CSR WORKSHOP WITH THE SPACE INDUSTRY - STAKES AND CHALLENGES OF THE EUROPEAN SPACE COMMUNITY

Abstract

On 25 October 2018, the European Space Agency (ESA) organised a workshop inviting representatives of its industrial stakeholders to take stock of their needs and expectations in updating its Corporate Social Responsibility (CSR) policy.

This event was organised to allow an open discussion between the participants, while applying various idea-generation methods.

The results of this approach are mainly qualitative and provide a vision of the mid to long term outlook for the various actors operating in the European industrial space sector regarding its responsibility to society and to the environment.

The main conclusion of this work is that in order to tackle the global issues facing the European space sector and indeed the planet, ESA needs to foster collaboration and coordinate the sector's efforts to target common sustainability goals, step up its own CSR efforts and improve its image of the space sector among the general public and in its Member States.

As follow-up action, ESA needs to improve its internal processes, develop its relations in the sector to address CSR issues, promote systematic socio-environmental consideration throughout projects, a unified CSR governance and strategy for the sector, and a commonly responsible industrial supply chain.

Overall, this exercise proved to be a dynamising experience, highlighting the key CSR issues and providing a platform for the sector to communicate its views beyond its frontiers. It paves the way for similar consultation processes to be organised in future, the aim being to galvanise all stakeholders into action and thereby safeguard the shared heritage, wellbeing and destiny of humankind for generations to come.

European Space Agency
Agence spatiale européenne

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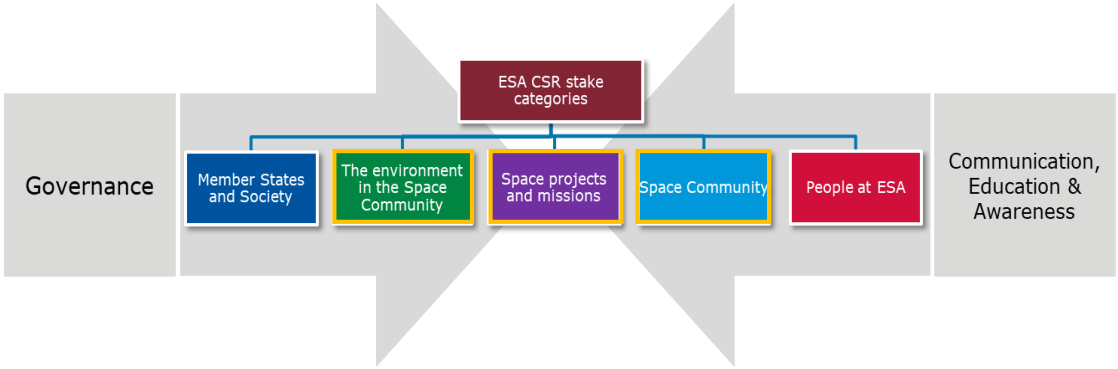
ABREVIATIONS

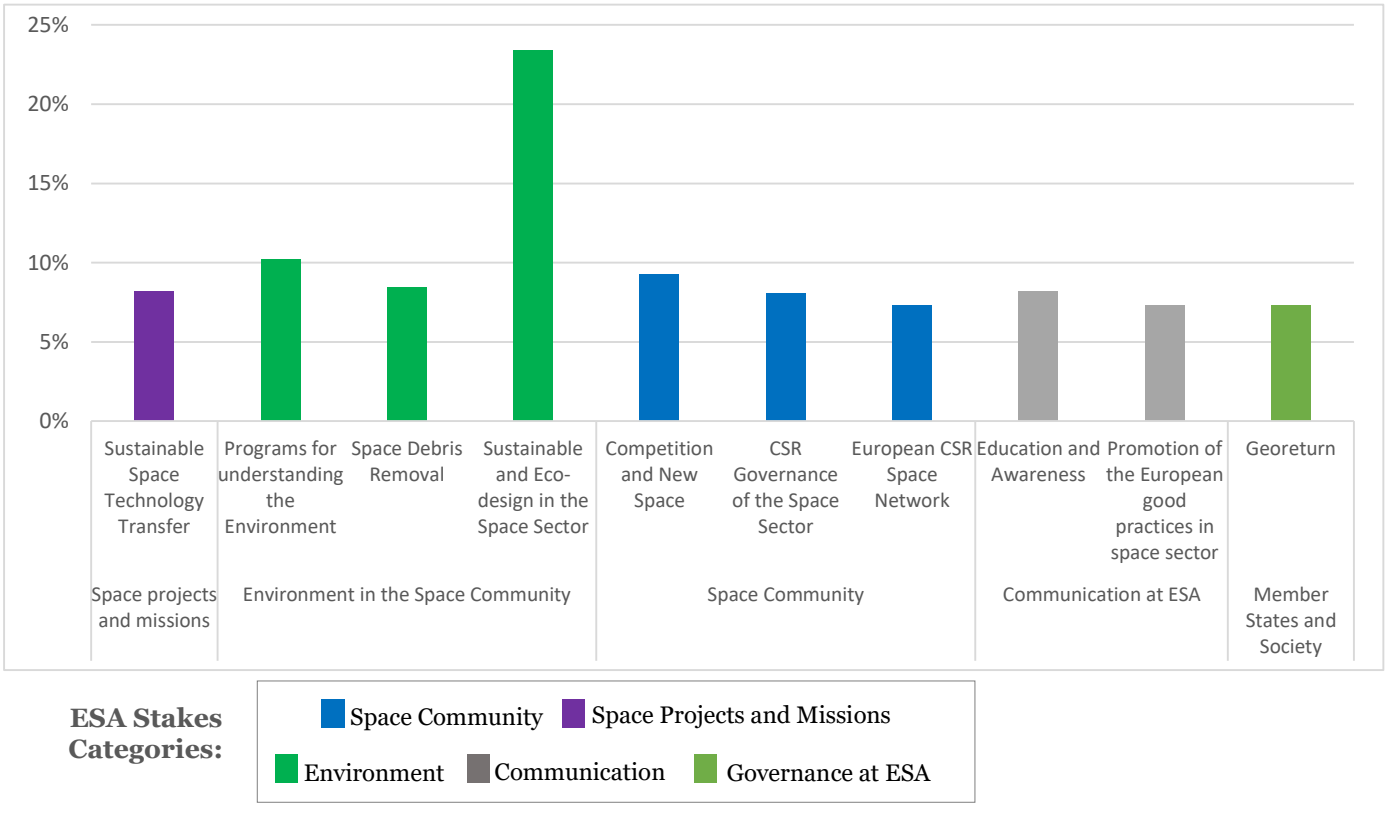
ITT: Invitation to Tender
CSR: Corporate Social Responsibility
S&I: Sites and Infrastructures

1 EXECUTIVE SUMMARY

On October 25th 2018, at ESA-ESTEC, DG-SD organised a workshop gathering together 15 representatives of 8 organisations of the European space sector (Airbus Defence & Space, Arianegroup, DLR, Deloitte, Orbit Recycling, OHB, Leonardo and Effective Space).
The aim of this workshop was to generate ideas and highlight the most important among the 31 stakes and challenges, in 7 categories, identified by ESA in its CSR approach.



The attendees of the workshop have been asked to focus specifically on the categories framed in yellow in the previous figure. However, the workshop, based on free idea generation methods, could allow the emergence of ideas in many other topics.
The following figure shows the level of interest of the representatives on the main stakes and challenges raised during the workshop.



We can see that there is a high interest for environmental challenges, especially, integrating more environmental criteria in the design of the space missions. But, on other interesting results is the pace Community category: There is a strong expectation for more cooperation in the European space sector. This has led the ESA CSR team to add a new challenge among the stakes and challenges identified previously: *cross-fertilisation among the space community*.
Elaborating the synthesis of all the results collected during the workshop, the CSR team has been able to establish the following roadmap.

This roadmap should be, according to the processed results of the workshop, be supported by the following 3 pillars' vision of the CSR in the European space sector:

1. **Cooperation for sustainability**
   - Sharing best practices
   - Sharing knowledge
   - Sharing purpose

2. **Responsible supply chain**
   - Embracing global and new challenges
   - Sustainable development of society
   - Transparency and ethics

3. **Improving European space sector image among the public and Member States**
   - Education and awareness
   - Inspire the public and future talents
   - Recognition

2 INTRODUCTION

ESA is updating its CSR Policy which was first released in 2011 as the Framework Policy on Sustainable Development.
After a first phase of dialogue with Agency's internal stakeholders, ESA has been able to build up a map of the stakes and challenges as shown in Figure 1.

Figure 1: Circular map of ESA CSR Stakes and Challenges

These stakes can also be represented in a more classic way, as shown in

Category of CSR stakes and challenges CSR stakes and challenges

Figure 2. However, one should notice that the map does not show any relative difference between stakes and categories and so should not be seen as a hierarchical system.

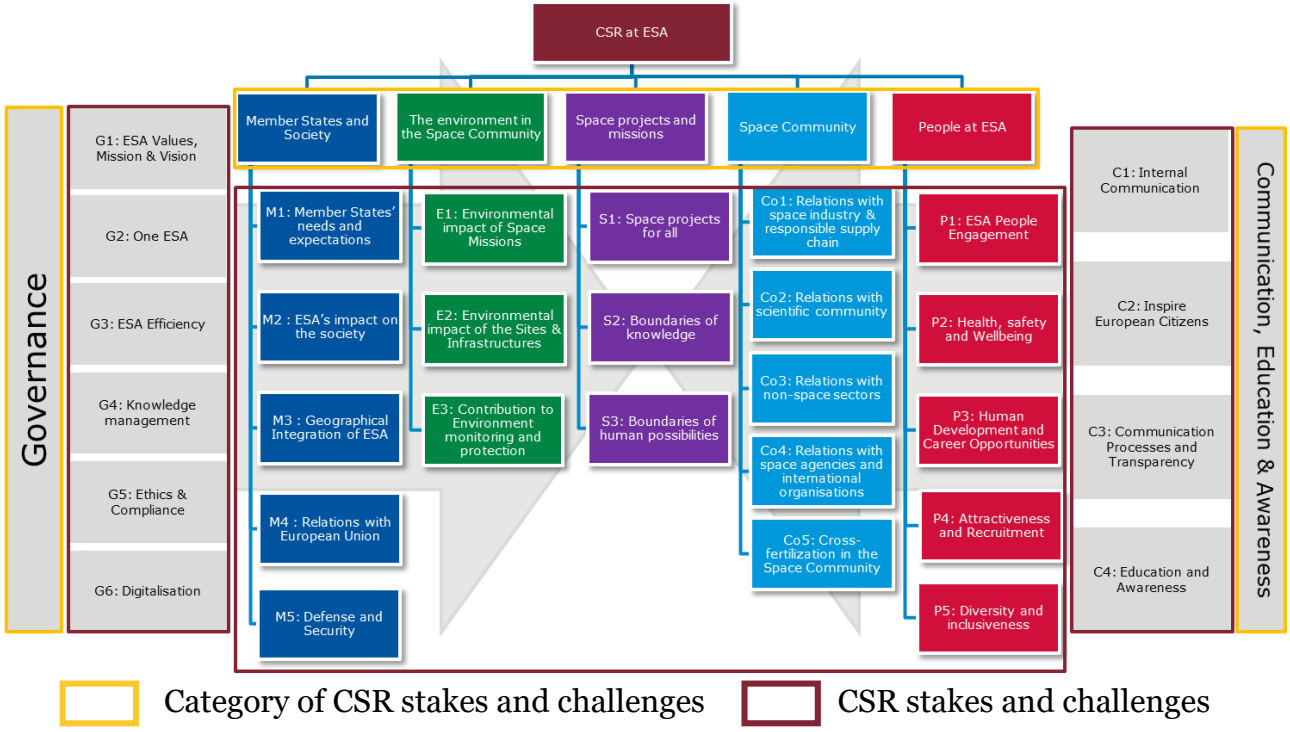


Figure 2: ESA alternative CSR Map

ESA is now in a phase of dialogue with its stakeholders that will allow ranking of the stakes according to their priority.

In the framework of this last phase, the ESA CSR team from the Corporate Development Office organised a focus group session at ESTEC High Bay, on 25 October 2018, as a side event of the ESA Clean Space Industrial Days. The aim was to initiate dialogue with ESA's industrial stakeholders, to draw the big picture of their needs and expectations, and to link them up with the stakes and challenges for the Agency.
In the first part of this document, we present the methodology applied to achieve the objectives of the session. Then, the results of the consultation will be shown and discussed. Finally, we propose further reflections to engage concerted work towards more sustainability in the space community according to the results presented in this report.

3 METHODOLOGY

3.1 Setting up the focus group panel

The focus group session aimed at collecting data on the needs and expectations of industry was organised as a side event of the Clean Space Industrial Days (CS-ID) at ESTEC.
For several years, many representatives of ESA's industrial stakeholders, mainly experts in LCA, eco-design and space debris issues have attended this event
Booking was required to attend the CS-ID and, via the same booking system, it was especially required to book for the focus group session with name, company name, position and email. Since the number of places was limited, this information allowed the ESA CSR team to validate each booking request to ensure the representativeness of the panel.
Additionally, 12 persons identified as CSR representatives of their company from ESA prime contractors were directly contacted and specifically invited to attend the meeting.

Figure 3 and Figure 4 show the attendance rates for each category of participants attending, those specifically invited or part of the CS-ID and those having additionally self-registered.

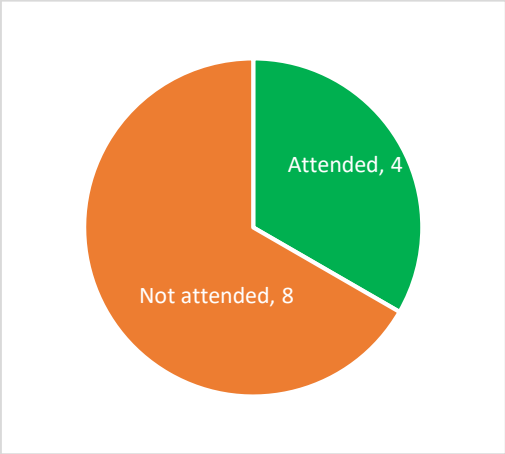


Figure 3: Specifically invited participant - Attendance

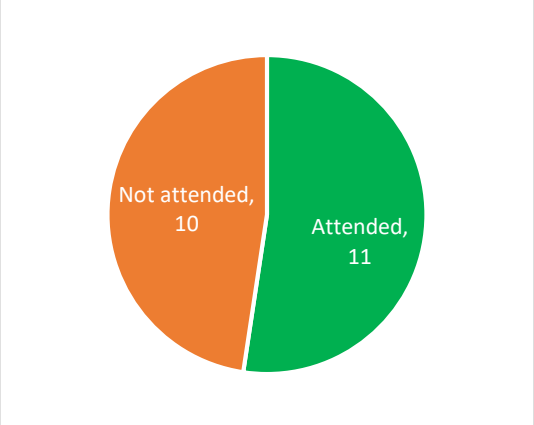


Figure 4: Self-registered people - Attendance

The ESA CSR team tried to ensure wide representativeness of the industrial space sector, verifying the registrations and refusing some from over-represented companies.

The following Figure shows the represented companies and organisations that registered and were accepted by the ESA CSR team and which actually attended the focus group session.

Figure 5: Represented companies and organisations which registered

We can see that the panel was quite representative, according to the registrations.
It will be noted that some organisations were represented by more than one person.

3.2 Content of session, idea-generation and ranking

At the beginning of the session, a brief reminder of the CSR definition was given to ensure a common knowledge base among the group.
Then, a map of ESA stakes and challenges was presented and, given the time available, it was proposed to work on certain issues only – those being the most relevant for the participants, as shown in the following Figure.

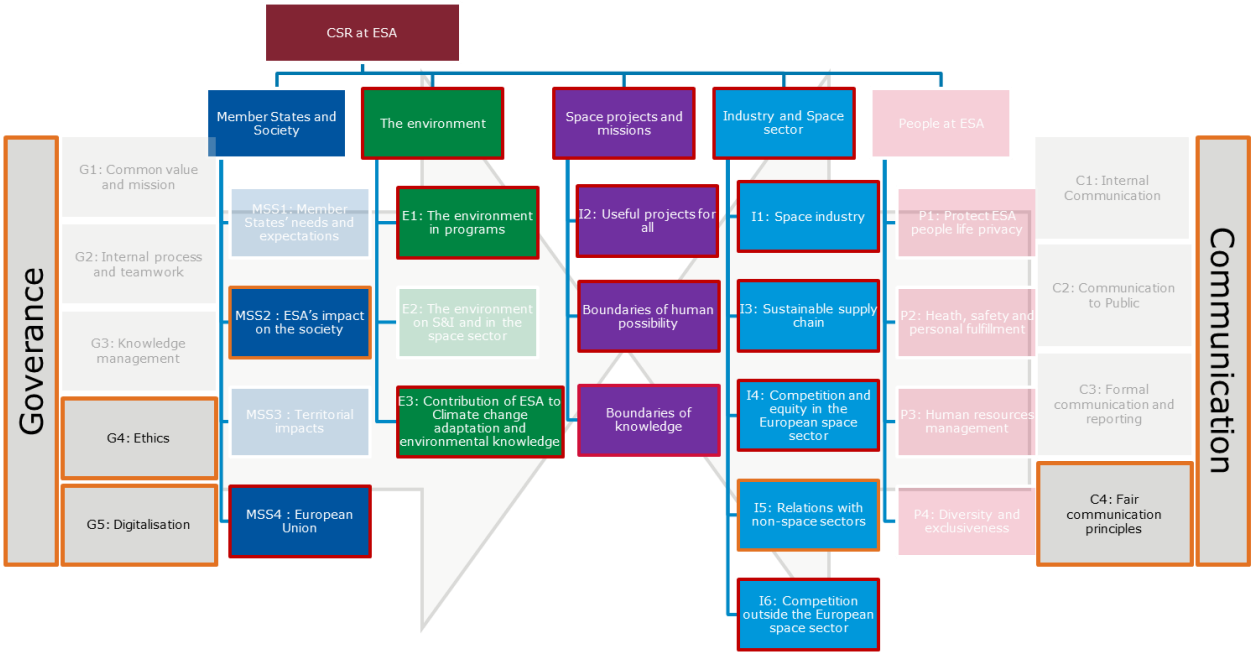


Figure 6: First version of ESA CSR stakes map

We can see that this map is quite different from the one presented in Figure 1. Indeed, the map in Figure 6 is an old version originating from the circular map and is the one presented during the session.
Only orange-framed stakes were specifically detailed to drive the session. However, where other stakes were proposed for discussion by the participants, these are shown in the results.

The session has been cut up into 7 different phases mainly according to the different stakes on the previous map:

- Phase 1: Personal Evaluation of ESA;
- Phase 2: I1: Space Industry;
- Phase 3: I3: Sustainable Supply Chain; I4: Competition and equity in the European Space Sector; I5: Competition outside the European Space Sector
- Phase 4: Space project and missions;
- Phase 5: Environment
- Phase 6: Last points: Corruption/fraud; Cyber security; Digitalisation; Fair Communication Principles; Time and Communication.
- Phase 7: Global Ranking

3.3 Description of each session phase

3.3.1 Phase 0: Personal Evaluation of ESA

Each attendee introduces him/herself, gives a mark out of 10 to evaluate ESA's relations with his/her organisation and says what ESA should do to get the top mark.

3.3.2 *Phase 1: Industry and Space Sector*

1. Each attendee has to write on a post-it what action ESA should take as a priority for this stake.
2. Each attendee exchanges his/her post-it with another and talks about what is written on it.
3. In groups of 2 persons, randomly selected, 2 post-its are then compared and discussed. Each couple has to distribute 7 points between their 2 post-its according to the question: "What is the better idea between the two?" The number of marks given to each idea is written on the back side of the post-it, avoiding interference with the following phases. Then, each attendee exchanges his/her post-it with the other member of the pair.
4. Phase 3 is repeated to take place 5 times, changing at random the constitution of the 2 person groups in each round.

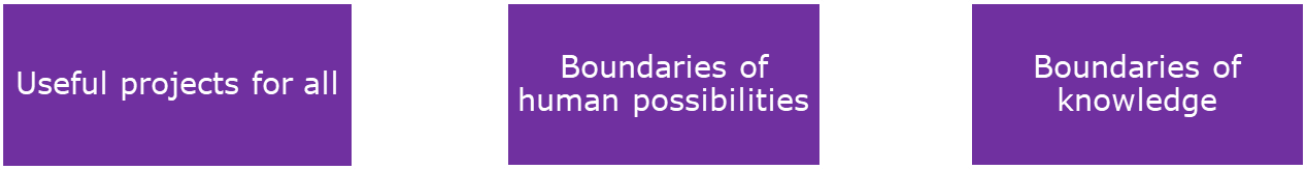
At the end of this phase, the results are a list of ideas ranked according to the number of marks given during the five rounds of the process.

3.3.3 *Phase 2: Industry and Space Sector*

1. The participants are split into groups representing each organisation present at the session (each group comprising representatives of the organisation);
2. Each group has to write on a post-it an idea related to the area of this phase and to be stuck on a flip chart, in a table with 5 columns: To remove / To do less / To do more / To create / To keep and cherish; to characterise the actions of ESA according to the stakes discussed in this phase.
3. The post-its are explained to all the participants by their authors.
4. Each group has to stick 7 coloured stickers among all the post-its of the participants according to the interest/importance/quality of each idea presented on the post-it.

At the end of this phase, a list of ideas is generated and ranked according to the number of stickers they got following the question: "What idea should be implemented as a priority?"

3.3.4 *Phase 3: Space Projects and Missions*



1. The participants are divided at random into 2 groups.
2. The first group works on describing the hypothetical "most perfect ESA project ever" whereas the second group works on describing what the "most horrible ESA project ever" could be.
3. The description is written up on a flip chart.
4. After 10 minutes, the groups switch and each group makes 2 proposals to improve the project described by the other.

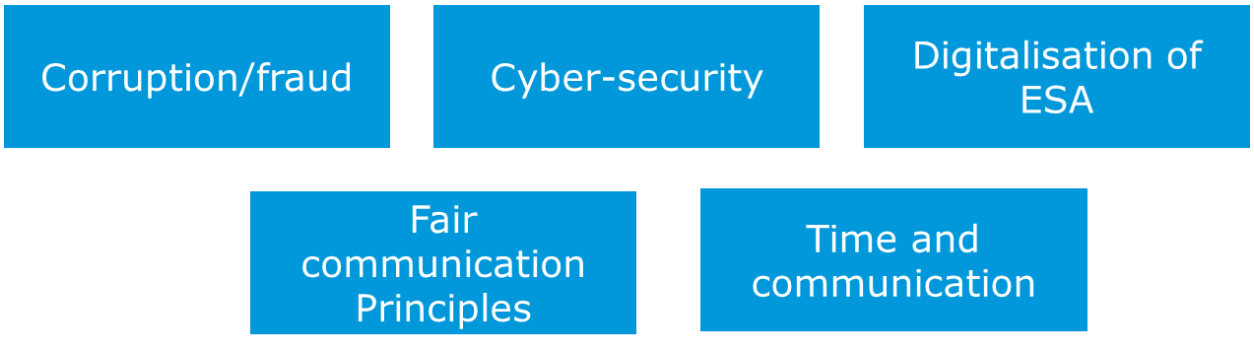
After an open discussion, proposals are made by the participants to ESA to elaborate the "best project ever".

3.3.5 *Phase 4: The Environment*

1. The participants are divided into groups of people from the same organisation.
2. Each group has to write on post-it an idea related to the area of this phase to be stuck on a flip chart in a table with 5 columns: To remove / To do less / To do more / To create / To keep and cherish – to characterise the actions of ESA according to the stakes discussed in this phase.
3. The post-its are explained to all the participants by their authors.
4. Each group has to stick 7 coloured stickers among all the post-its of the participants according to the interest/importance/quality of each idea presented on the post-it.

At the end of this phase, a list of ideas is generated and ranked according to the number of stickers they got following the question: "What idea should be implemented as a priority?"

3.3.6 *Phase 5: Last Points*



Personal ideas were raised here, inspired by these 5 stakes. There was no ranking done here but the ideas have been categorised and are to be found in the annex.

3.3.7 *Phase 6: Global Ranking*

Of all the ideas generated during the previous phases, the most consensual were kept, to be ranked all together.
Each group composed of members of the same organisation displayed 2 green stickers (tokens) for the most important ideas and one red sticker (token) for the least important.

3.4 Excluded Data and Results

For phases 2 and 4, only ideas marked 2 or more were considered.
Indeed, the ideas considered least important by the participants were set aside.
Ideas having scored 1 often got their vote from the person who proposed the idea and could not establish a strong enough consensus to convince other participants.
However, all the proposals noted during the session are detailed in the annex.

4 RESULTS AND DISCUSSION

The results have been collected and sorted according to the different stakes identified in the circular maps shown in the introduction (ESA Stakes) and also according to a specific categorisation elaborated to assemble the ideas collected in similar topics (Industry Stakes). They are here shown for each phase of the session.

4.1 Phase 0: Personal Evaluation of ESA

This phase offered an interesting insight into CSR activities at ESA as shown in Table 1.

The participants were mainly people working in fields related to CSR (CSR managers, health-safety-environment, eco-design and LCA engineers).
Therefore, the question was mainly answered through the prism of CSR and sustainability.
What we can see is that the relations between these representatives of the industry and ESA around the topics of CSR and the environment are considered as insufficient and/or non-existent. Currently, these relations are dealt with mainly by the Clean Space Initiative

and mostly on technical issues regarding the environmental impact of the space missions and space debris. These relations are good and fruitful but their range of action is limited to the 3 pillars of the activity (eco-design, CleanSat and E.Deorbit).
For the future, developing relations with industry around CSR issues more broadly could help enhance social responsibility in the sector, perhaps covering less specifically technical issues, but encouraging a much broader range of actions nonetheless.

Table 1: Feedback and marks given by each attendee responding

Company	Position	Level of satisfaction relation w/ ESA (/10)	How to improve our relations
Airbus Defence & Space	Eco design - governance team for CSR	7-8	Need to define together what is missing
Airbus Defence & Space	Eco design - governance team for CSR	8	Share more projects - more cooperation
Airbus Defence & Space	CSR team	7-8	Silo thinking too strong
ArianeGroup	Innovation house	N/A	More money
ArianeGroup	CSR officer	6	Only one meeting with ESA, need to have more regularly
ArianeGroup	Eco design team	5	Good relationship with Clean Space but only contractual. Need more space for discussion on the environment
Deloitte	Sustainability on eco design	7	Relationship with Clean Space but constraints of contractual relationship
DLR	Responsible for sustainability	7	Wish for a little more response time and more coordination
OHB SE	CSR officer	N/A	Need to develop the relationship with ESA
Leonardo	CSR officer	0	On the CSR aspect, no contact.

4.2 Phase 1: Industry and Space Sector

This issue, raised in the ESA internal stakeholders' dialogue process, was obviously the most relevant to the participants in this focus group session.
To verify that the focus group understood the topic and that the facilitating team moved the discussion in the right direction, Figure 7 shows which ESA stakes got the best scores during the ranking phase:

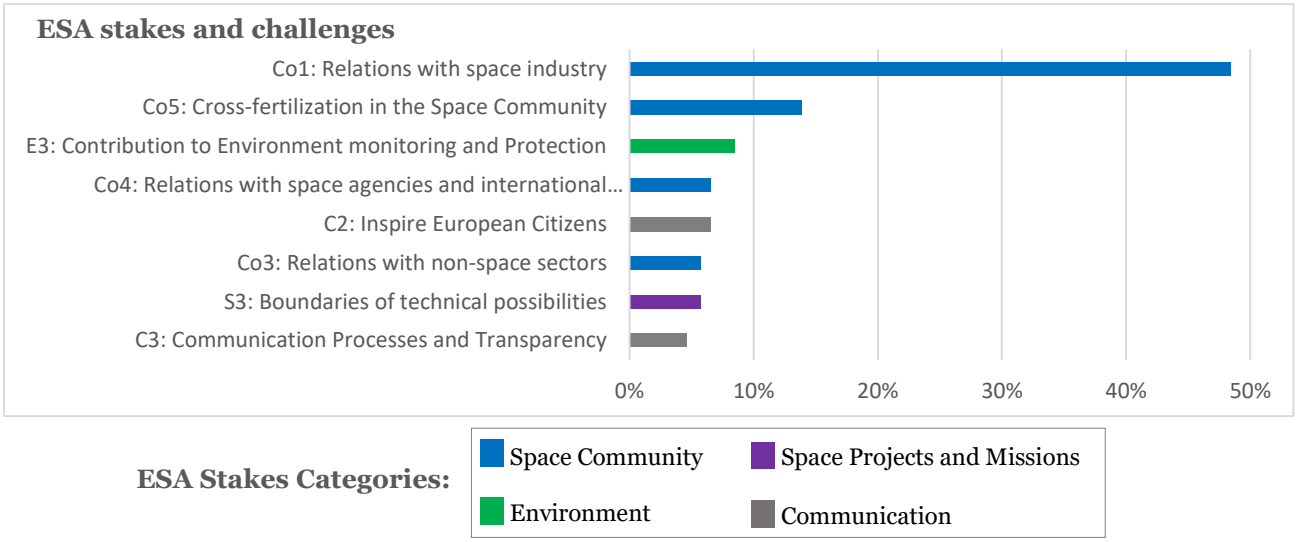


Figure 7: Categories of actions ESA should prioritise re. ESA stakes

The graph shows that ESA Stakes Co1 received almost 50% of all the marks given to all the ideas. The category *Space Community* got 75% of all the marks given by the participants.
Then, we can see that a significant share of the marks was given to *The environment*. That can be explained by the homogeneity of the panel regarding environmental expertise.
We can also see that the ESA stake *Communication* got 11% of the marks. That is consistent with the results of the first phases: ESA needs to openly communicate around CSR with its industrial stakeholders.
The following graph shows the results in more detail according to the Industry Stakes (crossed with ESA Stakes categories).

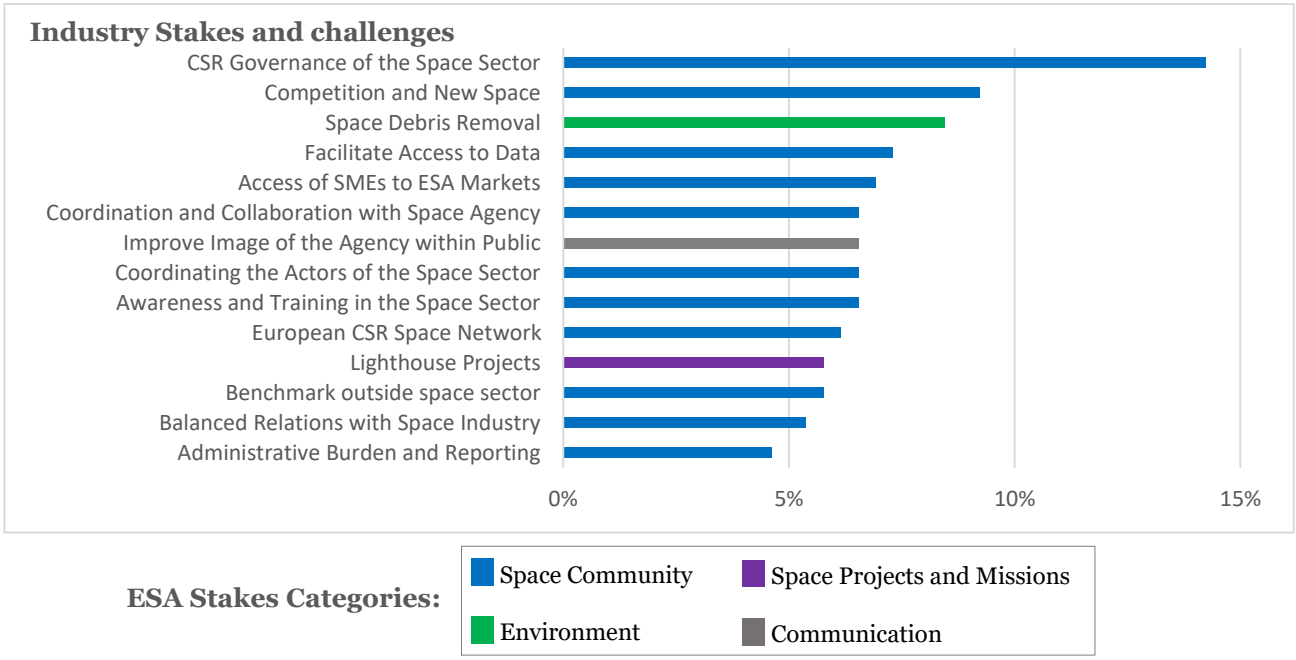


Figure 8: Categories of actions ESA should prioritise re. Industry Stakes

The category of highest interest *"CSR Governance of the Space Sector"* is composed of ideas related to "common CSR objectives, means and strategy of the entire ESS" that should be defined in a consensus driven by ESA. It can be linked with other categories such as *"Coordination and Collaboration with Space Agencies"* or *"Coordinating the actors of the ESS"*.

The participants expressed strong expectations that ESA organise by concrete means the European space sector around a common view of CSR, goals, targets and strategy.

Then, referring to ESA's role of enhancement of the space industry, a stake related to competition with non-ESSs and especially NewSpace (emerging actors such as SpaceX or Virgin Galactic) was raised along with the demand of "*Monitoring the space market and reacting with new ideas*".

4.3 Phase 2: Industry and Space Sector

In this phase, the scope of the discussions was wider than previously, for 5 stakes that were understood differently by the participants, as we can see in Figure 9. Indeed, the ESA stakes covered by the discussion are dispersed across categories that were not originally proposed in the discussion.
However, the value of the results is higher than expected.

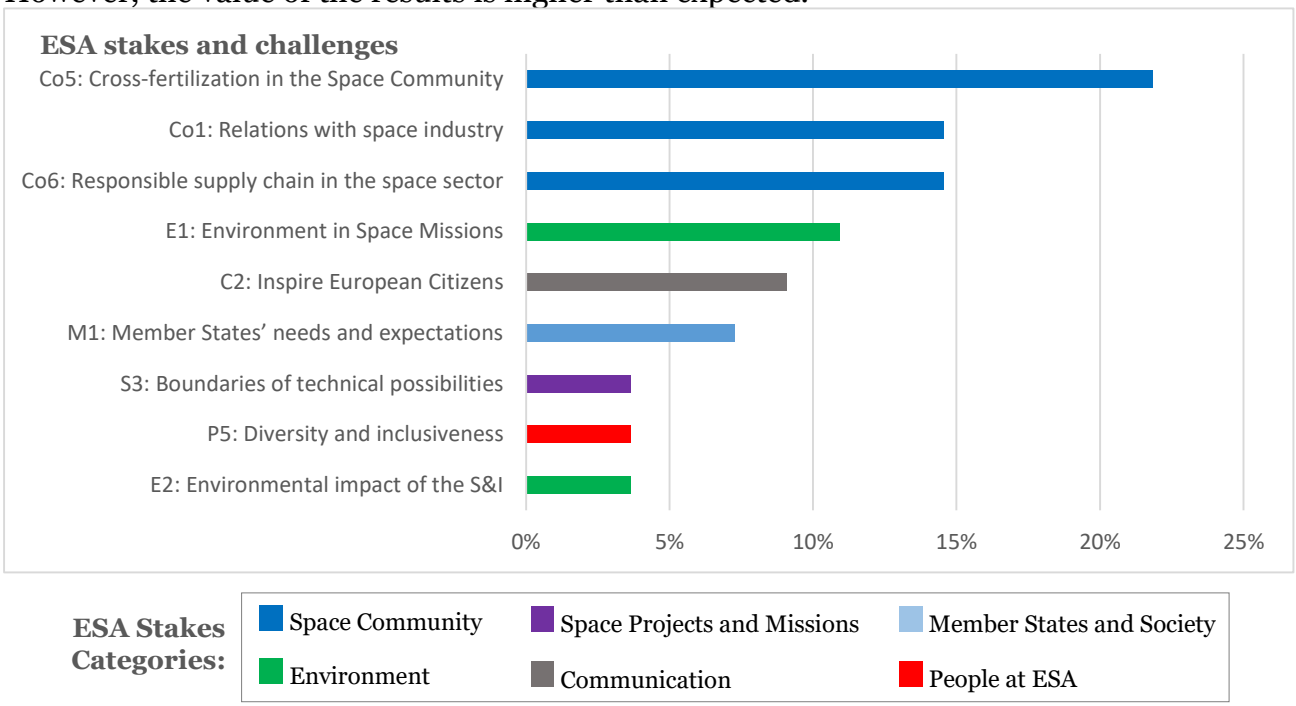


Figure 9: Industry representatives' interest in ESA's relations with the Space Community vis. ESA Stakes

ESA Stake Co5 is highly represented and got more than 20% of the marks distributed among all ideas, while Co1 and Co6 got 14% each.
Actually, these 3 categories, analysing the detailed ideas, show that the panel expects ESA to organise efficient governance and enhance collaboration inside the space sector (instead of competition) towards a precise goal: making the entire supply chain of the European space sector socially responsible (sustainable).
The environmental ideas raised here come more under the area of the Clean Space Initiative but should be taken into account in further steps of the ESA CSR team's work.

The following graph shows more details of the ideas getting the highest score. The details confirm the previous analysis but give also other information.

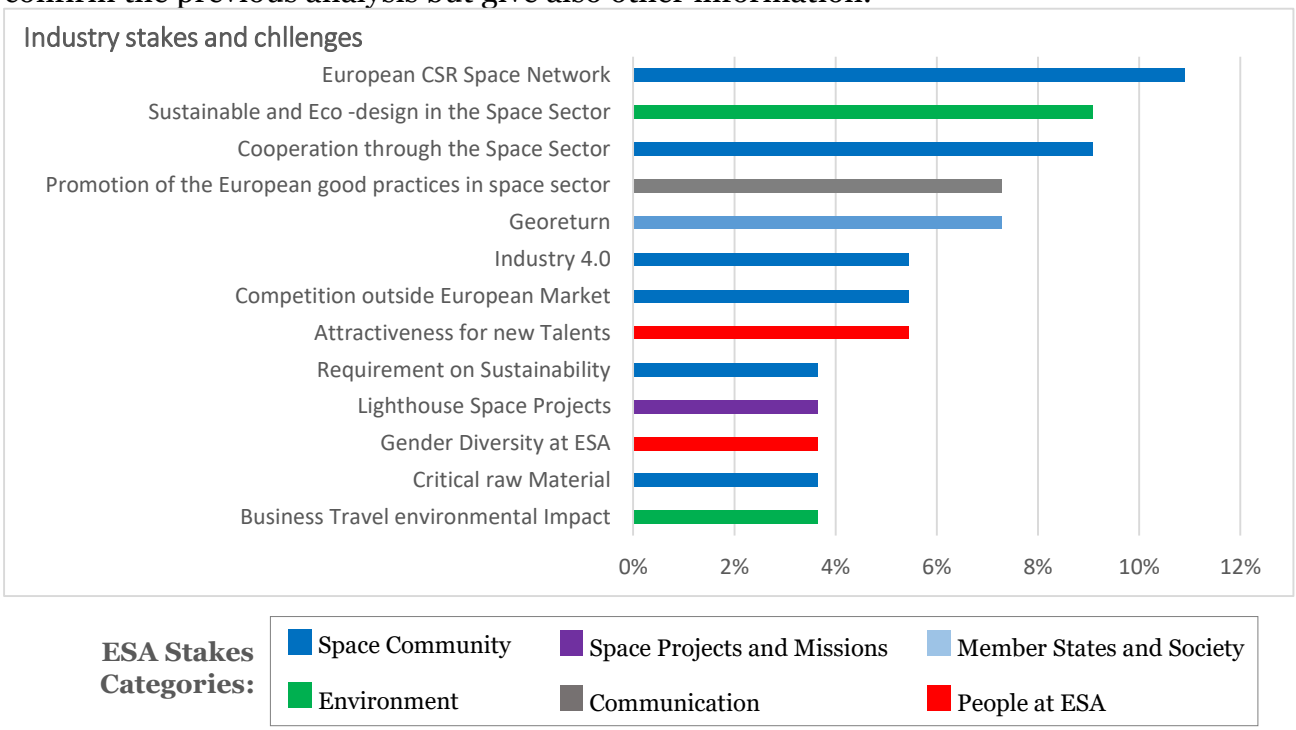
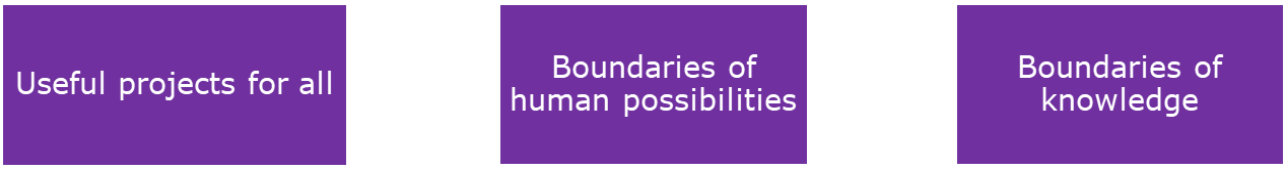


Figure 10: Industry representatives' interest in ESA's relations with the Space Community

For example, the preferred solution to establish a consensus and a common CSR strategy is, **firstly, to set up a network with representatives of industry and the European space sector** to meet regularly at events organised by the participants in turn.
Then, most of the other ideas raised in the session could be addressed by this network such as "Requirement regarding Sustainability" or reflection on "Critical Raw Materials".
The ideas from the ESA Stakes Category "People at ESA" are pretty close to issues identified by the Agency such as its upcoming retirement wave and the difficulties in recruiting new talent from diverse backgrounds (gender, background, age, etc.).

4.4 Phase 3: Space Projects and Missions



During this phase, the participants discussed 4 proposals.

- **A vision and roadmap to settle "outside Earth"**

The issue of *Lighthouse Projects* was raised several times during the session. A project for settling beyond Earth, was proposed along these lines.
Indeed, it would be a long term project, and particularly demanding for all the expertise and science fields of the European space sector that could unite many forces to drive towards fulfilling the same purpose.
It would be a way to push back the **boundaries of knowledge**, for instance on space travel and civil engineering in a hazardous environment.
Moreover, it would be a way to **push back the boundaries of human possibility**, on human spaceflight, life in space.
Developing such big projects, accessible to public understanding, able to inspire European citizens, could respond to many challenges such as improving the image of the space sector among the public and in Member States, easing the recruitment of new talent or fostering cooperation across the entire space sector.
Considering the positive side, the social impacts of such a project, we could see it as **a useful project for all**. However, this question generated a debate, especially on the social and environmental priority of current society which would not be covered by these impacts.

- **Technologies and missions enabling high-performing closed-loop systems and space garden**

MELiSSA (Micro-Ecological Life Support System Alternative) is the ESA project that has been studying closed-loop artificial eco-systems since 1987 along with the long-term needs for human missions to the Moon or Mars. The principle of this closed loop is to allow the growth of vegetables or algae for food, using the organic waste generated by activity on board as a substrate of fertiliser.
Since its creation, the project has shown good results in terms of technologies and innovation. Several prototypes on Earth and pilot installations are working – such as at the Concordia Research Station.
The fact that the panel put forward the proposal may reflect either that ESA is not communicating properly on its MELiSSA project or that our panel wants more resources and funding for this project to progress faster.
This project is a pusher-back of **the boundaries of human possibility** in the way that it will allow us in future to spend more time in space or on other planets.
Furthermore, it indirectly participates in the better understanding of Earth eco-systems by trying to partially recreate them artificially. So it can be considered as a good pusher-back of **the boundaries of knowledge**.

Furthermore, given the work of MELiSSA and its industrial participant on the technology transfer front to include decentralised water treatment systems in the building sectors or in humanitarian responses, we can consider that this project is particularly **useful for all**. Finally, we should underline that such a project, if well promoted among the public, may have a great impact on the common understanding of the Earth system as a closed eco-system and of environmental issues such as water consumption and pollution.

- **Develop zero-waste space missions**

Zero Waste is a movement that promotes a lifestyle aiming at avoiding the creation of waste in households. This philosophy or concept is becoming more than a simple personal lifestyle matter and is reaching more and more sectors.
Regarding the Space Missions aspect, it touches on a lot of concepts and notions, purely technical (production waste or satellite design), legal (responsibility for spacecraft, deorbiting, contracts, due diligence, etc.) and even philosophical (if a satellite burns in the atmosphere at the end of its service, is it really a zero-waste mission?).
The aim of this proposal is to foster a transverse approach on space missions to ensure better consideration of the end-of-life but also all the waste generated during its life cycle.

- **Space sector governance and responsibilities on Earth**

According to the ESA Convention, the Agency is in charge of elaborating and implementing the European industrial policy of the space sector.
In this framework, the panel considered that ESA has an important responsibility in the environmental and social impacts of the European space sector regarding its fmes and missions.
Therefore, ESA should position itself by specifically organising a governance system for the sector that takes into account these responsibilities.
Such a project should lead the way to ensure:

- the application of ESA's CSR objectives on all projects and missions;
- sufficient funding of projects and missions to take into account all social and environmental external issues;
- that ESA is taking the necessary steps to remedy past external issues that had not been taken into account.

4.5 Phase 4: The Environment

In this phase, we can see in Figure 11 that the most consensual ideas raised concern the environment, as expected, at an aggregate level of 48% of all marks given.
The fact that 20% of the marks was given to Space Projects & Missions can be explained by the fact that the majority of the participants comprised engineers working directly on space technologies. Moreover, the relatively small number of proposals made environmentally for Sites & Infrastructures shows that the panel does not see this category as a big lever for the improvement of the environmental performance of the ESS. The panel may be expressing here the opinion that it has a bigger range of actions on designing the space technologies according to their personal experience and expertise.
Finally, the high importance given to Education & Awareness, 20%, is a very interesting result. Space is considered a good vector of information and those attending assumed that in order to progress on the environment, knowledge and awareness have to be raised (climate change, loss of biodiversity, raw material depletion) among the general public in order to then influence decision-makers.

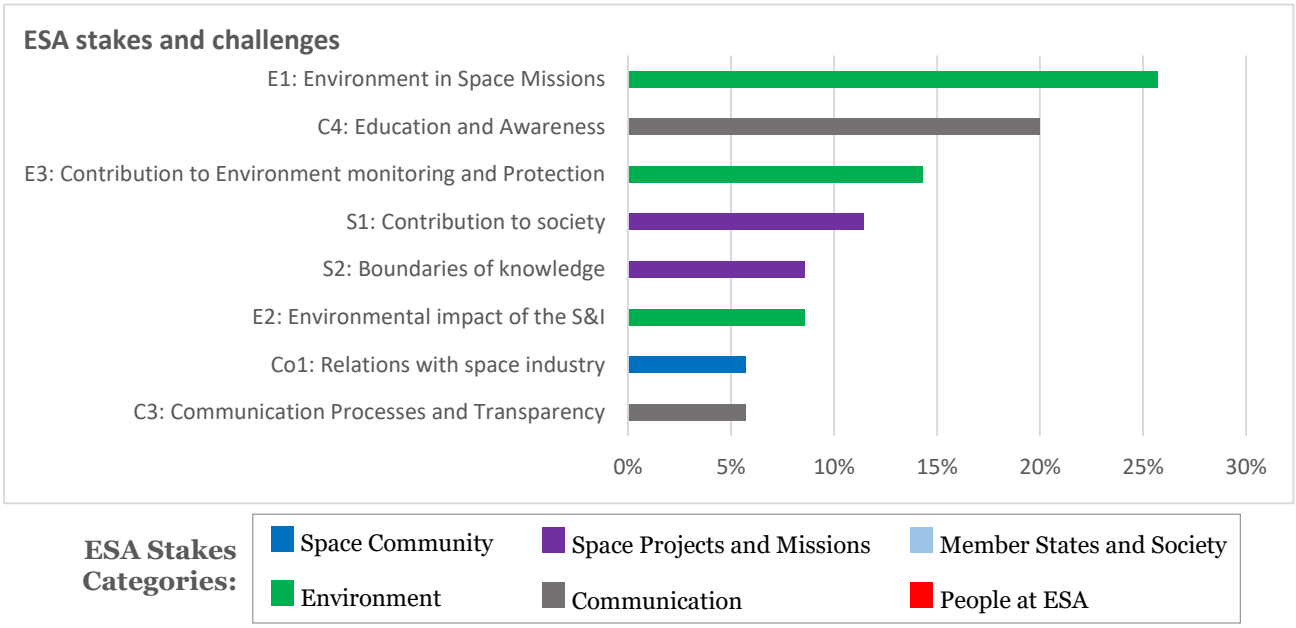


Figure 11: Interest of industry in environmental issues vis ESA Stakes

When looking at the distribution of marks according to the stake categories, especially established from the panel consultation results shown by Figure 12, we can see that an important expectation concerns the correlation between environmental activities or their environmental impact and the communication about these activities.

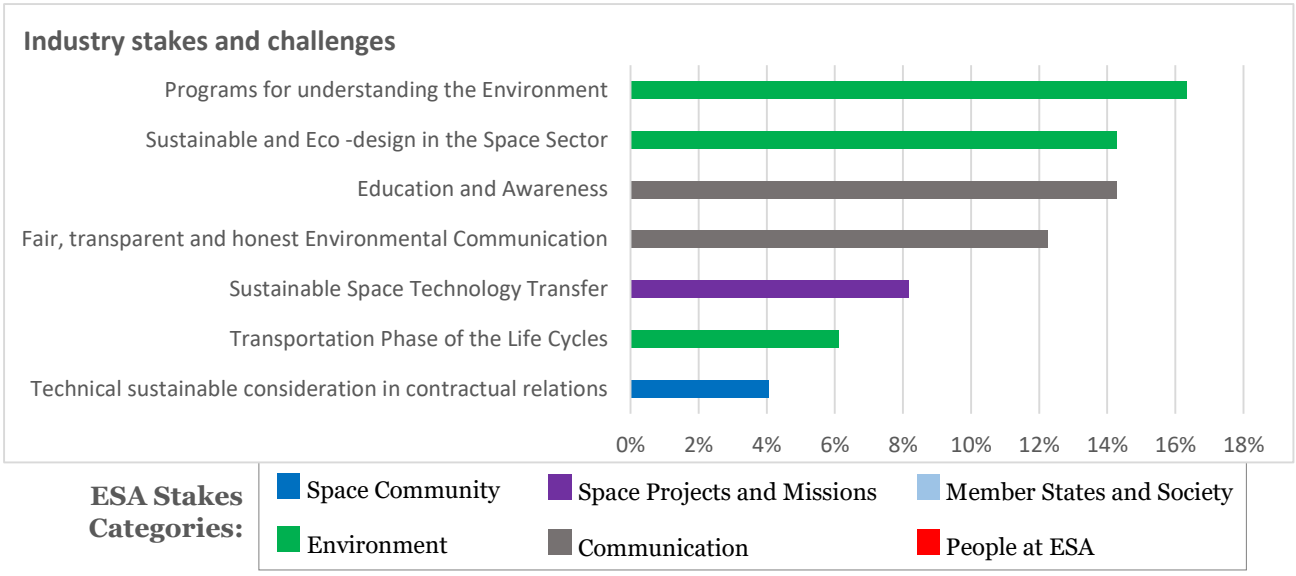


Figure 12: Interest of industry in environmental issues vis Industry Stakes

The first stake, the most important, with more than 16% of the interest expressed, lies mainly in Earth Observation projects. It suggests placing more emphasis on climate and Earth environment monitoring and applications using data collected. It suggests also working more on the processing and combining of data sets to ensure and ease wider use of them.

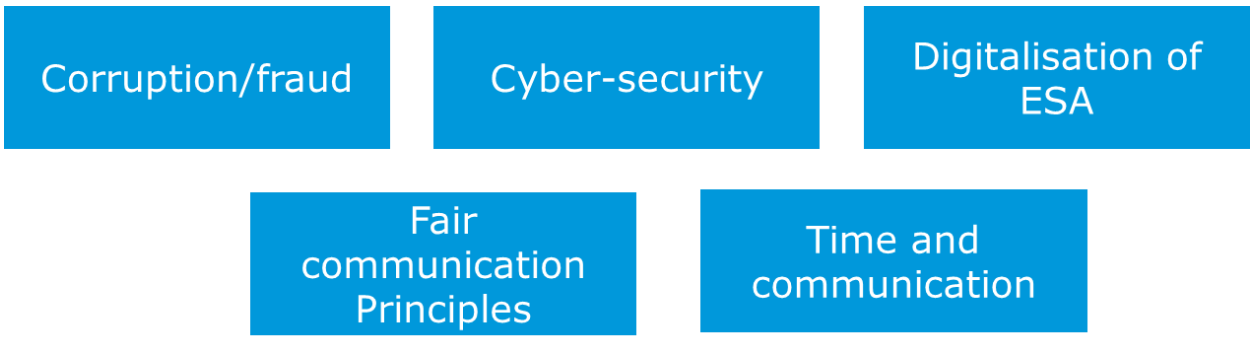
The second stake raised with more than 14% of interest is *Environmental Strategy in Mission Development*. It is a broad-ranging issue:

> *ESA should ensure the assessment of the full environmental impacts of space missions. Then ESA should work on space missions with reduced impact on climate change and launch mitigation actions (from decision to end of life).*
> *ESA should promote eco-design and LCA in the sector with particular attention given to critical raw materials. Use of green propellants.*

This expectation implies introducing a complete and transverse environmental responsibility across the entire space sector starting from ESA's core activities.

Next are the communication issues, at 14% and 12%, that consist in better promotion of the work of the sector regarding the environment. It was also said that the outstanding work made to preserve the environment (specifically by Earth Observation), should not relieve ESA from preventing and mitigating the environmental impacts of its activities.
Once again, the different contributors assumed that the space sector – being a small sector compared to many others – will have more impact on society in terms of decreased environmental impact thanks to education and growing awareness of the environment.

4.6 Phase 5: Last Points



The last points were approached as an open discussion and brainstorming phase.
Here, no ranking has been made.
In all, 15 ideas were generated and their distribution (by number of ideas) across the ESA Stakes categories is shown by Figure 13.

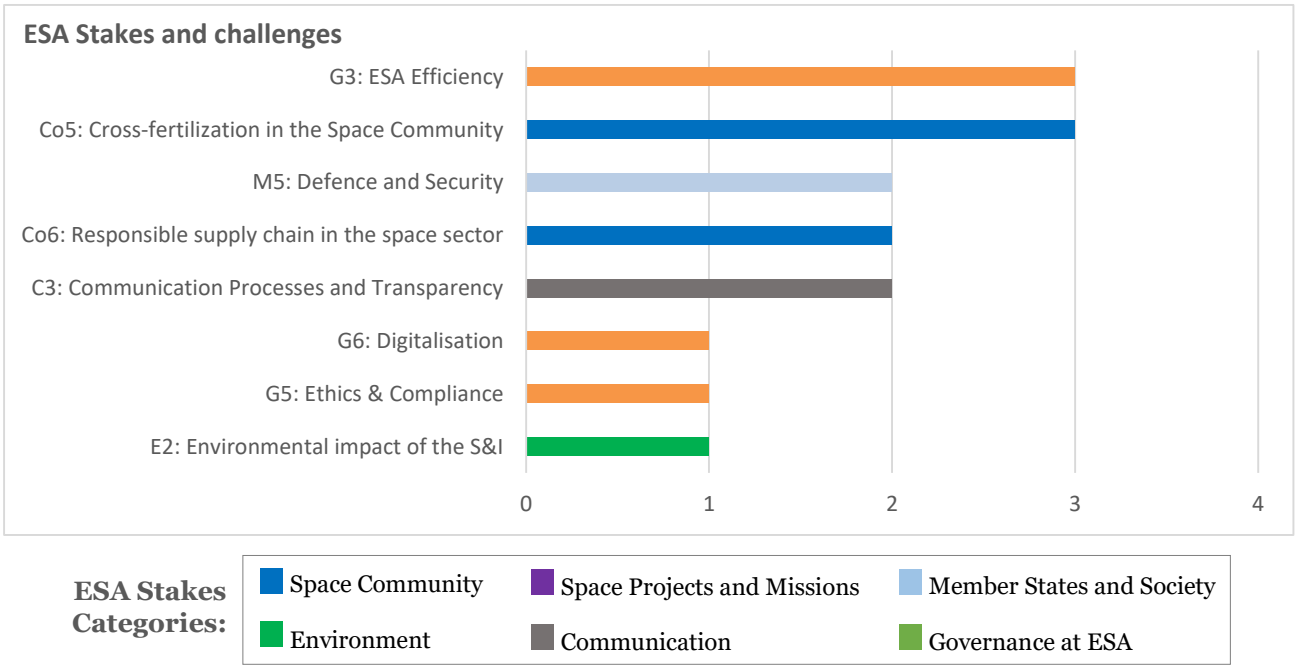


Figure 13: Number of ideas generated in other topics of interest vis ESA Stakes

Among the proposals, 3 were linked to ESA Efficiency or directed towards the improvement of ESA internal processes that have a significant impact on the work of industrial stakeholders.
Then, 3 others concerned *Cross-fertilisation in the Space Community*, meaning how ESA can foster coordination, cooperation and sharing of data, information or knowledge across the ESS.

Figure 14 proposes another repartition of the Ideas per industry stake category.

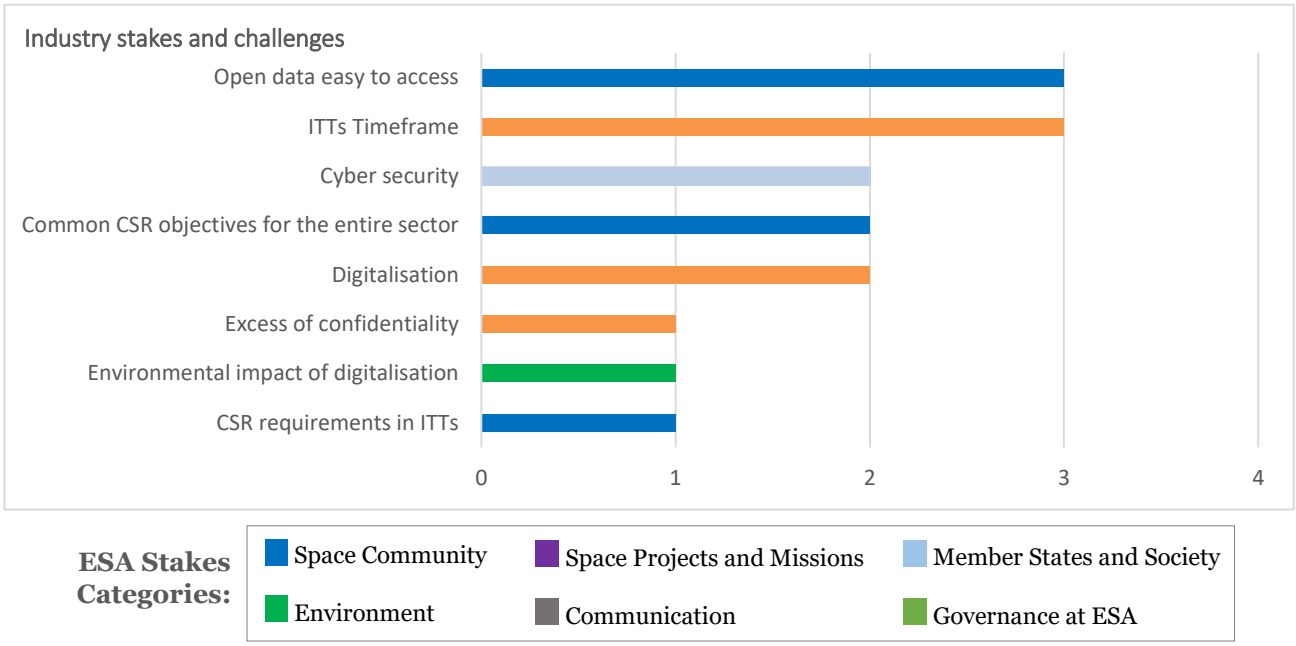


Figure 14: Number of ideas generated in other topics of interest vis Industry Stakes

Notice, again, in a more detailed way, the predominance of ESA governance issues, especially regarding internal rules and processes that have a high impact on external stakeholders. This is a general indicator of the relations ESA has with its stakeholder that need to be taken into account.
The main ideas and remarks in this category were about the lead time around ITT processes:

- too short a lead time between publication of the ITT and the application deadline;
- too long a lead time between the application and selection of companies;
- too much bureaucracy;
- lack of communication.

As for the previous category, the ideas emphasised for Space Community proposed a systemic approach to CSR throughout the entire European space sector to enhance the collaboration around certain topics and especially CSR. This implies firstly facilitating the sharing of and access to the knowledge and data generated under past projects or by current space missions. Then:

- coordination of the European space sector and more specifically industry;
- (jointly) define common CSR objectives;
- translate these objectives into contractual requirements;
- due diligence in meeting requirements and achieving objectives.

Finally, there is a dual vision regarding digitalisation at ESA. This is seen as a good way to oil the wheels of ESA processes. Nevertheless, the international scientific community considers it also as the new great marker of the 21st Century with regard to the Anthropocene (energy, space, global warming, resource depletion, extraction of critical raw materials, etc). Therefore, ESA and the ESS should also consider measures to mitigate the environmental impact of digitalisation.

4.7 Phase 6: Global Ranking

Having organised the previous phases around particular topics, all the ideas put forward are now ranked by each company group, giving green tokens to ideas considered as more important and red tokens to the ones considered as less important.
Figure 15 is a matrix showing how many tokens (more or less important) went to each ESA Stakes subcategory.

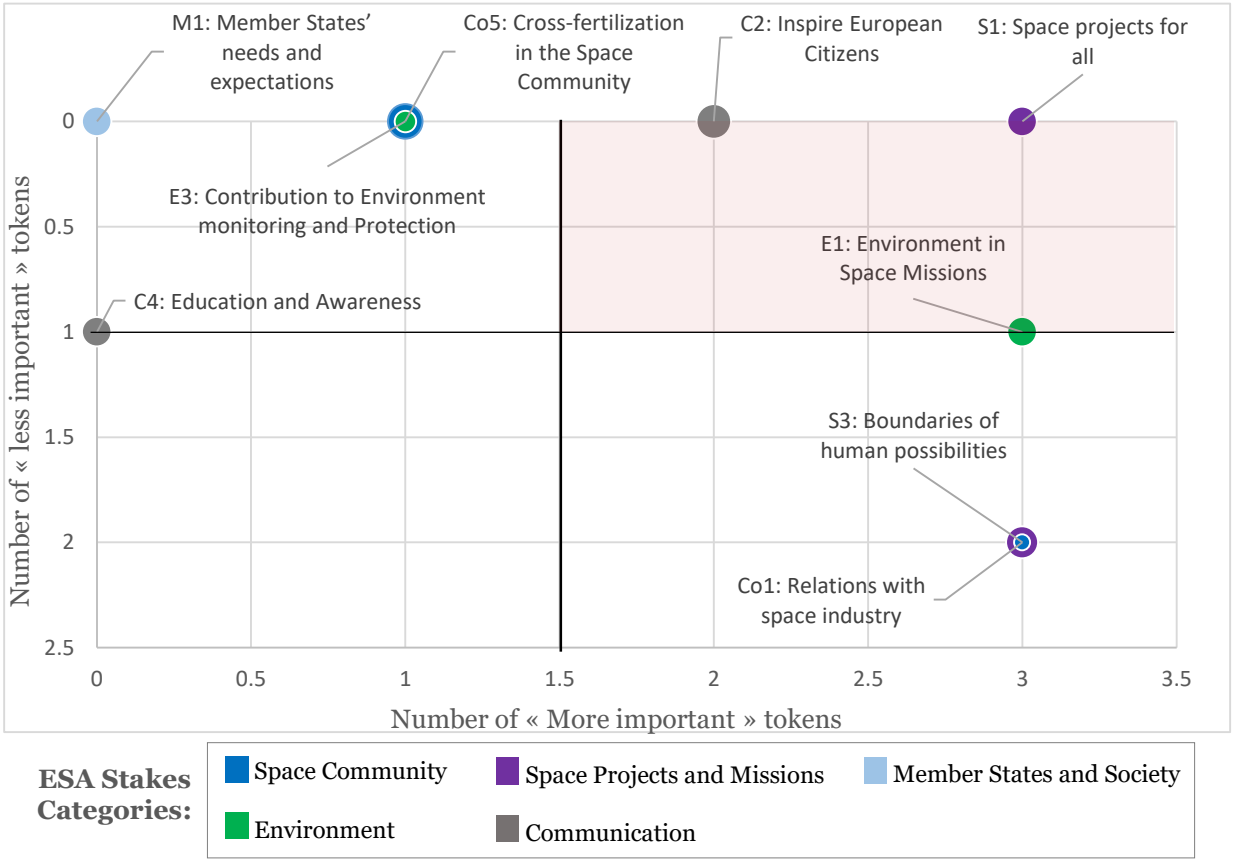


Figure 15: Matrix – ESA Stakes Category – Tokens awarded in both categories "Less Important" and "More Important"

The red part of the matrix is the area where the level of importance is the highest:

$$N_{Li} \leq 1 \quad AND \quad N_{Mi} \geq 1.5$$

where N_{Li} is the number of "less important" tokens and N_{Mi} is the number of "more important" tokens.
The 3 most important ESA Stakes subcategories for industry are:

- S1: Space projects for All;
- C2: Inspire European Citizens;
- E1: Environment in Space Missions.

The key message here is that the panel expresses the will to work on meaningful projects, beneficial to society, not harming the environment, and due recognition by ESA, its Member States and the public at large.

However, going more into detail on the results of this phase (

Table 2), we can see some opposing stances among the participants and some inconsistencies in the expectations expressed.

Ideas raised per ESA stake subcategory	Phase of the session	More important	Less important
C2: Inspire European Citizens		**2**	**0**
Promotion of the European good practices in space sector	Industry and Space Sector	2	0
C4: Education and Awareness		**0**	**1**
Education and Awareness	Environment	0	1
Co1: Relations with space industry		**3**	**2**
Competition and New Space	Industry and Space Sector	2	0
Co5: Cross-fertilization in the Space Community		**1**	**0**
CSR Governance of the Space Sector	Industry and Space Sector	2	2
European CSR Space Network	Industry and Space Sector	0	0
E1: Environment in Space Missions		**3**	**1**
Sustainable and Eco-design in the Space Sector	Industry and Space Sector	3	1
Zero Waste	Space Projects and Missions	0	0
E3: Contribution to Environment monitoring and Protection		**1**	**0**
Programmes for understanding the Environment	Environment	1	0
Space Debris Removal	Industry and Space Sector	0	0
M1: Member States' needs and expectations		**0**	**0**
Geo-return rules to be changed	Industry and Space Sector	0	0
S1: Space projects for all		**3**	**0**
Closed loop space systems	Space Projects and Missions	2	0
Sustainable Space Technology Transfer	Environment	1	0
S3: Boundaries of human possibilities		**3**	**2**
Interplanetary colonies	Space Projects and Missions	3	2

Table 2: Number of "Less Important" and "More Important" tokens received per top idea in each phase.

For example, in ESA subcategory Co5, *CSR Governance of the Space Sector*, there was a clear opposition between some participants expecting ESA to take a strong lead and push the European space sector towards sustainable objectives and others considering the risk of too much ESA interference or intervention in private-sector business.
Inconsistency was also noticed in E1, *Sustainable and Eco-design in the Space Sector*, attracting two proposals:

- Interact with industry ideas and support start-ups to encourage sustainable design, perform more eco-design for space;
- ESA should ensure assessment of the full environmental impacts of space missions. ESA should work on space missions with reduced impact on climate change and launch mitigation actions (from decision to end of life).
  ESA should promote eco-design and LCA in the sector giving particular attention to critical raw materials. Use of green propellants.

Indeed, the first proposal got 3 “more important” tokens while the other got 1 “less important” token.
They are interlinked, proposing to promote and enhance eco-design practices in the ESS. However, the second gives a more interventionist role to ESA, which is the source of worries for some stakeholders.

Finally, in phase 3: Space Project & Missions, participants proposed a lighthouse project consisting of a settlement on another planet (or natural satellite) of our solar system. The aim here was to propose a common aim for the long-term to build-up stronger cooperation around an inspirational vision of the European space sector targeting the general public. While this position was mainly held by the participants taking a more “*space project design*” approach, the eco-design or environmental experts among the participants were more sceptical about the priority to be given to such projects when considering the crucial terrestrial environmental issues humankind is facing, raising the often-heard objection: “Should we not try to establish a more socially responsible space sector in Earth before settling on other planets?”

5 CONCLUSION

The aim of this workshop, organised for industry, was to highlight ideas, needs and expectations on CSR which ESA's industrial stakeholders could communicate to the Agency.
It has been shown that, despite the Agency's desire to consult as widely as possible, in trying to reach a representative community, one of the limitations of this exercise was the homogeneous profile of the panel questioned and the absence of numerous important actors in the European space sector.

For future consultation and networking events on CSR in this sector, this first experience should be taken into account in order to better influence the ability and willingness of our industrial stakeholders to attend events such as this.

Yet the panel was broad enough to get interesting results on expectations from the European space industry and enrich the stakeholders dialogue already launched by ESA. According to the results presented in this paper, Figure 16 proposes a mid-term path of action for sector.
It is important to note that according to ESA's industrial stakeholders, the Agency has no vocation to enforce or dictate. Therefore, this scheme reflects the concern for cooperation that has been raised and the need for the sector to find a coordinator – which could be ESA.
Assuming ESA's continuing ability to progress regarding internal processes that have a significant impact on other actors in the sector, the Agency should develop these relations (at least) within the sector and coordinate the elaboration of common practices so as to move towards a more socially responsible sector.
This should be done keeping in mind key ideas such as using lighthouse projects to enhance the responsibility of the European space sector, cooperation and improvement of the sector's image.

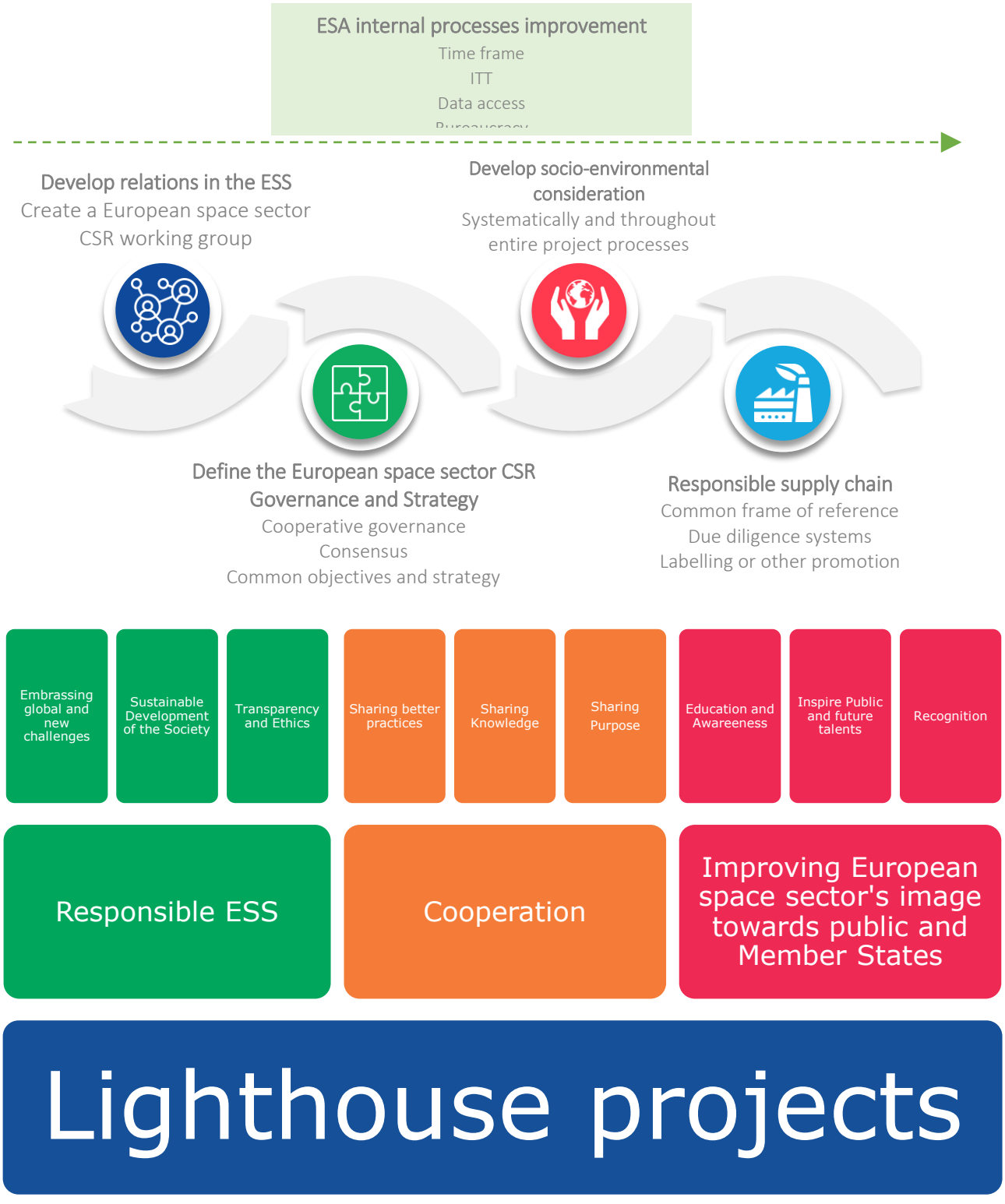


Figure 16: Scheme for the follow-up steps to this report

ANNEX 1. RESULTS OF PHASE 1: INDUSTRY AND SPACE SECTOR

Industry stake	Actions ESA should prioritise	ESA Stake	Sub category	Grade	Relative grade
Competition and New Space	Monitor the space market and react with new approaches	Space Community	Co1: Relations with space industry	24	9%
Space Debris Removal	Enable space debris removal	Environment in the Space Community	E3: Contribution to Environment monitoring and Protection	22	8%
CSR Governance of the Space Sector	Define what CSR & sustainability mean for the EU space industry (consensual way)	Space Community	Co1: Relations with space industry	21	8%
Facilitate Access to Data	List unnecessary confidentiality embargos and allow European stakeholders a wider and more streamlined access to data	Space Community	Co5: Cross-fertilization in the Space Community	19	7%
Access of SMEs to ESA Markets	ESA should establish a partner programme (beside a contractor programme) to allow smaller companies better visibility. Partner programmes exist in several industries and complement contractor or incubation programmes : like ESA BIC	Space Community	Co1: Relations with space industry	18	7%
Coordinating the Actors of the Space Sector	ESA should improve access to information and questions raised to improve interactions between government, science community and industry (synergy of information, ESA as a coordinator)	Space Community	Co5: Cross-fertilization in the Space Community	17	7%
Coordination and Collaboration with other Space Agencies	Coordination with motivated space agencies	Space Community	Co4: Relations with space agencies and international organisations	17	7%

Industry stake	Actions ESA should prioritise	ESA Stake	Sub category	Grade	Relative grade
Awareness and Training in the Space Sector	ESA shall increase the awareness on CSR (in general and on specific topics targeted by ESA) in companies & provide training	Space Community	Co1: Relations with space industry	17	7%
Improve Image of the Agency within Public	Increase drastically communication to the large public (e.g. Philae or Bepi.Colombo videos, space shops are good).	Communication at ESA	C2: Inspire European Citizens	17	7%
European CSR Space Network	Create a network and collaboration with European industry	Space Community	Co1: Relations with space industry	16	6%
CSR governance of the space sector	Define clear CSR goals reflecting both citizens and industry shared values	Space Community	Co1: Relations with space industry	16	6%
Benchmark outside space sector	Expand horizons to other industries	Space Community	Co3: Relations with non-space sectors	15	6%
Lighthouse Projects	ESA shall develop (together with industry and civil society) a CSR lighthouse project (new, tangible, large scale, visible). Ex : PMD project	Space projects and missions	S3: Boundaries of human possibilities	15	6%
Balanced Relations with Space Industry	Stop treating industry as being « less experienced » than ESA	Space Community	Co1: Relations with space industry	14	5%
Administrative Burden and Reporting	Reduce reporting templates between ESA & industry	Communication at ESA	C3: Communication Processes and Transparency	12	5%

ANNEX 2. RESULTS OF PHASE 2: INDUSTRY AND SPACE SECTOR

Industry stake	What to change or not about ESA and the European Space Industry	What to do	ESA Stake	Sub category	Grade	Relative grade
Sustainable and Eco - design in the Space Sector	Interact with industry ideas and support start-ups to encourage sustainable design, to perform more eco-design for space	To do more	Environment in the Space Community	E1: Environment in Space Missions	5	9%
Geo-return	Rethink the geographic return system (makes the industrial scheme more complex, economic disadvantage vs competition)	To remove	Member States and Society	M1: Member States' needs and expectations	4	7%
Promotion of the European good practices in space sector	Make European space more visible and denunciate unsustainable space practices outside Europe (e.g. ASAT tests/activities)	To do more	Communication at ESA	C2: Inspire European Citizens	4	7%
European CSR Space Network	ESA Clean Space Industrial Day	To keep & cherish	Space Community	Co5: Cross-fertilization in the Space Community	4	7%
Industry 4.0	Industry 4.0.	To do more	Space Community	Co1: Relations with space industry	3	5%
Competition outside European Market	Enable European industries to compete in world market	To do more	Space Community	Co1: Relations with space industry	3	5%
Cooperation through the Space Sector	Competition and equity in the European Space Sector: ESA should look to the collaboration instead of competition. ESA should help different actors connect between each other, in particular between SMEs and big companies.	To Create	Space Community	Co5: Cross-fertilization in the Space Community	3	5%
Attractiveness for new Talents	Attract or keep people/talents in Europe (job opportunities for youth)	To keep & cherish	People at ESA	P4: Attractiveness and Recruitment	3	5%

Industry stake	What to change or not about ESA and the European Space Industry	What to do	ESA Stake	Sub category	Grade	Relative grade
Lighthouse Space Projects	Stopping lighthouse projects like E.deorbit and similar. For example, why have we stopped the ATV (Automatic Transfer Vehicle) programme. What about deorbiting Envisat?	To remove	Space projects and missions	S3: Boundaries of human possibilities	2	4%
Cooperation through the Space Sector	Competition: do we have an EU market large enough to always go toward competition? Isn't cooperation a better solution?	To do less	Space Community	Co5: Cross-fertilization in the Space Community	2	4%
Business Travel environmental Impact	Travel for no good reasons	To do less	Environment in the Space Community	E2: Environmental impact of the S&I	2	4%
Gender Diversity at ESA	Time for a female ESA DG	To do more	People at ESA	P5: Diversity and inclusiveness	2	4%
Critical raw Material	Working group on critical raw materials	To Create	Space Community	Co6: Responsible supply chain in the space sector	2	4%
Requirement on Sustainability	Sustainability should be a requirement in all space industry, and not an option	To Create	Space Community	Co6: Responsible supply chain in the space sector	2	4%
European CSR Space Network	Meet to discuss CSR topics and exchange good practices for sustainability	To do more	Space Community	Co1: Relations with space industry	1	2%
Open cooperation with other Space Agencies	Work more openly with other space agencies (i.e. joint inter-agency projects)	To do more	Space Community	Co4: Relations with space agencies and international organisations	1	2%
Support to new and growing Businesses	ESA support to starting ideas/businesses (e.g. ARTES, etc.)	To do more	Space Community	Co1: Relations with space industry	1	2%

Industry stake	What to change or not about ESA and the European Space Industry	What to do	ESA Stake	Sub category	Grade	Relative grade
Space Debris international Agreements	Promote international policy about debris	To do more	Space Community	Co4: Relations with space agencies and international organisations	1	2%
Sustainable Technologies	Define and share on green propellant and green technology. Could eco-labels be the next step?	To Create	Space Community	Co5: Cross-fertilization in the Space Community	1	2%
Audit and monitoring of sustainability in the Supply Chain	Coordinate due diligence efforts/methodology in the sector (gain of time & efficiency), e.g.: CSR certification for suppliers?	To Create	Space Community	Co6: Responsible supply chain in the space sector	1	2%
CSR governance of the space sector	CSR European strategy for space	To Create	Space Community	Co6: Responsible supply chain in the space sector	1	2%
International Collaboration for global Issues	Doing some world-leading industry projects like an Active debris removal and/or Space Servicing Vehicles mission (JAXA or NASA can do this too), beside research missions like Bepi Colombo	To Create	Space Community	Co4: Relations with space agencies and international organisations	1	2%
Responsible supply chain	Policy that assure sustainable supply chain	To Create	Space Community	Co6: Responsible supply chain in the space sector	1	2%
Information shared in the Space Sector	Foster exchange of information along the value chain (e.g. Environmental Life Cycle Analysis)	To Create	Space Community	Co5: Cross-fertilization in the Space Community	1	2%
Audit and monitoring of sustainability in the Supply Chain	Make the space value chain actors working about evidence of their own sustainability credentials	To Create	Space Community	Co6: Responsible supply chain in the space sector	1	2%
ESA environmental Objectives	Establish the goals of ESA in terms of environmental impacts that need to be reduced	To Create	Environment in the Space Community	E1: Environment in Space Missions	1	2%

Industry stake	What to change or not about ESA and the European Space Industry	What to do	ESA Stake	Sub category	Grade	Relative grade
European CSR Space Network	A rotation clean space industrial day? (at ESA, TAS, Airbus…)	To Create	Space Community	Co5: Cross-fertilization in the Space Community	1	2%
Communication and Awareness about Space Sciences and Technologies	Scicom and outreach more like Rosetta/Bepi to improve understanding	To keep & cherish	Communication at ESA	C2: Inspire European Citizens	1	2%
Inequity in European Space Industries	Support French industry. Some of non-French industrial companies have the feeling that French industry is favoured compared to others.	To remove	ESA governance	G5: Ethics & Compliance	0	0%
European Preference for Launchers	Promote the « European preferences » (ESA Member States launching on European launcher)	To do more	Space Community	Co1: Relations with space industry	0	0%
Relations between Member States and Industry	Improve image/presence in ESA member states	To do more	Member States and Society	M1: Member States' needs and expectations	0	0%
Awareness of the supply chain regarding CSR	Educate suppliers on CSR and in particular on environmental issues	To do more	Space Community	Co6: Responsible supply chain in the space sector	0	0%
Communication Tools for the European Space Sector	Large system integrator to be more communicative among primes and with SMEs	To do more	Space Community	Co5: Cross-fertilization in the Space Community	0	0%
Connection between Needs and Projects	Do a « right need » design and production	To do more	Space Community	Co5: Cross-fertilization in the Space Community	0	0%
Circular Economy	Test potential for industrial ecology in space sector (reuse/recycling)	To Create	Environment in the Space Community	E2: Environmental impact of the S&I	0	0%
Sustainable Technologies	Invest in sustainable technologies and promote companies with this policy	To Create	Environment in the Space Community	E1: Environment in Space Missions	0	0%

Industry stake	What to change or not about ESA and the European Space Industry	What to do	ESA Stake	Sub category	Grade	Relative grade
Worldwide Cooperation and Networking for global Issues	Improve collaboration and ideas with outside large companies (open the ESA clean space days to Asia? More US participation? Especially in Active Debris removal and Post Mission Disposal)	To Create	Space Community	Co5: Cross-fertilization in the Space Community	0	0%
International Governance about Space Debris	Some rules (end-of-life, space debris…) at worldwide level	To Create	Space Community	Co4: Relations with space agencies and international organisations	0	0%
Open Access of Data and ESA Tools	Access to databases and simulations to encourage industry to use ESA tools (like DARMA, etc.)	To keep & cherish	Space Community	Co5: Cross-fertilization in the Space Community	0	0%
Communication Processes of ESA Contracts	Issuing of contracts to European industry for ESA projects	To keep & cherish	Communication at ESA	C3: Communication Processes and Transparency	0	0%
Geo-return	Geo-return should be kept and protected	To keep & cherish	Member States and Society	M1: Member States' needs and expectations	0	0%

ANNEX 3. RESULTS OF PHASE 3: THE ENVIRONMENT

Industry stake	What to change or not about ESA and the European Space Industry	What to do	ESA Stake	Sub category	Grade	Relative grade
Sustainable and Eco - design in the Space Sector	ESA should ensure the assessment of the full environmental impacts of space missions. Then ESA should work on Space missions with reduced impact on climate change and launch mitigation actions (from decision to end of life). ESA should promote eco-design and LCA in the sector with a particular attention to critical raw materials. Use of green propellers.	To do more	Environment in the Space Community	E1: Environment in Space Missions	7	14%
Programmes for understanding the Environment	ESA should work even more on Earth monitoring for precision farming, health of Earth, etc. Earth observation for application purposes. Establish earth observation programmes (similar to Copernicus) to track changes (oceans, poles, wood, deserts). Share climate-monitoring data and invest in combining dataset (different decades, different satellites).	To do more	Environment in the Space Community	E3: Contribution to Environment monitoring and Protection	5	10%
Education and Awareness	ESA open courses on climate monitoring from space (on future learn, great MOOC course)	To keep & cherish	Communication at ESA	C4: Education and Awareness	4	8%
Sustainable Space Technology Transfer	Use space technologies on Earth (remote solar panels, water recycling…)	To keep & cherish	Space projects and missions	S1: Space projects for all	4	8%
Education and Awareness	Teach about environmental impacts in schools/universities: future space engineers, lawyer…	To do more	Communication at ESA	C4: Education and Awareness	3	6%
Transportation Phase of the Life Cycles	Draw a map of European supply chain and try to optimise transportation needs. Develop local network of suppliers when possible.	To do more	Environment in the Space Community	E2: Environmental impact of the S&I	3	6%
Programmes for understanding the Environment	Climate monitoring satellites	To keep & cherish	Space projects and missions	S2: Boundaries of knowledge	3	6%

Industry stake	What to change or not about ESA and the European Space Industry	What to do	ESA Stake	Sub category	Grade	Relative grade
Fair, transparent and honest Environmental Communication	Stop saying that space does not need to improve its environmental impacts because it's helping environment on Earth (EO missions)	To remove	Environment in the Space Community	E1: Environment in Space Missions	2	4%
Technical sustainable consideration in contractual relations	Systematise: LCA, eco-design, consideration of environmental criteria in technical choices, sharing of LCA info in all ITTs and programmes. Check list of good practices for space at level 1 in ITT and contract (not optional)	To create	Space Community	Co1: Relations with space industry	2	4%
Fair, transparent and honest Environmental Communication	Push for environmental communication about space products	To create	Communication at ESA	C3: Communication Processes and Transparency	2	4%
Unify the space sector around common purposes	Explain purpose better	To do more	ESA governance	G1: Common value and mission	1	2%
Waste management	Waste reduction and recycling/upcycling (in sites and infrastructures)	To do more	Environment in the Space Community	E2: Environmental impact of the S&I	1	2%
Time frame of the missions	Realise missions in closer times	To do more	ESA governance	G3: ESA Efficiency	1	2%
Circular economy in the Space Sector	Integrate circular economy concept (not only eco-design)	To do more	Environment in the Space Community	E2: Environmental impact of the S&I	1	2%
Relations with worldwide decision makers	Liaise with decision makers worldwide.	To do more	Space Community	Co4: Relations with space agencies and international organisations	1	2%
Food supply and offer on sites	Organic, local and/or vegetarian food at canteens.	To do more	Environment in the Space Community	E2: Environmental impact of the S&I	1	2%

Industry stake	What to change or not about ESA and the European Space Industry	What to do	ESA Stake	Sub category	Grade	Relative grade
Fair, transparent and honest Environmental Communication	Communicate on existing study on environment (LCA or other eco-design study) outside space and eco-design engineers	To do more	Communication at ESA	C3: Communication Processes and Transparency	1	2%
End-of-life management	Reliable post-mission disposal	To do more	Environment in the Space Community	E1: Environment in Space Missions	1	2%
Limitation of the environmental Impact of space technologies	ESA should promote the use of green materials and technologies, LCA, non-critical raw materials... ESA should also push for development of alternatives to most impacting material and processes	To do more	Environment in the Space Community	E1: Environment in Space Missions	1	2%
Sustainable criteria in funding and governance	Put sustainability as guiding principle for programme funding & decision making	To do more	Member States and Society	M1: Member States' needs and expectations	1	2%
Waste management	Invest in recycling	To create	Environment in the Space Community	E2: Environmental impact of the S&I	1	2%
Develop and promote eco-design	Develop sales speech for eco-design	To create	Communication at ESA	C3: Communication Processes and Transparency	1	2%
Fair, transparent and honest Environmental Communication	Make LCA study results public after being delivered (communication, actions...)	To create	Space Community	Co5: Cross-fertilization in the Space Community	1	2%
Earth observation	Sentinels & Earth Exploration projects	To keep & cherish	Space projects and missions	S2: Boundaries of knowledge	1	2%
Eco-design	Reject false ideas on eco-design. They have to be based on scientific methodology.	To remove	Environment in the Space Community	E1: Environment in Space Missions	0	0%

Industry stake	What to change or not about ESA and the European Space Industry	What to do	ESA Stake	Sub category	Grade	Relative grade
Long term projects	Ideas to settle on other planets.	To do less	Space projects and missions	S1: Space projects for all	0	0%
Use of toxic products in aero-space production	Use less toxic products in our production cycles. For example, developing Additive Layer Manufacturing (ALM) could diminish the risks of exposure to Cyanide Compounds due to surface treatments.	To do less	Environment in the Space Community	E2: Environmental impact of the S&I	0	0%
Business travel	ESA should work on avoiding travels for no good reasons.	To do less	Environment in the Space Community	E2: Environmental impact of the S&I	0	0%
Environmental awareness	Raise awareness for environment	To do more	Communication at ESA	C2: Inspire European Citizens	0	0%
Space based debris tracking	Space based debris tracking	To do more	Space projects and missions	S3: Boundaries of human possibilities	0	0%
SDG's in the space sector	Space sector should align its policies and actions with SDG's	To do more	Space Community	Co5: Cross-fertilization in the Space Community	0	0%
Waste management	Develop recycling technologies (e.g. results for titanium are great)	To do more	Environment in the Space Community	E2: Environmental impact of the S&I	0	0%
Energy management	Funding of renewable and energy efficient investment	To create	Environment in the Space Community	E2: Environmental impact of the S&I	0	0%
Protection of Biodiversity	Clarify and communicate on the role of ESA and space in the protection of biodiversity. Link this potential role with UN SDGs.	To create	ESA governance	G1: Common value and mission	0	0%
CleanSpace Eco-design strategy efficiency	Robust, science based impact assessment of Clean Space – Eco-design branch	To create	ESA governance	G5: Ethics & Compliance	0	0%

Industry stake	What to change or not about ESA and the European Space Industry	What to do	ESA Stake	Sub category	Grade	Relative grade
Contribution of space activities to climate change	Develop recognized methodologies and values to evaluate space atmospheric impact & evaluate future trends of contribution of the increase of space traffic to global climate change	To create	Environment in the Space Community	E1: Environment in Space Missions	0	0%
Increase the use of space tech and data form climate	With Scicom, make the decision-makers (governments, administrations and big companies) more aware of what exists regarding climate data and products (what is available, how to use it).	To create	Communication at ESA	C4: Education and Awareness	0	0%
SVHC replacement	Support green propulsion systems in order to be compliant (and even in advance) with REACH requirements	To keep & cherish	Member States and Society	M4 : Relations with European Union	0	0%

ANNEX 4. RESULTS OF PHASE 4: LAST POINTS

Industry stake	What to change or not about ESA and the European Space Industry	Reflection subject	ESA Stake	Sub category
Open data easy to access	Synchronise and combine datasets from satellite products and make them accessible (and possibly free) for all academia, industry and citizens	Time and Communication	Communication at ESA	C3: Communication Processes and Transparency
ITTs Timeframe	Call for tenders or request for quotation: Communicate in advance the general topics to be proposed Let more time to prepare a better proposal (e.g. 6 weeks)	Time and Communication	Communication at ESA	C3: Communication Processes and Transparency
Open data easy to access	Documents, photos and all non-confidential data should be made accessible and easy to access (creative commons)	Digitalisation	Space Community	Co5: Cross-fertilization in the Space Community
Open data easy to access	ESA shall allow European stakeholders to download public reports or presentations from previous studies	Digitalisation	Space Community	Co5: Cross-fertilization in the Space Community
Common CSR objectives for the entire sector	Coordinate industry on future development for European space (reuse, liquid/solid/propulsion, space logistics)	Fair communication principles	Space Community	Co5: Cross-fertilization in the Space Community
CSR requirements in ITTs	Clean space and/or CSR team to flag Invitations to Tender with environmental/LCA/eco-design content	Fair communication principles	Space Community	Co6: Responsible supply chain in the space sector
Common CSR objectives for the entire sector	Define clear CSR objectives for industry so they are obliged to work on it and not do « greenwashing »	Fair communication principles	Space Community	Co6: Responsible supply chain in the space sector
Environmental impact of digitalisation	Digitalisation has long been presented as a better solution than paper regarding the environment. However, is it really a good idea or false good idea regarding environmental impact? (Impact of devices, servers, etc.)	Digitalisation	Environment in the Space Community	E2: Environmental impact of the S&I
Digitalisation	Streamline and simplify digital work-flow at ESA	Digitalisation	ESA governance	G3: ESA Efficiency
ITTs Timeframe	Speed up processes and decrease bureaucracy.	Time and Communication	ESA governance	G3: ESA Efficiency

Industry stake	What to change or not about ESA and the European Space Industry	Reflection subject	ESA Stake	Sub category
ITTs Timeframe	ESA should communicate dates, planning and deadlines more openly to European stakeholders.	Time and Communication	ESA governance	G3: ESA Efficiency
Excess of confidentiality	Avoid excessive confidentiality issues	Time and Communication	ESA governance	G5: Ethics & Compliance
Digitalisation	Really go for it (availability of documents, images, programming codes)	Digitalisation	ESA governance	G6: Digitalisation
Cyber security	Launch projects on space cyber security (space segment and ground segment)	Cyber security	Member States and Society	M5: Defence and Security
Cyber security	Cyber security is a challenge for satellite manufacturers/providers/owners especially to keep up with actual state of the art	Cyber security	Member States and Society	M5: Defence and Security

ANNEX 5. RESULTS OF PHASE 5: GLOBAL RANKING

					In the given phase	Global	
Issue Phase	Industry stake	Description	ESA Stake	ESA Sub category	Relative grade	More important	Less important
Industry and Space Sector	Competition and New Space	Monitor the space market and react with new approaches	Space Community	Co1: Relations with space industry	9%	2	0
Industry and Space Sector	Space Debris Removal	Enable space debris removal	Environment in the Space Community	E3: Contribution to Environment monitoring and Protection	8%	0	0
Industry and Space Sector	CSR Governance of the Space Sector	Define what CSR & sustainability mean for the EU space industry (consensual way)	Space Community	Co1: Relations with space industry	8%	1	2
Industry and Space Sector	Sustainable and Eco - design in the Space Sector	Interact with industry ideas and support start-ups to encourage sustainable design, to perform more eco-design for space	Environment in the Space Community	E1: Environment in Space Missions	9%	3	0
Industry and Space Sector	Geo-return	Rethink the geographic return system (Makes the industrial scheme more complex, economic disadvantage vs competition)	Member States and Society	M1: Member States' needs and expectations	7%	0	0
Industry and Space Sector	Promotion of the European good practices in space sector	Make European space more visible and denunciate unsustainable space practices outside Europe (e.g. ASAT tests/activities)	Communication at ESA	C2: Inspire European Citizens	7%	2	0

					In the given phase	Global
Issue Phase	Industry stake	Description	ESA Stake	ESA Sub category	Relative grade	More important	Issue Phase
Industry and Space Sector	European CSR Space Network	ESA Clean Space Industrial Days and CSR workshops should be kept and cherish	Space Community	Co5: Cross-fertilization in the Space Community	7%	0	0
Space Projects and Missions	Interplanetary colonies	A vision and roadmap to settle outside Earth	Space projects and missions	S3: Boundaries of human possibilities	N/A	3	2
Space Projects and Missions	Closed loop space systems	Technologies and missions enabling performant closed loop systems and Space Garden	Space projects and missions	S1: Space projects for all	N/A	2	0
Space Projects and Missions	Zero Waste	Develop Zero Waste Space Missions	Environment in the Space Community	E1: Environment in Space Missions	N/A	0	0
Space Projects and Missions	CSR Governance of the Space Sector	Define space governance and responsibilities in space and on Earth. ESA should accept its own responsibilities	Space Community	Co1: Relations with space industry	N/A	1	0
Environment	Sustainable and Eco - design in the Space Sector	ESA should ensure the assessment of the full environmental impacts of space missions. Then ESA should work on Space missions with reduced impact on climate change and launch mitigation actions (from decision to end of life). ESA should promote eco-design and LCA in the sector with a particular attention to critical raw materials. Use of green propellers.	Environment in the Space Community	E1: Environment in Space Missions	14%	0	1

					In the given phase	Global
Issue Phase	**Industry stake**	**Description**	**ESA Stake**	**ESA Sub category**	**Relative grade**	**More important**	**Issue Phase**
Environment	Programmes for understanding the Environment	ESA should work even more on Earth monitoring for precision farming, health of Earth, etc. Earth observation for application purposes. Establish Earth observation programmes (similar to Copernicus) to track changes (oceans, poles, wood, deserts). Share climate-monitoring data and invest in combining dataset (different decades, different satellites).	Environment in the Space Community	E3: Contribution to Environment monitoring and Protection	10%	1	0
Environment	Education and Awareness	ESA open course on climate monitoring from space (on future learn, great MOOC course)	Communication at ESA	C4: Education and Awareness	8%	0	1
Environment	Sustainable Space Technology Transfer	Use space technologies on Earth (remote solar panels, water recycling…)	Space projects and missions	S1: Space projects for all	8%	1	0