introduced over the past three years, helping to retain highly skilled employees who might otherwise have had to leave due to personal circumstances. Employee feedback has been positive, with flexible work options, smooth returns from maternity leave, and overall job satisfaction have been a major factor for job acceptance.

Astroscale is committed to developing and implementing wellbeing initiatives that support employees in both aspects of their lives, professionally and personally.

Challenges & Lessons

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The company has made significant progress in social initiatives, such as flexible working policies, employee well-being, and diversity monitoring.

- **Balancing business demands, regulations, and employee satisfaction:** Astroscale's flexible work policies have been well-received, but the fast-paced nature of the space sector means customers and suppliers often expect immediate responses, even outside set schedules. This can make boundaries difficult to enforce.

  Lesson: Astroscale is working to design policies that offer equal opportunities while respecting individual needs. Flexibility can be a strategic asset for retention and engagement, but only when aligned with business priorities and legal requirements.

- **Bridging ESG gaps without overloading the team:** Different regulations in each country complicate the creation of uniform ESG policies with very different levels of ESG maturity, while every new initiative demands resources and coordinating data collection and best practices across teams is complex.

  Lesson: Scaling ESG requires balancing ambition with capacity. Astroscale now prioritises key topics, measures their impact carefully, and strengthens internal data collection to guide better decisions and prevent burnout but also makes it easier to share best practices across all locations.

- **Overcoming Resistance to Knowledge-Sharing:** Within the space industry, ESG often sit under HR, but many companies don't have dedicated HR teams, and the social component remains undervalued. This gap makes it harder to roll out governance-related ESG practices effectively and slows progress across the sector.

  Lesson: Change cannot happen in isolation. Shared policies, open dialogue, and collective action are vital to transform industry culture, particularly in the underrepresented social dimension of ESG. Two of the Astroscale team are founding members of an HR network in the UK space sector, ConstellHR.

- **Lack of Consistent ESG Standards:** Without common ESG frameworks, governance and social responsibility risk being treated as optional rather than essential. Standardised criteria would make ESG compliance a given, helping companies prioritise governance and social initiatives in their day-to-day operations.

  Lesson: Astroscale sees space conferences as vital for advancing ESG dialogue and sharing practical solutions. Government collaboration is key to setting common standards and metrics, enabling fair comparisons and faster ESG adoption across the industry.

Balancing employee needs with business demands, aligning practices across regions, and facing industry-wide gaps in social ESG and standardisation show that progress requires not only internal action but also collective collaboration across the space sector.

Opportunities & Trends

Astroscale's journey reveals several opportunities to strengthen both its internal culture and the wider space industry:

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- **Talent Attraction & Retention:** Astroscale continues to introduce policies gradually (e.g., flexible work, career pathways, return-to-work support) and support for life transitions (e.g., maternity leave, illness recovery) reduce attrition and make the company, and the wider industry, more attractive to new professionals.
- **Career Development Focus:** Ongoing projects on personal growth and career pathways are being tested internally.
- **Knowledge Sharing:** While there is resistance across the sector to share HR and people-management practices, Astroscale continues to encourage collaboration and sees an opportunity for greater openness to accelerate progress.
- **Social ESG as a Growth Opportunity:** The social dimension remains undervalued across the space industry, but demonstrating its positive impact on people, business, and communities could strengthen stakeholder engagement and attract talent.

Missing Skills

The future of the European space sector depends on people as much as on technology. Building a truly sustainable and competitive industry requires not only technical expertise but also strong social and multidisciplinary competencies. Astroscale stresses that standardising ESG benchmarks, increasing HR funding, and supporting government-led initiatives are essential steps toward creating a more accountable, people-centred space ecosystem.

Astroscale also remarks the importance of broadening access to the space sector by integrating space education into disciplines beyond engineering, such as law, business, psychology, and other areas and by developing non-traditional routes into technical roles that will help diversify the talent pool, attract new generations, and ensure both the depth and variety of skills are present for the future of space.

Future professionals will need to combine technical expertise with social skills. There is growing demand for multidisciplinary engineers who can design reusable and repairable spacecraft, as well as for professionals skilled in ESG principles, capable of balancing environmental, social, and governance objectives.

2.5.1.2 SES

Established in 1985 and headquartered in Luxembourg, with a strong presence in the United States, SES operates a multi-orbit network of more than 120+ satellites supported by advanced ground infrastructure and industry expertise. This global network enables SES to deliver reliable, high-quality video and data services worldwide. The company integrates ESG principles into every aspect of its operations, prioritising climate action, social responsibility, and strong governance. By keeping sustainability and accountability at its core, SES ensures that its mission in space drives meaningful, long-term benefits on Earth.

Key ESG Practices

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One of their main achievements is the development of a clear ESG strategy, launched in 2021. This strategy is based on a maturity assessment from a wide range of internal and external stakeholders. It focuses on four key areas.

SES has developed several key practices to support and strengthen its ESG efforts across the company:

- **Green energy transition through energy efficiency and on-site renewable deployment:** SES is advancing its energy efficiency efforts and expanding the use of renewable energy across its operations, ensuring safe and responsible practices in line with industry standards.
- **Science Based Targets initiative through GHG management:** SES applies data-driven tracking and reporting to monitor and reduce its environmental impact.
- **Sustainable mobility:** SES promotes eco-friendly commuting among employees through initiatives such as the Luxembourg shuttle service, which connects the company's campus to the nearest train station using electric shuttles. On average, around 100 employees use the service each day, helping to reduce emissions.
- **Community and cross-team collaboration:** SES fosters collaboration across departments and with external partners. The 'Giving Back Days' initiative exemplifies this approach, enabling employees to support local communities through volunteer activities.
- **Digital inclusion:** SES contributes to expanding access to online education, government services, and healthcare in underserved regions, helping to close the digital divide and create new opportunities.
- **ESG training & awareness:** SES has enhanced its ESG education by adding live training sessions to its on-demand e-learning platform, making learning more interactive and accessible for employees.
- **Sustainable procurement:** SES has reinforced its supply chain to align with ESG principles, ensuring ethical sourcing and responsible use of resource management.

Challenges & Lessons

- **Cross-department data collection:** At SES, collecting ESG data has been a complex and time-consuming task. The process was manual and heavily dependent on Excel, which made it difficult to ensure accuracy and consistency across teams. Environmental data was sometimes delayed by months, making difficult to report and align with financial cycles. Before a dedicated ESG team was established, the challenge was even greater, as relevant data was dispersed across different departments without a clear structure for consolidation.

  Lesson: SES responded by investing in employee awareness and skills to create a stronger ESG culture. By making ESG a shared responsibility and ensuring colleagues understand both the goals and benefits, employees are now better equipped to contribute effectively to data collection and reporting.
- **Data-driven decision making:** For SES, the difficulties in strengthening ESG performance was the lack of automated tools and systems to support effective tracking. Manual processes limited the company's ability to monitor progress efficiently and meet stricter reporting requirements improved these systems. The company needed to make ESG data as reliable and accessible as its financial data.

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Lesson: SES transitioned from broad commitments to measurable Key Performance Indicators (KPIs), aligning them with the company's strategy. This allowed progress to be tracked more effectively and ensured ESG considerations were fully embedded in business decisions.

- **Regulatory complexity, pressure and lack of ESG standards:** The constant introduction of new ESG regulations and requirements created additional complexity, requiring the company to adjust its processes rapidly while ensuring alignment with business operations. At the same time, the lack of widely accepted and standardised ESG tools or methodologies made it difficult to ensure consistent reporting and to compare results across companies. The introduction of the CSRD intensified these challenges, demanding more detailed data collection and stricter reporting standards.

  Lesson: SES highlighted the importance of securing leadership buy-in and building cross-department collaboration early on. By allowing different teams to progress at their own pace while pushing for harmonised standards, SES is both strengthening its internal ESG culture and contributing to the broader industry call for more standardised reporting.

- **Limited resources:** SES first centralised ESG responsibilities within a single team, but with limited resources to handle all the work. The ESG team remained small, and while it coordinated the company's efforts, it could not manage all initiatives alone. This created bottlenecks and made it difficult to engage other departments, many of which saw ESG tasks as additional responsibilities. Beyond the organisation, SES also encountered resistance from some clients who were slow to recognise the value of ESG initiatives, making external collaboration more difficult.

  Lesson: SES realised that success relies on engaging people early, both within the organisation and beyond. By promoting behavioural change and shared responsibility across departments, SES has made ESG a collective effort. Initiatives such as the shuttle service have shown positive results, but achieving lasting change in areas like commuting and energy use requires continuous involvement. Through ongoing education and close collaboration across the value chain, SES now views ESG reporting as a shared responsibility rather than an isolated task, fostering stronger commitment and greater impact.

Opportunities & Trends

SES operates globally, and there is strong potential in ensuring that ESG principles are integrated not just at headquarters but across all offices and regions. Emerging trends and opportunities for SES are:

- **Data ESG Management:** Automation and digital tools can enhance ESG data accuracy, streamline reporting, and ensure compliance with evolving regulations like the CSRD.
- **Cross-Functional Collaboration:** Building on existing initiatives, stronger collaboration across teams and partners can drive greater employee engagement and social impact.
- **ESG as a Competitive Advantage:** A robust ESG framework and transparent KPIs position SES to attract responsible investors and strengthen market trust.
- **Digital Transformation:** Expanding connectivity to underserved regions supports global education, healthcare, and economic development opportunities.

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SES sees this moment as a chance to move to a more proactive, value-creating approach that supports innovation, builds stronger relationships with stakeholders, and contributes to a more sustainable future.

Missing skills

ESG in the space industry goes far beyond isolated initiatives — it requires a mindset shift, systemic improvement, and embedding sustainability at the core of business operations. SES focuses on enhancing competitiveness through effective ESG integration, recognising that success depends on a balanced mix of qualitative and quantitative skills.

SES is strengthening its data-driven approach, highlighting the growing importance of analytical capabilities in ESG reporting and decision-making. Future professionals will need strong competencies in data analysis, digital reporting tools, and platform management, complemented by communication, collaboration, and change management skills. They must also be able to operate across cultures, understand international standards, and adapt strategies to diverse regional contexts — transforming ESG from a compliance exercise into a long-term driver of value and impact**.**

2.5.1.3 Science Park Graz

For over 23 years, Science Park Graz has empowered entrepreneurs to transform more than 210 high-tech ideas into successful companies. Based in Austria, it's part of the AplusB (Academia plus Business) and ESA BIC (European Space Agency Business Incubation Centre) networks, supporting the commercialisation of innovative space-enabled products and services.

Since 2002, the incubator has integrated ESG principles into every stage of startup development, encouraging founders to build companies that are both successful and responsible. Its mission: turn dreamers into doers, while making ESG a natural part of building a resilient future.

Key ESG Practices

Science Park Graz has developed a multifaceted approach to embedding ESG principles into its startup incubation process. Through a mix of training, internal practices, and hands-on support, they help founders think about sustainability, inclusion, and good governance from the start.

- **Early-stage ESG training:** Before incubation begins, Science Park Graz runs a structured academy program designed to equip founders with the knowledge and mindset for responsible entrepreneurship. Through workshops on the United Nations Sustainable Development Goals (SDGs), sustainable business models, and diversity and gender equality, laying a strong foundation for responsible entrepreneurship.
- **ESG reporting as a precondition:** Science Park Graz integrates ESG indicators into its selection and evaluation processes across several programs. By prioritising startups developing green technologies or with strong social impact missions, the incubator uses an "impact through others" approach, amplifying ESG outcomes. This reflects their belief that high-tech as well as space startups are open to shaping their business models around ESG values.

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- **Gender equality radar:** Internally, they use a Gender Equality Radar to track progress and ensure equal representation. Externally, all incubated startups are required to participate in workshops on gender bias, diversity, and equity, helping founders create more inclusive teams and workplaces. Many startups actively seek guidance on recruiting diverse co-founders and fostering equitable company cultures, making this an essential part of the company´s support.

Challenges & Lessons

- **Gap between institutional expectations and market demand:** Public institutions, such as funding bodies or governmental agencies are increasingly requiring startups to integrate ESG practices into their business models. However, many clients, particularly in the space industry, still operate with more traditional mindsets and don't yet prioritize ESG reporting or sustainable practices. For early-stage founders with limited resources, this creates a difficult balancing act: meeting funders' ESG expectations while trying to gain traction in markets that are not fully aligned with these ESG values.

  Lesson: Science Park Graz has learnt that introducing ESG thinking early in the incubation process helps transform it from a compliance requirement into a growth strategy. By providing founders with practical ways to integrate ESG frameworks, startups are better prepared to build socially responsible, sustainable companies while also positioning themselves for long-term success.

- **High costs in the short-term:** Many startups want to make sustainable choices, but these are often financially out of reach, especially during the pre-revenue phase. In these cases, immediate cost-effectiveness tends to outweigh longer-term sustainability goals, forcing founders to make difficult decisions about where to invest limited resources.

  Lesson: Startups are often more adaptable and open to change than larger, established companies. Providing them with the right tools, resources, and knowledge early on empowers them to grow in a way that is both sustainable and competitive, ensuring ESG considerations remain part of their business journey as they grow.

- **Detachment between policies and funding:** While grants and incentives tied to ESG goals are becoming more common, startups often face regulations that make sustainable operations difficult. Complex incorporation procedures, high taxes, and limited flexibility in hiring can slow progress and add significant costs. This creates a disconnect: Governments encourage ESG integration through funding, but the operational environment does not fully support these ambitions.

  Lesson: In Austria, public funders are now asking startups to define their ESG approach, even when their products are not directly ESG-focused. This requirement has encouraged founders to take a closer look at how their companies operate and the values they represent, leading to more intentional and responsible business strategies.

- **Greenwashing risk:** Rapid growth can overshadow financial stability, social responsibility, and environmental stewardship, leading to superficial ESG claims rather than meaningful, lasting impact. Science Park Graz questions whether the 'scale fast' model is truly sustainable, arguing that it can lead to superficial ESG claims rather than genuine impact.

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Lesson: Genuine ESG integration takes time and requires shifting mindsets, not just quick fixes. While a single workshop may not directly transform a business model, the cumulative effect is clear. Startups are now actively seeking Science Park Graz's guidance, for example, on finding female co-founders or addressing gender bias within their teams. These actions demonstrate that real ESG values are beginning to take root, even if the full impact becomes visible only gradually.

Opportunities & Trends

Over time, Science Park Graz has observed a clear shift in how startups engage with ESG. While a few years ago many founders saw these topics as secondary, or even optional, there is now a growing sense that ESG is becoming a core part of running a responsible business. Whether through public funding requirements, growing awareness of social issues, or interest in sustainable innovation, founders are increasingly open to exploring how environmental and social goals can align with their business plans.

- **ESG as a Business Priority**: Founders increasingly recognise that sustainability and social responsibility strengthen long-term success. Many now aim to align their environmental and social goals with core business strategies.
- **Institutional Influence Driving Change**: Public funders and investors are asking startups to demonstrate their sustainability approach, encouraging even early-stage ventures to integrate ESG principles from the start.
- **Rising Awareness and Practical Action:** Startups are engaging more deeply with issues like supply chains, diversity, and data ethics. Science Park Graz helps translate these values into concrete business practices through mentoring and workshops.
- **Growth in ESG-Focused Innovation:** There is growing momentum in sectors such as green tech, circular economy, and social impact solutions, with founders increasingly collaborating across industries to create sustainable innovation.

Missing skills

Science Park Graz highlights the importance of fostering diversity and inclusion from the earliest stages, encouraging startups to form teams that reflect a variety of perspectives and experiences. Core competencies such as self-awareness, active listening, and inclusive leadership are seen as essential for driving sustainable growth and innovation.

Future professionals must be equipped to make informed decisions that balance economic, social, and environmental considerations, maintaining ESG goals without compromising competitiveness.

Many startups begin with limited ESG knowledge but demonstrate strong motivation to learn when provided with relevant, case-based examples. Peer discussions on real-life challenges have proven particularly valuable, as they enable startups to learn collaboratively and apply solutions directly to their contexts.

Introducing sustainable development principles and business models already at the university level would give future entrepreneurs early exposure to ESG thinking and its potential impact on business success.

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For both startups and the incubator, curiosity, adaptability, and openness to evolving ESG standards are key capabilities for making a lasting contribution to a responsible and competitive space ecosystem.

2.5.1.4 CGI

Founded in 1976, CGI is a consulting and software development, with nearly five decades of experience supporting industries in designing and implementing tailored operating architectures. Headquartered in Montreal, the company operates in numerous countries, including many across Europe, with IT infrastructure underpinned by data centres that provide secure storage and advanced processing for both client solutions and internal operations.

CGI's commitment to ESG principles is embedded in its core values and reflected across its client projects, operational practices, supply chain management, and community service initiatives. CGI's commitments align with the UN Global Compact's ten principles and support the achievement of the UN's seventeen SDGs.

Key ESG Practices

- **Leadership on board:** ESG is one of CGI's six core values and is embedded throughout its services. The CEO plays an active role, ensuring ESG reporting is fully integrated into the company's overall strategy rather than treated as a side initiative.
- **Social and governance focus:** CGI demonstrates that strong governance and collaboration are at the core of responsible business. By embedding ethical practices across its global operations, the company not only upholds high internal standards but also positively influences clients, partners, and suppliers. CGI prioritises the social and governance aspects of ESG, fostering an inclusive workplace, supporting employee well-being, and engaging in community outreach. The company actively addresses bias and ensures that decision-making reflects these principles.
- **Ethical business conduct & transparency**: Anchored in its Code of Ethics and Business Conduct and Third-Party Code of Ethics, CGI's ethics and compliance framework reflect its commitment to high ethical standards and full legal compliance. These principles guide daily operations and aim to create genuine, long-term impact, beyond simply reporting metrics.
- **Volunteering and community engagement**: CGI encourages community responsibility through volunteering, starting with simple initiatives such as tree planting or assisting the elderly. Over time, engagement has evolved into more complex projects, including cybersecurity support for seniors, implementing a Customer Relationship Management (CRM) system for a museum, and developing an app to track participants and ensure safety for the charity event Swim to Fight Cancer.
- **Prevention and Mitigation Training:** Ongoing training for CGI's procurement team covers critical issues such as modern slavery. The curriculum is regularly updated to address emerging ESG challenges, ensuring consistent application of best practices.

Challenges & Lessons

- **Difficulties sourcing renewable energy for data centres**: Sourcing renewable energy for CGI's data centres has proven challenging, particularly in rural areas dependent on coal-based power.

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Transitioning to cleaner energy in some regions risks local job losses, creating a dilemma between advancing ESG goals and safeguarding livelihoods. This situation underscored the delicate balance between environmental responsibility and social impact in supporting local economies.

Lesson: CGI recognised the value of solutions that address both priorities. By collaborating with local governments, the company helped bring green energy to underserved regions, demonstrating that partnerships can promote sustainability while strengthening local economies and protecting jobs.

- **Lack of Authentic Data:** Reliable, verifiable data is essential to track genuine progress and avoid greenwashing. While numerous ESG frameworks and resources are available to accelerate implementation, starting later than peers can increase pressure to show rapid results.

  Lesson: CGI adopted a phased approach, beginning with achievable, realistic ESG goals before gradually expanding its ambitions. This method avoided rushed reporting, reinforced a data-driven ESG strategy, and enabled more meaningful, measurable outcomes over time.

- **Business Trip Contradictions:** Balancing operational needs with sustainability objectives remains a challenge in business travel. While travel is essential for client relationships and project delivery, it increases the company's carbon footprint. Decisions on whether to travel, and how, require balancing efficiency, cost, and environmental impact.

  Lesson: CGI views ESG progress as a long-term effort. Meaningful change requires years of data collection, collaboration across departments, and adaptability. Success depends on engaging local authorities, maintaining transparent discussions with clients, and ensuring that operational requirements and sustainability targets advance together.

Opportunities & Trends

One of the key changes has been the growing commitment to sustainability at all levels of the company

- **Sustainability as a Core Value**: Senior management has driven sustainability to the heart of CGI's strategy, expanding its focus beyond environmental concerns to include social responsibility, employee well-being, community engagement, and workplace inclusivity.
- **Data-Driven Decision-Making**: The growing use of data analytics supports more effective and measurable sustainability actions, enabling CGI to refine its ESG strategy and achieve tangible results.
- **Collaboration in Green Initiatives**: Partnerships with local governments and organisations are helping expand access to green energy in underserved areas, advancing CGI's own sustainability goals while contributing to the creation of more resilient, sustainable communities.

Missing Skills

CGI emphasises that success in the space sector requires more than advanced technical expertise, it demands strong people skills, emotional resilience, and leadership abilities to navigate the pressures of highly complex and fast-evolving environments.

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Professionals must be equipped to manage stress, maintain mental well-being, and lead teams effectively under demanding conditions. On the technical side, data management stands out as a critical capability. The ability to collect, analyse, and interpret data accurately is essential for ensuring that ESG performance remains transparent, measurable, and results-driven rather than limited to aspirational statements.

2.5.1.5 German Research Centre for Artificial Intelligence (DFKI)

The German Research Centre for Artificial Intelligence (Deutsches Forschungszentrum für Künstliche Intelligenz GmbH – DFKI), founded in 1988 as a non-profit public–private partnership, is Germany's leading research institution in the field of AI. With locations across the country, DFKI develops innovative and trustworthy AI solutions aimed at addressing major societal challenges such as climate change, social inequality, and public health issues.

We include DFKI within the space industry because it plays a pivotal role in strengthening Europe's capabilities through its collaborations with ESA, such as ESA_Lab@DFKI and AI4EO, applying advanced AI to satellites, Earth Observation (EO) and space safety. Its Robotics Innovation Centre designs advanced systems for exploration, in-orbit servicing, and debris removal, supporting Europe's leadership in sustainable space technologies. Guided by its mission of "AI for humanity," DFKI combines scientific excellence with a strong ESG focus, ensuring the European space sector remains globally competitive while serving the public good.

Key ESG Practices

- **DFKI4Planet initiative:** DFKI is committed to advancing intelligent and sustainable AI by improving energy and resource efficiency while embedding ESG principles from the earliest stages of design. Initiatives such as ESCADE demonstrate how frugal innovation and edge computing can drive greater energy efficiency across technological systems. A core mission of DFKI is to leverage AI to address pressing societal and environmental challenges such as climate protection, circular economy, biodiversity and the energy transition. All coordinated through its DFKI4Planet Competence Centre.
- **Circular Economy - Green-AI Hub:** In space robotics, DFKI is developing modular and reconfigurable robotic systems designed to extend the lifespan and adaptability of equipment for future space missions. By focusing on circularity and reuse of materials. Beyond the space sector, DFKI also coordinates the Green-AI Hub, an initiative that helps businesses increase their resource efficiency using AI. By 2025, up to 20 pilot projects are planned to demonstrate how AI can boost sustainability across industries.
- **Gender equality plan:** DFKI's Gender Equality Plan supports both recruitment and leadership development, ensuring equal opportunities at every level of the organisation. This framework complements a wide range of educational pathways, from internships and thesis supervision to early-stage research roles, all aimed at attracting and nurturing diverse talent.
- **Codes of conduct:** Ethics and transparency are central to DFKI's research initiatives. To ensure that its initiatives remain human-centred and accountable, DFKI has established robust governance structures. The Compliance Department, Ethics Board, and the Diversity and Gender Equality Working Group (AG Diversity) all report directly to Executive Management.

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- **Energy-efficient AI:** Sustainability also guides DFKI's operations. The organisation continuously monitors its energy consumption and has committed to sourcing 100% green electricity by 2026. In line with this commitment, its new Berlin facility has been awarded the highest gold certification by the German Sustainable Building Council.

Challenges & Lessons

- **Limited resources and political constraints:** DFKI's ability to expand ESG integration and develop future talent often depends on public funding. External factors such as export controls, geopolitical tensions, and shifting political priorities can also create barriers to participation in advanced technology projects and limit the sharing of knowledge. In some instances, sudden political changes have even led to the suspension of established scientific collaborations, demonstrating how quickly strong partnerships can be disrupted.

  Lesson: Adaptability as a core strategy. To succeed in such a complex environment, it is essential to start early, build inclusively, and design initiatives with a long-term vision. Navigating funding limitations and political uncertainties requires flexibility, proactive planning, and readiness to adapt as circumstances evolve.

- **Integrating ESG thoroughly across teams:** Making ESG part of everyday work. While DFKI has developed strong initiatives such as its gender equality plan and code of conduct, the greater challenge lies in fully embedding ESG into daily operations and project workflows. This means raising awareness across teams, encouraging active participation, and developing better tools to track progress — not a small task in fast-moving fields such as robotics and AI.

  Lesson: ESG is most effective when shared by everyone. For ESG to have lasting impact, it must be seen not as a separate task or side project, but as a shared mindset embraced by every team and embedded into every project. Long-term results come from consistent, inclusive actions — such as outreach initiatives like Girls' Day and student internships, which help inspire young people to explore careers in science and technology, ultimately shaping the workforce of the future.

Opportunities & Trends

DFKI has seen a clear shift in how ESG is approached within the organisation. What began as individual initiatives has grown into a more structured, cross-cutting effort, with environmental sustainability, ethical research, and inclusive practices increasingly built into project planning.

- **Responsible Innovation and Talent Development**: DFKI increasingly focuses on energy-efficient AI, responsible robotics, and inclusive talent pipelines, ensuring that innovation aligns with social and environmental goals.
- **Employee Well-Being and Governance**: The organisation promotes flexible work models, emergency childcare, and equal pay, supported by evolving governance structures that strengthen accountability and transparency.

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- **Sustainable Technology Opportunities:** Advances in modular robotics and AI-driven efficiency open pathways to circular design and greener operations, both on Earth and in space.

Missing Skills

As ESG principles become central to AI and robotics in space, tomorrow's professionals will need more than just technical expertise. They must understand environmental impact, energy efficiency, circular design, and how to create adaptable, resource-efficient systems with long lifespans. Space professionals should also be able to work across disciplines, assess the societal implications of technology, and build inclusive, collaborative teams. In addition to engineering skills (mechanics, electronics, software, systems engineering, material science), they will need expertise in data sciences, AI, space manufacturing, and robotics assembly.

Equally important are skills in ethical reasoning, respecting space laws, ensuring transparency, engaging stakeholders, and making informed decisions — especially in sectors like space, where technology directly impacts lives and the environment. Updating space curricula to integrate ESG principles into technical education will equip graduates to tackle complex challenges while meeting the evolving demands of forward-thinking space organisations.

2.5.2 Young Startups

The following section highlights selected young space startups that, while still in the early stages of their ESG journey, bring fresh perspectives, creativity, and purpose-driven approaches to ESG implementation. Among them is Oxo Earth, which stands out as an exception due to its early and deep integration of ESG principles into its core mission. As a result, Oxo Earth received special attention in the *ESG Space Industry Practices Book*, alongside more established companies with ESG experience.

Together, their experiences demonstrate how entrepreneurial spirit, enthusiasm, and a strong willingness to implement ESG practices within their companies can serve as powerful drivers for accelerating ESG adoption and fostering competitive transformation within the European space ecosystem.

2.5.2.1 Oxo Earth

OXO Earth, a Munich-based startup founded three years ago, has embedded ESG principles at its core from the outset — making it a standout inclusion alongside established companies in the ESG Space Industry Practices Book. Focused on combating climate change, the company specialises in satellite-powered measurement and verification systems to monitor forest impacts, with an emphasis on carbon removal and biodiversity restoration.

Beyond data analysis, OXO Earth helps businesses understand the wider environmental and local implications of their activities. Using EO data, the company not only tracks progress but actively supports carbon capture and ecosystem recovery, making sustainability an integral part of every decision and solution.

Key ESG Practices

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Oxo Earth brings a different perspective to sustainability that challenges how most companies approach ESG. As a small, driven startup, their work is built around making a real impact, not just meeting reporting requirements. The following key ESG initiatives were highlighted:

- **Approach to tackling environmental impact:** At OXO Earth, impact lies at the heart of the company's DNA. Its main KPI is every tonne of CO_2 removed, achieving genuine negative emissions through carbon removal. By applying an innovative Improved Forest Management (IFM) method, the startup reduces reversal risks and ensures removals are safe, durable, and credible, avoiding the greenwashing concerns often associated with forest carbon projects. This makes OXO Earth a trusted partner for buyers seeking high-integrity climate action.
- **Space technology:** Leveraging EO data, OXO Earth can monitor vast forest areas consistently and cost-effectively. This capability enables the company to scale its operations efficiently and track both social and environmental progress across multiple regions.
- **Knowledge Sharing and Capacity Building**: The company actively invests in employee learning through regular "lunch & learn" sessions and dedicated funding for courses on sustainable finance, product carbon footprints, and life-cycle assessments. While this represents a significant investment, it strengthens internal expertise and embeds sustainability across all levels of the organisation.

Challenges & Lessons

Oxo Earth's experience as a sustainability-focused startup offers valuable insights into the practical challenges that many mission-driven companies face — especially those working at the intersection of technology, nature, and climate action. Their journey highlights not only the obstacles in the current system but also the lessons learnt along the way that can guide future efforts:

- **ESG vs. sustainability reporting:** ESG frameworks can play an important role in improving transparency, but they are often treated as the end goal, rather than a starting point. Many companies focus heavily on reporting data without taking the next step: understanding and addressing how their activities affect people, ecosystems, and the planet.

  Lesson: For Oxo Earth, it became clear that prioritising impact over reporting is essential. ESG should support meaningful change, not replace it.

- **Lack of consolidated regulation on carbon removal**: Many companies still focus on disclosing environmental data, but don't take significant steps to reduce or remove their emissions. Carbon removal, while critical, is often seen as optional. This limits market demand and slows progress across the sector.

  Lesson: Oxo Earth has realised that market incentives created through policy and regulation are essential for advancing on ESG objectives. Without a strong policy framework and political support, even the most innovative sustainability solutions struggle to grow.

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- **Data alone is not enough:** Tracking emissions or resource use is important, but data alone doesn't show whether those figures represent real harm or meaningful improvement. Too often, companies collect numbers without understanding the full picture of their environmental or social impact.

  Lesson: Oxo Earth has learnt to stay true to their mission, even when market conditions aren't ideal. Honest conversations and bold ideas, they've found, can still influence clients, policies, and peers working in space.
- **Funding difficulties and short-term thinking:** In recent years, there's been a noticeable decline in momentum around climate tech investment. What once felt like a rising wave of enthusiasm and funding has slowed, partly due to current geopolitical shifts and economic uncertainty. At the same time, many businesses and political leaders remain focused on short-term goals, which makes it harder to invest in long-term climate solutions.

  Lesson: Real progress depends on long-term leadership and commitment. The most meaningful results often take time and that kind of patience and vision is exactly what's needed to solve large-scale challenges like climate change and social inequality.

Opportunities & Trends

Oxo Earth has been closely observing how the sustainability landscape is evolving, and they perceive that the pace of change is often slower than the urgency of the climate crisis demands.

- **Increasing Regulation:** Particularly within the EU, is shaping the sustainability landscape. Frameworks like the CSRD are driving companies to treat non-financial performance more seriously, establishing shared standards and prompting broader action.
- **Leadership and Influence**: A growing number of influential companies are using their position to promote sustainability across their value chains, requiring partners and suppliers to adopt responsible practices.
- **Space Technology as an Enabler**: EO data and other space technologies are becoming increasingly essential for tracking and verifying environmental impact. As demand grows for evidence-based climate action, remote monitoring will be key to proving real-world results.

Missing Skills

OXO Earth emphasises that technical skills alone aren't enough — context matters just as much. It's not only about knowing how much carbon is emitted or water is used, but also understanding where, why, and what the consequences are. This demands critical thinking and the ability to connect environmental knowledge with social, political, and economic perspectives. What stood out in OXO Earth's journey was that people with a background in life-cycle assessments or systems thinking were able to add high value fast.

To create real impact, OXO Earth believes future professionals must be purpose-driven, entrepreneurial, and adaptable — ready to thrive in fast-paced environments where innovation and long-term vision go hand in hand. Above all, resilience is the key skill in sustainability roles. Driving meaningful change takes time, especially when that change needs to occur on a systems level.

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At a broader level, effective ESG reporting requires a diverse skill set: regulatory knowledge to navigate frameworks like GRI, CSRD, and the EU Taxonomy; strong data management to quantify impacts and maintain audit-ready integrity; financial acumen to connect sustainability to business performance; and the ability to identify material issues through stakeholder engagement. Equally important are communication and storytelling skills, turning complex data into clear, compelling narratives. In essence, ESG reporting demands professionals who are analysts, policy interpreters, knowledge brokers, and communicators all in one.

2.5.2.2 ESG Practices´ Highlights from Other Young Startups

Within Europe's dynamic space ecosystem, a new generation of young and ambitious space startups is redefining what it means to operate responsibly in space. While these companies may not yet have established ESG frameworks, they are driven by fresh ideas, strong values, and a clear commitment to positive social and environmental impact.

This subsection highlights four early-stage companies, each offering a unique perspective — from sustainable technologies to community-driven innovation.

Caius

Established in 2022, Caius combines AI and satellite data to safeguard natural environments, promote sustainable tourism, and empower rural communities. Emerging from university research and inspired by a love of hiking, its first product maps and monitors forest trails, blending innovation with a strong environmental and social mission.

For Caius, improving the quality of life in rural areas goes hand in hand with protecting nature and ensuring the responsible use of its resources. The company's work demonstrates how technology and sustainability can coexist to support local development and environmental protection.

Caius advances sustainable land management by mapping and digitising trails to support responsible land use while using AI and satellite solutions to protect ecosystems and empower rural communities. Its decentralised governance model empowers local communities and promotes equitable access, including free satellite internet in underserved regions. In addition, a flexible work culture nurtures innovation and employee well-being.

Despite bureaucratic hurdles and the time needed to build trust with authorities, these challenges pave the way for stronger partnerships and long-term solutions. Caius recognises that technology must complement local knowledge to drive meaningful change. Looking ahead, it sees opportunities to position ecotourism and rural trails as strategic assets, attract remote workers to revitalise local hubs, and promote social equity in Europe's rural regions.

To fully realise its mission, Caius highlights the need for professionals with hands-on, in-situ experience and greater youth involvement, empowering new generations through technology, mentoring, and collaboration to drive sustainable rural transformation.

WaltR

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Founded in 2018, WaltR transforms environmental responsibility into measurable results. Using satellite imagery and ground-based data, the company helps businesses monitor and reduce emissions, improve employee well-being, and protect communities. Its ESG-driven approach ensures that decisions are transparent, data-based, and aligned with climate goals.

By embedding ESG principles into its core operations, WaltR enables organisations to strengthen accountability, attract sustainable finance, and make informed choices that drive both innovation and long-term environmental performance.

While scaling to structured processes and implementing robust ESG systems present challenges, these efforts enhance efficiency, reputation, and sustainable growth. The lack of ESG standardisation and shifts in EU space funding create both risks and opportunities, reinforcing the need for clear rules and prioritisation. Looking ahead, WaltR seeks to advance emissions monitoring technology, secure funding for sustainability initiatives and ESG training, and respond to growing societal demand for ethical business practices.

To fully realise these goals, the company recognises the need for professionals who combine technical, scientific, and soft skills, balancing data-driven precision with collaboration, communication, and ethical awareness. WaltR also emphasises fostering a participatory mindset where universities can help to foster a culture of inclusion and engagement, to drive effective governance and innovation within the workforce.

UrbanSens

Launched in 2023, UrbanSens delivers precise, localised insights into climate-related risks, including floods, heatwaves, and other natural hazards. By merging Earth Observation data with IoT sensor networks, the company transforms complex environmental data into actionable intelligence. Its tools help municipalities, utilities, and energy providers improve sustainability planning and strengthen resilience to climate challenges.

UrbanSens sees ESG as the link between environmental knowledge and real-world action, turning climate data into decisions that create value, protect communities, and promote long-term resilience.

Its ESG approach includes empowering vulnerable communities with climate risk data, maintaining ethical governance and equal opportunities, minimising its environmental footprint through sustainable operations, and ensuring compliance with international ESG standards such as CSRD and IFRS.

While translating complex data and engaging with public authorities can be challenging, these efforts enable more precise decisions and durable partnerships. Limited access to affordable datasets and the lack of shared ESG metrics highlight the need for open-source solutions, common frameworks, and targeted European support programmes.

Looking ahead, UrbanSens aims to integrate diverse data sources, develop open-access databases, and enable real-time ESG monitoring to enhance transparency and efficiency. Achieving these goals requires professionals with systems thinking, interdisciplinary expertise combining geospatial, technical, and policy knowledge, and strong problem-solving skills to turn environmental data into practical, impactful solutions.

Dreamwaves

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Founded in 2019, Dreamwaves develops innovative navigation solutions designed for blind and visually impaired users. Its WaveOut app uses 3D spatial audio and virtual waypoints to enable hands-free navigation with AI-powered precision.

Dreamwaves embodies inclusion by design. Its solutions merge social impact with sustainability, reducing the need for extra hardware while promoting equal access to public and private spaces. By aligning technology with social good, they show how innovation can serve both people and the planet.

Through real-time spatial audio navigation, user-driven innovation, and a strong commitment to inclusive design, Dreamwaves ensures that accessibility and user experience evolve hand in hand. The company faces challenges in attracting investment and the undervaluation of accessibility technologies, but this represents a significant opportunity to innovate in an underserved market with high demand. With growing global attention on digital accessibility, they are well-positioned to expand spatial audio applications into broader mobility and transportation solutions.

To sustain this growth, the company identifies a need for professionals skilled in social business models and marketing experts who can connect social impact with economic metrics, helping decision-makers see the long-term value of accessibility solutions.

2.6 Environmental, Social and Governance Space Industry Practices: Closing the Gap Between Sector Needs and Educational Offers for a More Competitive European Space Workforce

The *Environmental, Social, and Governance (ESG) Space Industry Practices: Closing the Gap Between Sector Needs and Educational Offers for a More Competitive European Space Workforce* — or simply the *ESG Space Industry Practices Book (available now on the ASTRAIOS website under Publications)* — gives hints to understand the evolving journey of ESG practices in the European space industry. It explores how its implementation and companies' behaviour towards these practices are being understood, tested, and integrated into the sector, while also highlighting their direct impact on shaping the future workforce. Rather than serving as a technical manual or corporate showcase, the book functions as a collective reflection, an inspiration, and a learning tool designed to bridge the gap between industry, academia, and EU policymakers.

Selection of Companies

The book features ten companies, chosen based on their active and sustained participation in all three Peer-to-Peer workshops and their willingness to engage in one-on-one follow-up interviews. This continuous involvement provided a unique opportunity for in-depth exploration of real-world ESG experiences, offering authentic insights into both ESG progress, trends and challenges as well as skills gaps.

Diversity of Companies

The organisations represented in the book vary in size, maturity, and ESG experience. Together, they provide a comprehensive view of the sector's ESG landscape, ranging from seasoned entities with advanced ESG systems to young startups still defining their approach. To reflect this diversity, the book is divided into two main groups:

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1. Established Entities

These organisations have already recognised the strategic value of ESG as a tool for competitiveness, risk management, and stakeholder trust. They have moved beyond conceptual intent and have begun full implementation, establishing structured governance systems, measurable KPIs, and cross-departmental ESG strategies. Their experiences demonstrate how ESG integration can drive operational performance, foster innovation, and deliver long-term impact.

2. Young Startups

Mission-driven and often founded with social or environmental purposes at their core, these early-stage companies may lack formal ESG frameworks or extensive resources. However, their fresh perspectives, creativity, and eagerness to learn make them crucial voices in shaping the future of responsible and competitive space innovation. Their insights, highlighted in the section *"Additional Insights: ESG Highlights from Other Key Participants,"* reflect early ESG awareness, particularly in sustainability and social responsibility.

Purpose and Vision of the ESG Space Industry Practices Book

The *ESG Space Industry Practices Book* serves as both a repository of best ESG practices in the space industry and a roadmap for continuous improvement, identifying the skills required to ensure a competitive European space sector. It reflects the full spectrum of ESG practices, ranging from early experimentation to consolidation. The purposes for each target group are as follows:

- **For companies**, the book acts as a mirror, offering a way to learn from other organisations' ESG practices, challenges, and successes. It also encourages reflection on current gaps in ESG skills and practices.
- **For academia**, the book serves as a source of inspiration for enhancing space curricula. It encourages the integration of skills not typically taught but highlighted as essential by the industry. Examples include emotional intelligence, teamwork, empathy, and addressing gender imbalances in the sector.
- **For EU policymakers**, the book offers valuable insights from hands-on industry stakeholders. These insights can inform policies and incentives that encourage space companies to embed ESG as a core requirement and prompt academic institutions to expand curricula with non-traditional courses that cultivate both technical and soft or transferable skills.

The Broader Goal

Ultimately, the goal of the *ESG Space Industry Practices Book* is to contribute to a more competitive, inclusive, and autonomous European space sector. By mapping out ESG challenges, opportunities, new trends and skill gaps, the book aims to guide academia in aligning curricula with industry needs. This alignment ensures that Europe's future space workforce is equipped with the sustainability, ethics, and adaptability required for success in an evolving industry.

While the primary focus of the book is on ESG practices, we must not forget the broader mission of the ASTRAIOS project within the book: to reveal how the industry's ESG practices highlight existing skills gaps. By addressing these gaps through the analysis of ESG practices outcomes, the book provides insights for

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improving both the governance of employers and the capabilities of the next generation of space professionals.

In essence, the *ESG Space Industry Practices Book* aims to connect voices, inspire collaboration, and prepare the next generation of space workforce to lead with purpose. By sharing industry´s ESG experiences and mapping the evolving skills, the book serves as a catalyst for change — ensuring that both space companies and academia continue to evolve in a way that supports a sustainable, resilient and competitive future for the space sector.

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3. INSTITUTIONAL AND REGULATORY FRAMEWORKS

Driven by the EU's commitment to sustainability, transparency, and ethical innovation, several EU institutional and regulatory frameworks are influencing the way in which space companies integrate ESG into their strategies and reporting processes.

Companies across the European space ecosystem are aligning their ESG practices with international and European frameworks to ensure transparency and consistency. These include UN Principles, OECD guidelines, UN SDGs, GRI standards, Omnibus legislation, and metrics aligned with CSRD, amongst others. We have learnt that the CSRD pushes space companies to move beyond voluntary reporting and adopt more harmonised, standardised ESG practices.

Alongside, national-level regulations vary significantly across EU Member States. Some countries enforce stricter ESG requirements, while others rely on voluntary guidelines. This lack of uniformity often creates challenges for companies operating internationally, as they must navigate multiple reporting standards and compliance expectations.

The space sector faces new regulations linked to environmental monitoring and data use. Companies working with EO data, emissions tracking, or sustainable transport technologies must comply with both EU data protection rules and specific standards to ensure accuracy, transparency, and ethical use of information.

The ASTRAIOS participating entities highlighted that current frameworks often remain fragmented and complex, with gaps in clarity and consistency. Many companies expressed the need for clearer metrics, consistent quality standards, and stronger international cooperation to speed the process and reduce barriers to ESG integration. Without such alignment, there is a risk of ESG being treated as a box-ticking exercise rather than a strategic driver of innovation and competitiveness.

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4. UNVEILING ESG PRACTICES: OPPORTUNITIES, CHALLENGES AND NEW TRENDS

To develop a comprehensive understanding of how ESG practices are shaping the European space sector, the findings presented below were derived from a structured and methodical approach implemented throughout Task 2400. As described in previous sections, this approach involved a series of Peer-to-Peer learning workshops and one-on-one follow-up interviews, facilitated through ongoing collaboration with a diverse group of European entities (see Section 2.3). These activities were specifically designed to gather insights and foster a deeper engagement with key stakeholders across the sector.

The insights obtained through this extensive process have been systematically compiled into the *ESG Space Industry Practices Book*. The following summary outlines the primary ESG findings, with a focus on three key themes that emerged from the collective experiences and perspectives shared during the workshops and interviews:

- **ESG as a Strategic Advantage**
  - **Stakeholder trust and reputation:** Transparent ESG reporting demonstrates a genuine commitment to sustainability and ethics, amongst others, strengthening relationships with customers, employees, and investors.
  - **Talent attraction and retention:** As younger generations seek meaningful careers, companies with visible ESG commitments are better positioned to attract and retain top talent.
  - **Innovation & competitiveness:** ESG drives new business models and helps companies differentiate themselves in global markets.
  - **Risk management & compliance:** ESG provides tools to anticipate and mitigate risks related to climate change, regulations, supply chain problems.
  - **Enhanced collaboration & partnerships:** Working with peers, academia, and clients on ESG initiatives strengthens networks, co-creation, and cross-sector learning.
  - **Cost savings and growth:** Sustainable practices often lead to operational efficiency, reduced waste, and better resource management.
  - **Positive social impact:** Initiatives supporting diversity, inclusion, STEM outreach, and bridging the digital divide increase societal value and brand reputation.

- **ESG as catalyst for EU competitiveness: Common challenges**
  - **Data & metrics:** Companies struggle with mixed and fragmented data, lack of consistent standards, and the time needed to establish a solid baseline.
  - **Regulatory complexity:** Different national standards and shifting rules make ESG reporting difficult to harmonise.
  - **Cultural & structural barriers:** Resistance to change, opaque supply chains, and limited transparency.

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- **Knowledge gaps:** Lack in both technical and soft skills needed for effective ESG metrics and workforce development.
- **Lack of strategy:** Without a clear plan, well-defined targets, and measurable KPIs, ESG efforts risk remaining a well-meaning idea with no way to measure success.
- **Resource constraints:** Smaller companies face time, funding, and staff challenges to implement ESG meaningfully.
- **Stakeholder misalignment:** While younger employees often drive ESG forward, clients and investors, and management may fall behind, creating different speeds that companies must carefully balance.
- **Distinguish between ESG reporting and sustainability:** Without clear distinction, ESG risks being diluted.
- **Politics shift:** In the space sector, political and defence agendas heavily influence priorities now, risking ESG slipes down in the priority list.
- **Skills and workforce gaps:** ESG reporting highlights the need for specific expertise to ensure competitiveness. Currently, there are significant gaps in both technical and soft skills that must be addressed.

- **Emerging Opportunities & New Trends**
  - **Standardisation push**: Growing trend for a unified ESG language and global strategy, powered by smart data tools that don´t collect just information but also explain the purpose of its collection.
  - **Talent magnet:** Companies are realising that better work-life balance, social impact projects, and visible values are essential to attract and retain diverse, top talent.
  - **Diversity & Inclusion:** DEIB initiatives are moving from buzzwords to practical policies in hiring, inclusivity, and career development.
  - **Small clear focus goals:** focusing on a handful of goals to clearly measure return, a smart way to get everyone on board.
  - **Circular economy & shrinking carbon footprints:** From greener data centres to satellite refuelling and repair, companies are embedding sustainability into core operations.
  - **Collaboration over command:** Co-creation and partnerships in shaping ESG strategies are proving more effective results when management, employees, clients, and stakeholders take part.
  - **Automated ESG reporting:** AI and automated platforms are modernising ESG reporting, enabling clean, traceable, and consistent ESG data with regulations like CSRD.
  - **Accountability everywhere:** ESG is increasingly embedded across product design, supply chains, and executive strategy, no longer isolated in compliance departments.

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- **The ESG ecosystem grows:** Peer collaboration, leveraging social impact tools and circular economy models often drives greater ESG innovation than external pressure alone.
- **From fuzzy targets to sharp KPIs:** Setting measurable KPIs keeps the work focused, strategic, and impactful.
- **Digital transformation:** Space companies are moving away from traditional manual processes, adopting real-time, AI-powered ESG insights that enable smarter decision-making, faster compliance, more stability.
- **ESG as part of the mission:** No more "separate department", ESG is now integrated into project planning, from modular robotic components for long missions to designs that boost resource efficiency.
- **Talent take-off:** Collaborating with universities through initiatives like ASTRAIOS helps space companies combine technical training with soft skills, preparing graduates to drive innovation from day one.

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5. CONCLUSION: ADEQUACY BETWEEN CURRICULA AND INDUSTRY NEEDS

The European space sector is evolving quickly, driven by digitalisation and sustainability goals, but academia is struggling to keep up. While universities provide strong technical foundations, they often overlook the interdisciplinary, ethical, and social skills the industry now requires, as companies increasingly prioritise ESG principles. So, what exactly is missing?

Task 2400 implementation outputs reveal a disconnect between academic curricula and the evolving needs of the space industry. As the industry rapidly transforms, graduates must be equipped not only with technical expertise but also with the ability to think holistically, lead diverse teams, and grasp the social and environmental impacts of their work.

Companies, from established giants like SES and Astroscale to innovative startups like OXO Earth and Dreamwaves, have voiced a common message: today's space professionals must be more than just technicians. They need to be ethical leaders, creative problem-solvers, and dynamic communicators who can connect technical innovations with societal needs.

Soft or transferable skills are now just as critical as technical ones. From adaptability, governance and cross-cultural awareness to leadership and emotional intelligence, these competencies are indispensable in a sector that operates globally, with a strong emphasis on collaboration. But, while universities are great at developing technical skills, these essential "people skills" are often left out of the curriculum.

So, what does this mean for academia? It is time for a shift. The space industry is not just looking for graduates who can develop satellites or engineer rockets — they need professionals who can engage with multiple disciplines. They want people who understand governance, environmental and social impacts, and the ethical implications of their work. They are seeking talent that can apply and communicate systems thinking to solve complex problems that extend beyond the technical domain.

The good news is that this shift is not only necessary — it's an opportunity and a win-win. By aligning curricula with industry needs, universities can create graduates who are not only job-ready but also future-proof. Students will leave with a robust understanding of both technology and the global challenges they will face in their careers — ready to lead with responsibility, creativity, collaboratively and resilience in a rapidly changing world.

The future of space innovation depends on it. If academia and industry can work together to bridge this gap, we will see a new generation of professionals — ones who can blend technical prowess with a deep understanding of the social and environmental impacts of their work. That is the kind of workforce Europe's space sector needs to remain competitive, sustainable, and responsible on the global stage.

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6. ASTRAIOS LEGACY AND FUTURE OUTLOOK

Europe's space sector is rapidly evolving, driven by digitalisation, sustainability goals, and emerging business models. However, academic programmes have struggled to align with the fast-paced needs of the industry, creating a disconnect that must be addressed for future success.

One of the key outputs of ASTRAIOS, the *ESG Space Industry Practices Book, represents* an enduring resource for EU policymakers, academia, and industry leaders, providing continuous guidance for evolving space industry practices. For companies, ESG is not merely a regulatory obligation but a strategic tool for operational improvement, identifying skill gaps, and fostering innovation. For academia, ESG functions as a "skills scanner," highlighting the areas where curricula must adapt to integrate technical expertise with sustainability, policy, and human-centred skills. For EU policymakers, the key takeaway is the need for simplified and harmonised ESG standards that reduce administrative barriers and support targeted upskilling initiatives, enabling sustainable growth, particularly for startups and SMEs (see Section 6.1).

6.1 Moving Forward: Key Actions for the European Space Ecosystem

To bridge the gap between academia, industry, and EU policymaking, deeper collaboration is essential. Initiatives like the Horizon project ASTRAIOS exemplify how dialogue and shared learning can align educational outcomes with real-world needs. By embedding ESG principles at the core of the European space sector, we can cultivate a workforce that is not only technically skilled but also fairer, more inclusive, and ethically driven — creating a competitive, sustainable future for the space sector. The following actions outline what needs to be done by each key stakeholder group to support this transformation:

- **For Companies:** Embrace ESG as a strategic tool to drive operational improvements and innovation, focusing on cross-disciplinary competencies, including ethical awareness, leadership, and adaptability.
- **For Academia:** Adapt curricula to reflect the increasing demand for interdisciplinary skills —combining technical expertise with ESG, sustainability, and human-centred approaches.
- **For EU Policymakers:** Create a supportive ecosystem by simplifying ESG regulations, aligning standards, and funding dedicated programmes to enable sustainable growth for startups and SMEs within the space sector.

The *ESG Space Industry Practices Book* also serves as a roadmap for these stakeholders to act upon, offering concrete guidance for reshaping the workforce and fostering long-term resilience and sustainability within Europe's space industry.

6.2 Dissemination Strategy: Ensuring the ASTRAIOS Legacy & Long-term Impact

In parallel to the actionable insights outlined in the previous section, the dissemination of the *ESG Space Industry Practices Book* is a key component in ensuring that these findings reach the right audiences and remain a valuable resource in the years ahead. The dissemination strategy is designed to maximise visibility and engagement with key stakeholders across the space ecosystem:

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- **Digital Distribution:**
  - A dedicated webpage featuring a downloadable digital version of the *ESG Space Industry Practices Book.*
  - Promotion through ASTRAIOS and AZO social media channels (e.g., LinkedIn, X), including pre-launch, launch-week, and post-launch posts.
  - Articles on the ASTRAIOS project website announcing surveys and each Peer-to-Peer workshop, in addition to articles and dedicated sections in the ASTRAIOS and AZO newsletters, as well as cross-promotion through partner websites and newsletters to amplify reach.
  - Two of the ASTRAIOS ESG Peer-to-Peer learning workshops have also been highlighted within the ASTRAIOS news articles published within the EASN Periodic newsletters:
    - Analysis of Skills, Training, Research and Innovation Opportunities in Space | EASN Newsletter 2024 | Issue #2.
    - Analysis of Skills, Training, Research and Innovation Opportunities in Space | EASN Newsletter 2025 | Issue #2
- **Printed Distribution:**
  - Copies of the book will be distributed to participating companies, consortium partners, and key stakeholders, including representatives from the European Commission.
- **Event Promotion:**
  - The results were presented at key conferences, including the 15th EASN International Conference on 'Innovation in Aviation & Space towards Sustainability Today and Tomorrow' on October 15th, 2025 (see Annex 1.11), and the ASTRAIOS Final Event in Paris on December 1st, 2025 (See Annex 1.11).
- **Consortium Outreach:**
  - Partners will share the book and related materials through their professional networks, events, and online platforms to extend the reach of the insights.

The dissemination efforts ensure that the *ESG Space Industry Practices Book* continues to serve as an accessible, practical ASTRAIOS legacy for EU decision-makers, industry peers and European space curricula, helping to steer current and future initiatives in the European space ecosystem toward more sustainable, competitive and responsible European space sector.

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Figure 15: References

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