ESA Ecodesign Policy

What it means for industry and the European space sector

External webinar

Strategic Sustainability & Clean Space Teams

8th July 2026

EUROPEAN SPACE AGENCY

Objective of today's webinar

By the end of the webinar, participants should be able to:

1. **Understand**
   ESA Ecodesign Policy objective and approach

2. **Anticipate**
   What the policy means for future and ongoing supplier contracts

3. **Explore**
   Upcoming requirements and ESA supporting initiatives

Relevant for: **Prime contractors** | **Technology suppliers** | **LCA & Ecodesign experts**

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Today’s agenda

1 Introduction and context

2 ESA Ecodesign Policy

3 Policy working instructions Focus on Space systems and technologies

4 Conclusion

5 Q&A

Why we need to act?

Growing pressure

Space activities are increasing. More missions. More launches. More technology. This growth puts pressure on the environments where the space sector operates, on Earth, in orbit and beyond.

The challenge

How do we design space missions while minimising our environmental impact on Earth?

Opportunities

Ecodesign to enhance resilience, reputation, competitiveness, responsibility and long-term success

A cross-directorate approach

Building on 10 years experience in LCA, measuring impacts, ESA is moving from analysis to action

"By 2030, **reduce GHG emissions by 46% for our operational** activities and **28% for the activities executed by our suppliers**."

From goal setting to action plan | Ecodesign ambition

LEARNINGS & COMMITMENTS

Industrial activities accounted for 85% of the ESA GHG assessment in 2019

ESA has pledged to **reduce it by 28% by 2030**

APPROACH

- ✓ **Understanding** key environmental impacts along programmes life cycle
- ✓ **Implementing** – early in design – optimised mitigation solutions to reduce space programmes' environmental impacts

GOAL

Make the European space sector a **role model for ecodesign implementation** in space projects

HOW

By **implementing systematically ecodesign and LCA in ESA space projects**

Today’s agenda

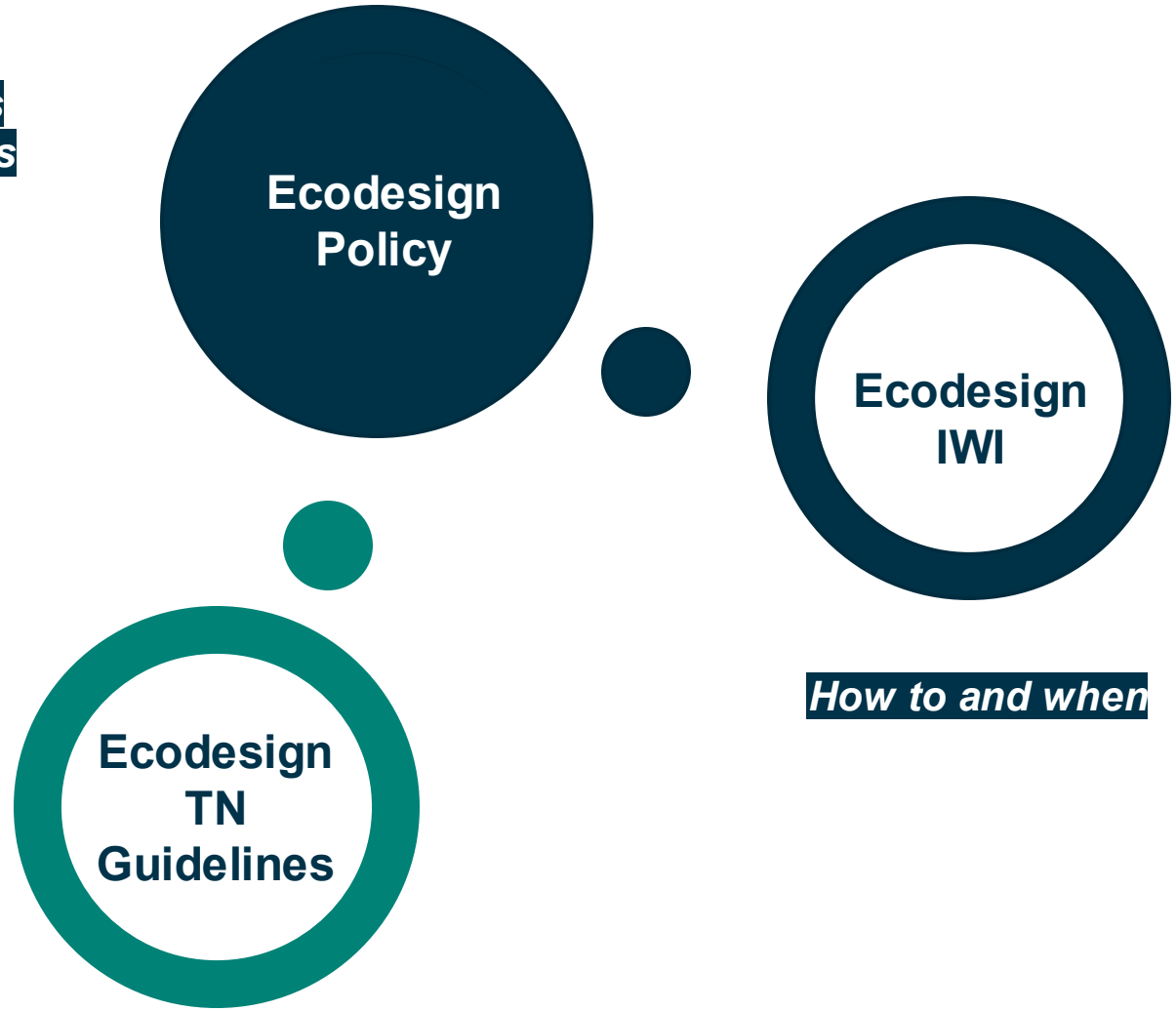
1. Introduction and context
2. ESA Ecodesign Policy
3. Policy working instructions Focus on Space systems and technologies
4. Conclusion
5. Q&A

ESA Ecodesign Policy and accompanying documents

From **measuring impacts** to **acting on them** through ecodesign solution identification and implementation

Principles, roles & responsibilities

V1 October 2025
Endorsed by DG



ESA Ecodesign Policy | Scope & Objectives

From **measuring impacts** to **acting on them** through ecodesign solution identification and implementation

Objectives:

- Increase knowledge
- Quantify impacts
- Mitigate impact
- International cooperation

Scope of application:

- **Procurement of ESA space system**
- Procurement of ESA space system-related services
- **Procurement of ESA contribution to international collaborations**
- **Procurement of design & development of new equipment, components, material or processes**
- **R&D activities in the Ecodesign Technical Roadmap**

Today’s agenda

1. Introduction and context
2. ESA Ecodesign Policy
3. Policy working instructions Focus on Space systems and technologies
4. Conclusion
5. Q&A

Applicability to space systems and technologies

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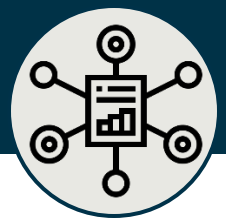
Ecodesign – a three-pronged approach to reduce scope 3 emissions

Increase of the **environmental performance** of space systems is based on the simultaneous and **continuous use and improvement** of key items

Providing **Technical Guidance**

Space Systems LCA Guidelines*

Space LCA Database**



Developing the **Ecodesign Technical Roadmap**

Key R&D technologies, products and processes targeting environmental hotspots

Implementing the **ESA Ecodesign Policy**

Early simplified LCA to identify hotspots

Identification of alternative solutions (ecodesign)

*Open to all
** Open to Member states' organizations, need an ecoinvent license

ESA Ecodesign Policy working instructions

Space Systems & Technologies applicability

Early phases (A/B1) / Low TRL: Simplified LCA

- Estimate environmental hotspots
- Identify ecodesign measures
- Optimize data collection for later phases

Ecodesign Implementation Plan (EIP)

Advanced phases (B2/C/D/E) / High TRL: LCA

- Minimize environmental impact of the project
- Report on environmental performance
- Enhance Ecodesign Technical Roadmap, Ecodesign Lessons Learned Repository and ESA LCA Database for future projects

Ecodesign Implementation Report (EIR)

Ecodesign Policy | Space Systems | What to expect?

Procurement of ESA space systems

Applicability:

- **All space systems** procurements

(i.e. any system that contains at least a space segment, a ground segment or a launch segment, including, e.g., launchers, satellites and inhabitable or robotic vehicles);

Scope:

- All elements included in the procurement
- From design to end of life (prospective for all phases from A to F)
- Baseline and optional system designs

Efforts: adapted to type of project and mission class or number of satellites involved

Ecodesign Policy | Space Systems | What to expect?

Procurement of ESA space systems

Phase A/B1

Main objectives:

- Familiarise with LCA & Ecodesign
- Perform a Simplified LCA
- Identify preliminary hotspots
- Propose potential ecodesign solutions
- Analyse the programmatic impacts of potential ecodesign solutions
- Trade-off ecodesign solutions in terms of risk, performance, quality, schedule & cost
- Propose tailored data collection approach
- Capture lessons learned

Outcomes:

- Simplified LCA model (including developed or modified datasets for inclusion in the ESA LCA Database)
- Simplified LCA report (including:
    - Analysis of the data quality of the model
    - Potential Ecodesign solutions analysis and trade off
    - Proposed tailored data collection approach
    - Lessons learned

Ecodesign Policy | Space Systems | What to expect?

Procurement of ESA space systems

Phase A/B1

Main objectives:

- Familiarise with LCA & Ecodesign
- Perform a Simplified LCA
- Identify preliminary hotspots
- Propose potential ecodesign solutions
- Analyse the programmatic impacts of potential ecodesign solutions
- Trade-off ecodesign solutions in terms of risk, performance, quality, schedule & cost
- Propose tailored data collection approach
- Capture lessons learned

Material:

ESA LCA Handbook

Information available at Project level

Selected Ecodesign Lessons learned

ESA LCA Database

SimaPro

TeamWork

Expertise:

- Systems engineers
- Techno experts
- LCA/Ecodesign experts (internal or external)

Ecodesign Policy | Space Systems | What to expect?

Procurement of ESA space systems

Phase B2/C/D/E

Main objectives:

- Implement selected ecodesign solutions
- Implement selected supplier data collection approach
- Perform an LCA
- Report environmental impacts & achieved reduction
- Develop datasets with good data quality for inclusion in the ESA LCA database
- Capture lessons learned
- Propose additional ecodesign measures to be added to the ETR.

Outcomes:

- LCA model (including assessment of ecodesign solutions)
- LCA report (including:
    - Ecodesign solutions analysis
    - Analysis of the data quality of the model
    - Lessons learned
    - Potential additional Ecodesign solutions analysis
- Populated supplier data questionnaires

Ecodesign Policy | Space Systems | What to expect?

Procurement of ESA space systems

Phase B2/C/D/E

Main objectives:

- Implement selected ecodesign solutions
- Implement selected supplier data collection approach
- Perform an LCA
- Report environmental impacts & achieved reduction
- Develop datasets with good data quality for inclusion in the ESA LCA database
- Capture lessons learned
- Propose additional ecodesign measures to be added to the ETR.

Material:

ESA LCA Handbook

Information available at Project level

Suppliers' data questionnaires

ESA LCA Database

SimaPro

TeamWork

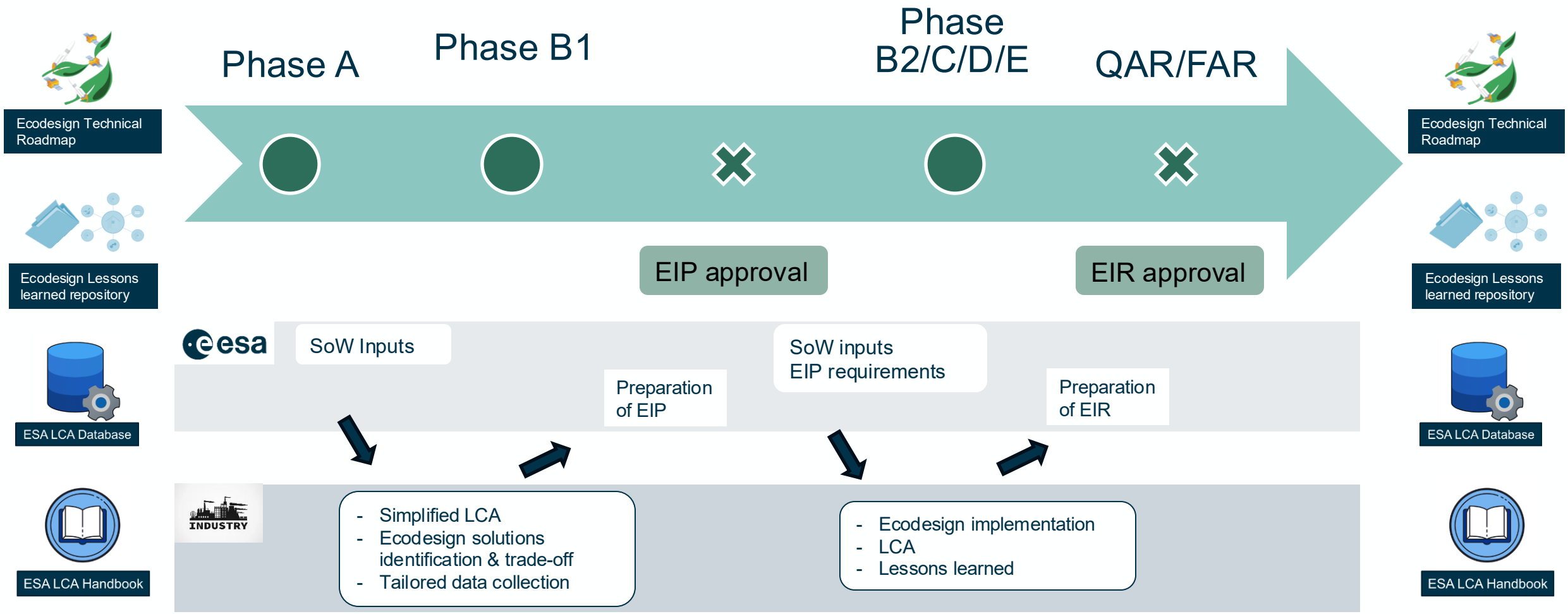
Expertise:

- Systems engineers
- Techno experts
- Techno suppliers
- LCA/Ecodesign experts (internal or external)

Ecodesign Policy | Space Systems | What to expect?

Procurement of ESA space systems

EIP: Ecodesign Implementation Plan
EIR: Ecodesign Implementation Report



Ecodesign Policy | Technologies

Procurement of design and development services of specific new equipment, components, materials, or processes

ESA research and development activities selected in the Ecodesign Technical Roadmap

Applicability:

- **Each technology development programme** will have **selected technology developments** that will apply the Ecodesign Policy. This selection will be done **once a year.**
  Prioritisation of highly recurrent technologies to maximise benefits

- Technologies identified recurrently as **hotspots or gaps in space systems environmental assessment** will be included in the **Ecodesign Technical Roadmap (ETR)** for application of the Ecodesign Policy

Ecodesign Technical Roadmap (ETR)

What? Roadmap defining sustainable technology alternatives addressing environmental hotspots identified through LCA, ecodesign methodologies and tools, and data gap activities.

Why? To mature solutions that improve future systems environmental impacts. Feed to different technology development programmes for maturation of ecodesign solutions (TRL>7).

How? Living document, regularly updated to reflect new knowledge and developments.

Ecodesign Policy | Technologies

Procurement of design and development services of specific new equipment, components, materials, or processes

ESA research and development activities selected in the Ecodesign Technical Roadmap

TRL 3/4

Main objectives:

- Familiarise with LCA & Ecodesign
- Perform a Simplified LCA
- Identify preliminary hotspots
- Propose potential ecodesign solutions
- Analyse the programmatic impacts of potential ecodesign solutions
- Trade-off ecodesign solutions in terms of risk, performance, quality, schedule & cost
- Capture lessons learned

Material:

Information available at Project level

Suppliers' data questionnaires

ESA LCA Database

SimaPro

Expertise:

- Systems engineers
- Techno experts
- LCA/Ecodesign experts (internal or external)

Ecodesign Policy | Technologies

Procurement of design and development services of specific new equipment, components, materials, or processes

ESA research and development activities selected in the Ecodesign Technical Roadmap

TRL 5/6/7

Main objectives:

- Implement selected ecodesign solutions
- Perform an **LCA**
- Report environmental impacts & achieved reduction
- Develop datasets with good data quality for inclusion in the ESA LCA database
- Capture lessons learned

Material:

Information available at Project level

Suppliers' data questionnaires

ESA LCA Database

SimaPro

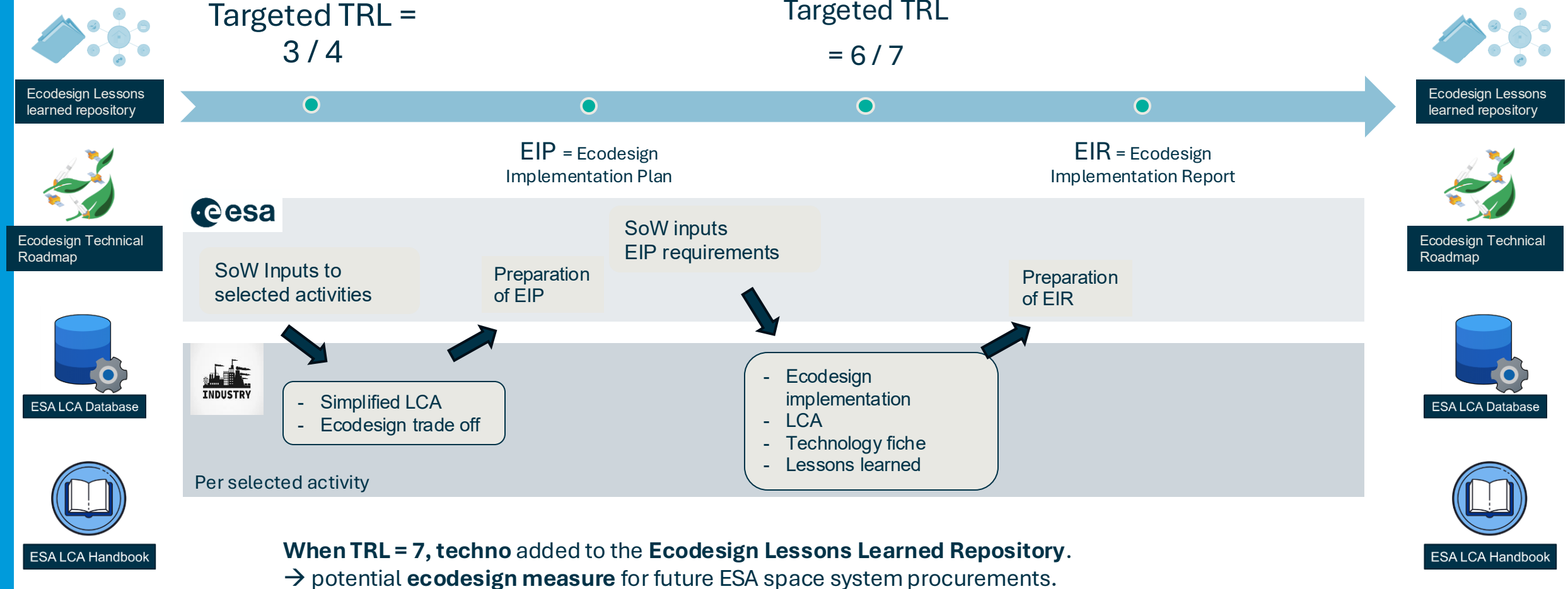
Expertise:

- Systems engineers
- Techno experts
- LCA/Ecodesign experts (internal or external)

Ecodesign Policy| Selected R&D & Technology development

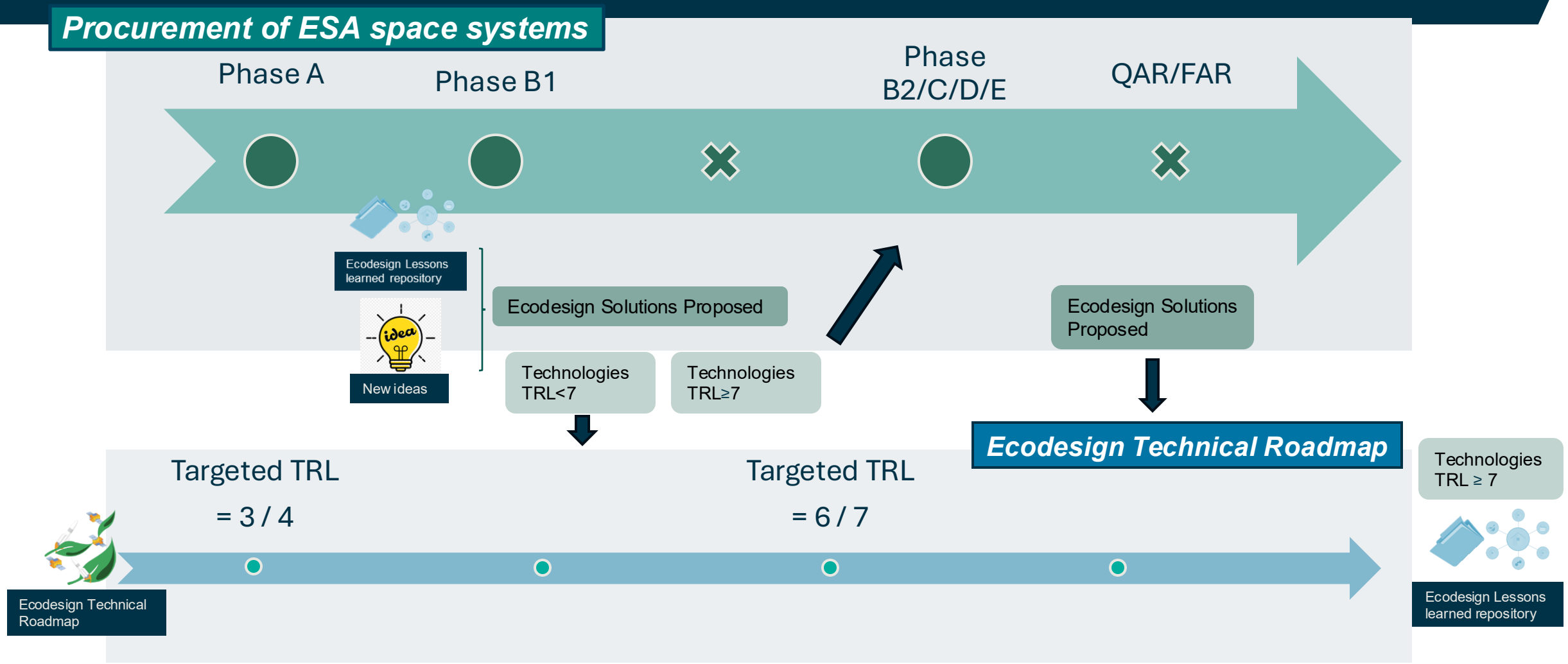
ESA research and development activities selected in the Ecodesign Technical Roadmap

Procurement of design and development services of specific new equipment, components, materials, or processes



When TRL = 7, techno added to the **Ecodesign Lessons Learned Repository**.
→ potential **ecodesign measure** for future ESA space system procurements.

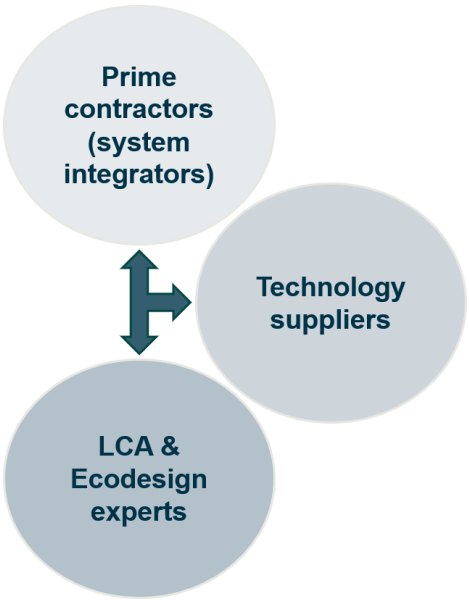
Link between Procurement of Space Systems and ETR



Funding for Techno maturation through Technology development programmes of the different directorates (e.g. GSTP, TDE, ARTES, etc) & not from Space System procurement

Main stakeholders — where do you stand?

	Space System Launcher integrator	Technology supplier	LCA Practitioner
Life Cycle Assessment	• **Report** on environmental impacts of the space systems • **Propose** possible ecodesign solutions • **Collect** and consolidate supplier data and manage inconsistencies	• **Provide** detailed component data through supplier data questionnaires	**Conduct** environmental assessments using heterogeneous data and assumptions to support both technology-level and system-level LCA and Ecodesign tasks
Ecodesign	• **Implement** selected ecodesign solutions • **Justify** the achievements	• Might need to **perform** LCA and Ecodesign for new activities*	



***Note:** Ecodesign will be mandatory for selected activities in different ESA technology programmes

Requirements and tasks examples

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Requirements and tasks examples

- The following slides show examples of tasks and requirements that industry could find in the ESA ITTs of space systems
- The slides are divided into phase A, phase B1 and phases B2/C/D

Note: The following tasks and requirements might vary from project to project.

Example phase A tasks and requirements

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Example phase A tasks and requirements

[SOW-LCA-010] The project shall familiarise with LCA and ecodesign using the document *ESA LCA Handbook*

- Read the ESA LCA Handbook and get familiar with LCA and ecodesign

[SOW-LCA-020] Consider the lessons learned provided by ESA. The contractor shall provide in the Final Report an estimation of the impact of those measures in terms of risks, performance, quality, schedule and cost.

- Evaluate and report in the Final Report the technical and programmatic feasibility of introducing the ecodesign measures and lessons learned provided by ESA

Example phase A tasks and requirements

[SOW-LCA-030] The contractor shall identify potential hotspots with, for example:
- High energy consumption
- Scarce materials usage
- High material usage and waste
- Toxic emissions

❖ Starting to think about other possible ecodesign measures (apart from the ones provided by ESA).

Example phase B1 tasks and requirements

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Example phase B1 tasks and requirements

[SOW-LCA-010] The Contractor shall preliminarily estimate the environmental impact of the space system by performing one **simplified LCA iteration** in accordance with the requirements in the MSRD, and following the guidelines *ESA LCA Handbook*.

The simplified LCA shall **cover all life-cycle phases of the space system**, from design and development through manufacturing, integration, testing, launch (if applicable), operations/use, and end-of-life. The system boundaries shall include, where applicable:

- production and transport of dedicated Electrical Ground Support Equipment (EGSE) and Mechanical Ground Support Equipment (MGSE);
- space system transport;
- storage in clean room facilities.

ESA LCA Handbook

Information available at Project level

- Need to define: Goal & Scope including functional unit and system boundaries
- Need to adapt space system product tree to system boundaries

Example phase B1 tasks and requirements

[SOW-LCA-020] Based on the results of the simplified LCA, the contractor shall:

- **identify** the main environmental impact **hotspots** of the space system;
- **propose ecodesign alternative measures** addressing the identified hotspots;
- **assess the proposed alternatives** by quantifying the expected reduction of environmental impacts, at a minimum in terms of Greenhouse Warming Potential (GWP); and Single Score indicator.

- Assess preliminary hotspots
- Propose ecodesign alternatives based on the hotspots and assess the potential environmental impact reduction

[SOW-LCA-030] The contractor shall **trade-off** the **proposed ecodesign measures**, considering at least: technical feasibility, implementation timeline, required resources, impact on schedule and associated risks; identifying the ones that could be implemented within the frame of the project in phases B2/C/D.

- Trade-off of the proposed ecodesign measures

Example phase B1 tasks and requirements

[SOW-LCA-040] The contractor shall agree with the Agency on the **ecodesign measures** to be implemented within the scope and constraints of the space system.

- Ecodesign measures agreement

[SOW-LCA-050] The contractor shall generate a **simplified LCA model** and **simplified LCA report** of the baseline and optional space system. The simplified LCA model shall:

- exploit and adapt existing datasets from ESA LCA Database and from LCA in previous space systems;
- generate new datasets or update and/or reuse the datasets
- make maximum use of information already available at project level.

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- Simplified LCA report
- Simplified LCA model
  - Existing datasets (*ESA LCA Database* or from previous LCA)
  - Adapted datasets (*ESA LCA Database* or from previous LCA + info available at project level)
  - New datasets (from info available at project level)

Example phase B1 tasks and requirements

[SOW-LCA-060] The contractor shall **provide** to the Agency and the LCA contractor in charge of the ESA LCA Database all newly created datasets for integration within the ESA LCA Database.

Note: *In line with the objectives of this activity, the Agency intends to use its outputs to populate the ESA LCA database. Before any further dissemination, ESA will process the data either by creating anonymised generic datasets or by retaining project-specific data but redacting (concealing) sensitive information. To enable this, the Contractor shall* ***clearly identify and justify all BIPR and commercially sensitive information included in the LCA model****.*

- Clearly identify and justify all BIPR and commercially sensitive information included in the simplified LCA model.

Example phase B1 tasks and requirements

[SOW-LCA-070] The contractor shall perform a **simplified Data Quality Rating (DQR)** assessment of the simplified LCA model, following the guidelines to be provided by the Agency. The contractor shall:

- identify the elements which could need of supplier data collection in the following phase;
- propose a tailored data collection approach for phases B2/C/D/E, to be agreed with and provided to the Agency, focusing on:
  - system elements associated with high environmental impacts (hotspots); and/or
  - elements for which data cannot be retrieved without supplier input (gaps).

- ❖ Simplified DQR
- ❖ Propose to ESA a tailored/optimised data collection approach for phases B2/C/D based on preliminary hotspots and data gaps

[SOW-LCA-80] The Contractor shall identify, document and provide to the Agency **lessons learned** to support future improvements of the ecodesign and LCA process

- ❖ Provide Lessons Learned

Ecodesign Lessons learned repository

Example phase B2/C/D tasks and requirements

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Example phase B2/C/D tasks and requirements

[SOW-LCA-010] The project shall implement the **ecodesign solutions** agreed with ESA

- ❖ Ecodesign solutions integrated as requirements in the MSRD/SoW
- ❖ Ex: Testing cycles shall be limited to xx.

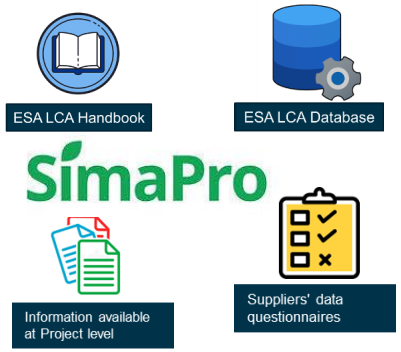
[SOW-LCA-020] The Contractor shall evaluate the environmental impact of the space system by developing a **LCA** in accordance with the requirements in the MSRD, and following the guidelines *ESA LCA Handbook*.
The LCA shall cover **all life-cycle phases of the space system**, from design and development through manufacturing, integration, testing, launch (if applicable), operations/use and end-of-life. The system boundaries shall include, where applicable:

- production and transport of dedicated Electrical Ground Support Equipment (EGSE) and Mechanical Ground Support Equipment (MGSE);
- space system transport;
- storage in clean room facilities.

- ❖ Need to define: Goal & Scope including functional unit and system boundaries
- ❖ Need to adapt space system product tree to system boundaries

Example phase B2/C/D tasks and requirements

[SOW-LCA-030] The Contractor shall perform at least **one complete LCA iteration** of the baseline system.



- LCA in line with the ESA LCA Handbook.

[SOW-LCA-040] The contractor **shall engage with subcontractors** for which information is required to achieve the correct level of data quality, following the tailored data collection approach defined in early phases. The LCI data collection questionnaire from Annex G.1 of *ESA LCA Handbook* shall be used for this purpose. The prime shall coordinate all the data collection, helping and supporting the subcontractors with the data collection task, especially in the case of SMEs.

- Supplier data collection
- Data collection tasks shall be flown down to the suppliers SoW

Data Questionnaire

ESA Clean Space

ESA data collection file

Version: v2.1 **Date of release:** May 7th, 2025

RD : ESSB-HB-U-005 (Issue 2.0) Space Systems LCA guidelines

PEFCR FOR THE SPACE SECTOR

esa

Introduction

This data collection file is developed for harmonizing the data collection files requested to European industry in order to ESA Contractor to perform an LCA study on space systems. This document is the result of the collaboration between ESA, the European Commission, and the PEFCRSpace working group to minimise the efforts required for suppliers data collection.

More information about the ESA governance on LCA topics project can be found on:
https://blogs.esa.int/cleanspace/

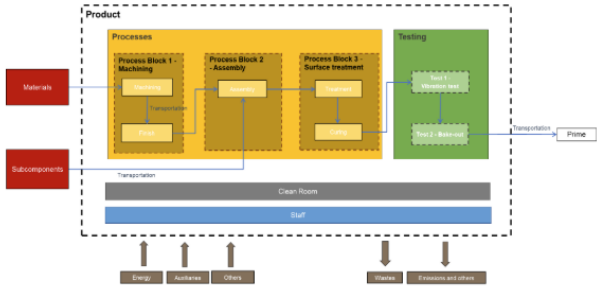
Data entry guidelines

List of Abbreviations

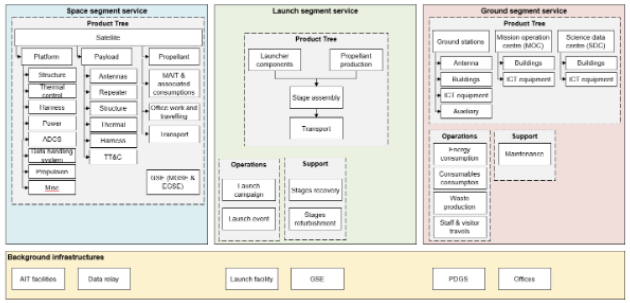
CH	Ceiling Height
DML	Declared Material List
DPL	Declared Processes List
EM	Electrical Model
EGSE	Electrical Ground Support Equipment
EQM	Engineering Qualification Model
FM	Flight Model
GSE	Ground Support Equipment
LLI	Lower Level Item
MAI	Manufacturing, Assembly and Integration
MGSE	Mechanical Ground Support Equipment
PFM	Proto Flight model
SM	Structural Model
TM	Test Model

Macro activities

category of similar activities that are expected in the modelling of equipment, subsystems, and systems
These macro activities include: ***Raw Materials and LLI (lower-level items), Processes, Transport, Staff Office Work, Staff Travels, Testing, Clean Room Usage.***



System boundaries of ESA LCA Handbook

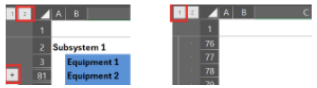


General

- Each tab consists of the overview of all **inputs** and **outputs**, positioned next to each other on the tab.
- Please fill in the requested data in each of the relevant cells, keeping in mind the following:

Blue text	represent dropdown menus
Grey cells	contain a formula and will be filled automatically. However, the cells are not protected, so if needed, specific data can be filled in these cells
Filled cells	shall be filled in
White cells	are not to be filled

- In column D, assess the completeness of the data provided for each activity, using the dropdown menu
- Feel free to add more lines in each section, keep in mind the formulas (grey cells) are not automatically added.
- Each tab contains grouped rows to simplify the overview. E.g. on the tab **Equipment** all details are grouped per subsystem resp. equipment so they can be opened or closed. To open an equipment, press the + sign next to the line numbers. Alternatively, all equipment can be opened simultaneously by pressing the 2 in the top left corner of the workbook. To close an equipment, press the – sign next to the line numbers, or press the 1 in the top left corner to close all.



Example phase B2/C/D tasks and requirements

[SOW-LCA-050] The project shall develop an **LCA model** and produce an **LCA report** for the baseline system.
The contractor may use the *ESA LCA Database* to develop the LCA model for background materials and processes, and for those elements for which, upon agreement with the Agency, no further data collection is deemed needed.
To develop the LCA model, the Contractor shall generate new datasets and/or update or reuse datasets available in *ESA LCA Database* or from previous LCA performed by the contractor.


ESA LCA Handbook


ESA LCA Database

SimaPro


Suppliers' data questionnaires


Information available at Project level

- LCA report
- LCA model
  - Existing datasets (*ESA LCA Database* or from previous LCA)
  - Adapted datasets (*ESA LCA Database* or from previous LCA + data collection)
  - New datasets (data collection)

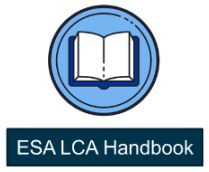
Example phase B2/C/D tasks and requirements

[SOW-LCA-060] The project shall demonstrate by means of the final iteration of the LCA model that the following **Data Quality Ratings (DQR)** are achieved, in accordance with Annex B of the *ESA LCA Handbook* and using the ESA LCA DQR Aggregation Template from Annex G.1 of *ESA LCA Handbook*, for Global Warming Potential, Mineral Resource Depletion, Human Toxicity, and Single Score indicators:

a. DQR < 3 at system level, covering all relevant elements and models (e.g. PFM, FM, GSE, STM, EQM);

b. DQR ≤ 2 at equipment level for at least 20% of the equipment and instruments listed in the product tree.

The selection of equipment shall be agreed …..



- Data quality to be calculated and achieved
  - DQR < 3 at system level
  - DQR ≤ 2 at equipment level for at least 20% of the equipment and instruments

Data quality rating example – Equipment level

Iteration #2 Solar Array	Raw material & LLI	Processes	Staff - office work	Staff- travels	Transport	Testing	Clean Room
Completeness							
Total number of flows	19	20	5	5	3	10	4
Number of flows modelled	19	18	5	3	3	10	2
If different, justification		Wastes not modelled		Daily commuting not included			Only clean room ISO is given by the supplier, duration estimated by the LCA practitioner
Data source							
Number of PD-D	15	6	2	0	0	4	0
Number of PD-I	4	8	3	2	0	4	1
Number of SD-I	0	4	0	1	3	2	1
Number of SD-AD	0	0	0	0	0	0	0
Number of SD-NAD	0	0	0	0	0	0	0
Check	Correct	Correct	Correct	Correct	Correct	Correct	Correct
DQR computation	**2**	**3**	**2**	**4**	**4**	**3**	**4**

Data quality rating example - Aggregated

Element	DQR total	Relative Impact for impact category GWP	Raw materials & LLI items	Process	Staff Office work	Staff Travels	Transport	Testing	Clean Room
Payload 1	4.42	0.12		5	1	3	2	5	5
Equip 1	4.43		1	5	5	5	5	5	5
Equip 2	4.57		2	5	5	5	5	5	5
Equip 3	4.43		1	5	5	5	5	5	5
Equip 4	4.71		3	5	5	5	5	5	5
Equip 5	4.67		3	5	5	5	5	5	5
Equip 6	4.43		1	5	5	5	5	5	5
Payload 2	2.43	0.03	1	3	1	3	1	3	5
Structure	2.57	0.06	2	3	1	3	2	2	5
Thermal Control System	4.10	0.05		5	5	5	5	5	5
Thermal Passive Hardware	2.43		1	2	3	1	3	2	5
Thermal Active Hardware	5.00		5	5	5	5	5	5	5
Propulsion	3.14	0.09	2	3	3	4	3	2	5
Power	3.59	0.03		5	5	5	5	5	3
PCDU	3.57		1	3	2	5	4	5	5
Battery	3.14		2	2	1	5	3	4	5
Solar Array	3.14		2	3	2	4	4	3	4
DHS	3.81	0.06		5	5	5	5	5	3
Onboard Computer	4.00		4	5	2	5	3	4	5
Remote Interface Unit	3.29		3	2	1	5	3	4	5
Mass Memory and Formating Unit	3.43		4	2	3	3	4	3	5
AOCS	3.63	0.09		5	5	5	5	5	3
Star Tracker	3.71		4	3	1	5	4	4	5
Magnetometer	3.29		3	2	4	5	2	2	5
Magnetorquer	3.29		2	3	2	5	3	3	5
Reaction Wheels	3.43		4	4	2	2	4	3	5
GNSS Receiver	3.86		4	3	3	5	3	4	5
Reaction Wheels	3.17		4	3	3	3	2	2	5
GNSS Antenna	3.43		3	4	1	5	3	3	5
Coarse Earth Sun Sensor	4.00		4	5	4	5	2	3	5
TMTC	3.96	0.04		5	5	5	5	5	3
S-Band Transponder	3.86		3	3	3	5	3	5	5
S-Band Patch Antenna	3.86		4	2	4	5	4	3	5
S-Band Helix Antenna	3.57		3	2	3	5	4	3	5
PDT	3.75	0.03		5	5	5	5	5	3
X-Band Downlink Assembly	3.43		3	3	2	5	3	3	5
X-Band Antenna	3.29		2	4	3	5	2	2	5
Harness	4.00	0.01	3	5	2	4	4	5	5
System PFM	**DQR_System_GWP**		/	5	1	3	2	2	3
RI for impact category GWP	3.26		0	0.02	0.01	0.09	0.08	0.07	0.12
Check RI for impact category GWP	1	#needs to be 1							

Example phase B2/C/D tasks and requirements

[SOW-LCA-070] The contractor shall **provide** to the Agency and the LCA contractor in charge of the ESA LCA Database all newly created datasets for integration within the ESA LCA Database.

Note: *In line with the objectives of this activity, the Agency intends to use its outputs to populate the ESA LCA database. Before any further dissemination, ESA will process the data either by creating anonymised generic datasets or by retaining project-specific data but redacting (concealing) sensitive information. To enable this, the Contractor shall* ***clearly identify and justify all BIPR and commercially sensitive information included in the LCA model and in the LCA data questionnaires.***

- Clearly identify and justify all BIPR and commercially sensitive information included in the LCA model and in the LCA data questionnaires.

Example phase B2/C/D tasks and requirements

[SOW-LCA-080] In accordance with the guidelines defined in Annex B of the *ESA LCA Handbook*, the project shall systematically **model the following macro-activities** for each equipment, subsystem, and system element within the product tree: raw materials and lower-level items; processes; staff office work; staff travel; transport; testing; and clean-room activities.

❖ **Template for modelling of space missions**

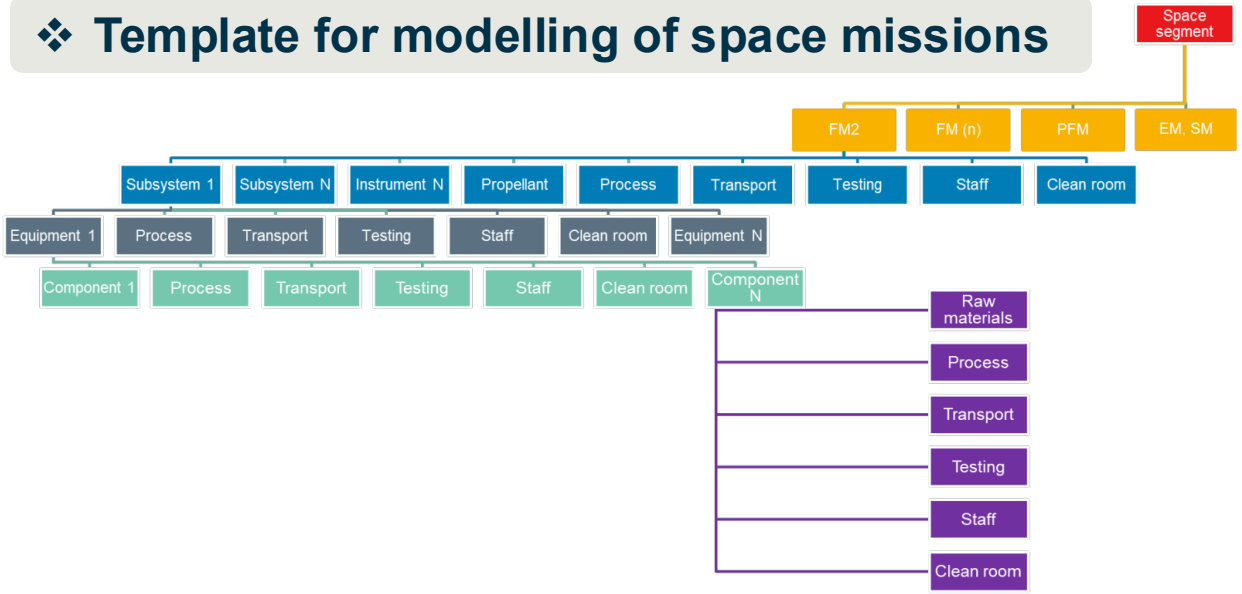


Figure F-8: Modelling structure of the space segment

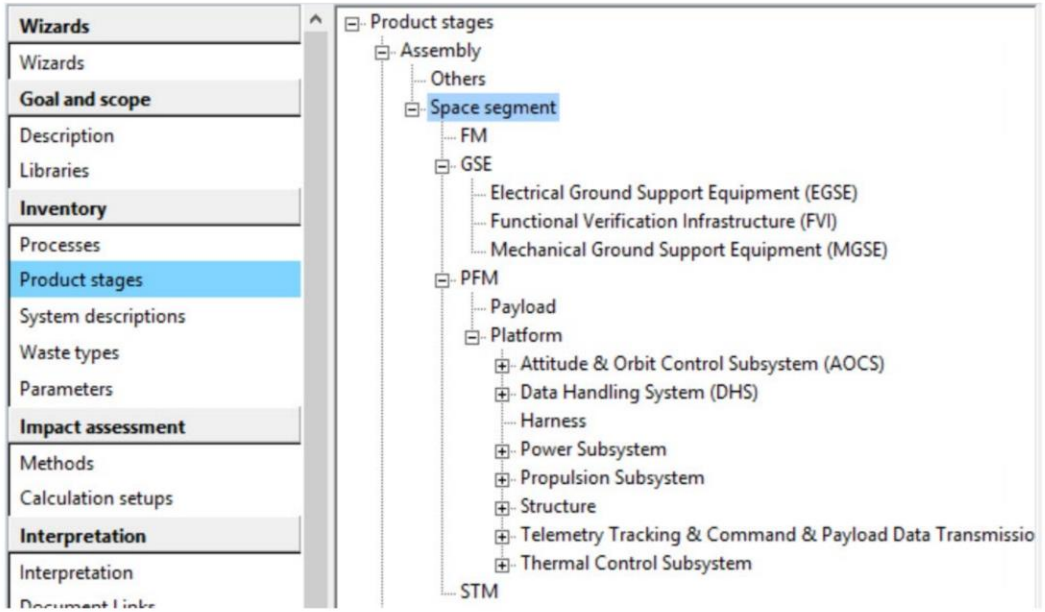
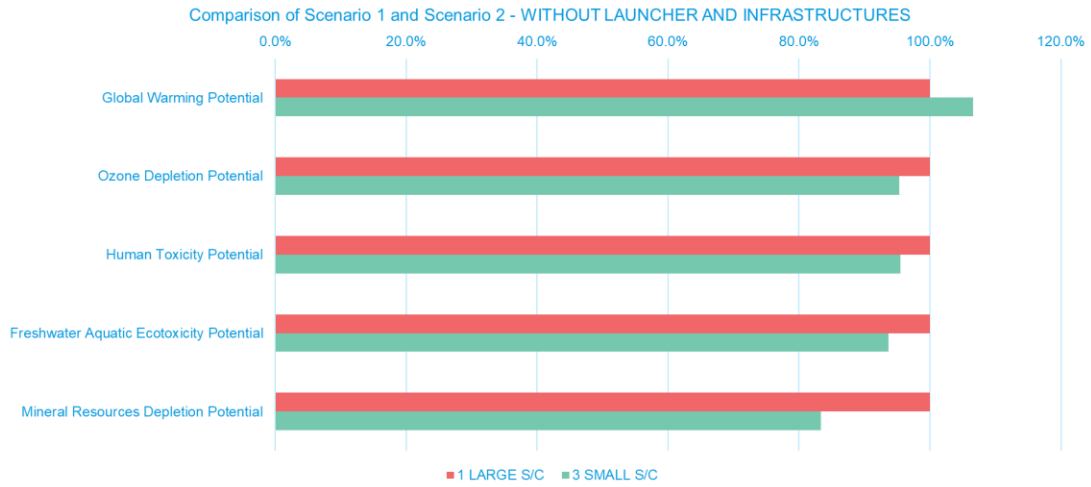


Figure F-10: Structure of the template under product stages

Example phase B2/C/D tasks and requirements

[SOW-LCA-090] The Contractor shall assess, through LCA, the environmental impact **reductions achieved** by the implemented mitigation actions and report the results in the LCA report. The assessment shall identify the remaining environmental hotspots of the baseline system design, taking into account the environmental impact categories listed in *the ESA LCA Handbook*. Any deviation from the ecodesign solutions agreed previously with the Agency shall be justified and reported.

❖ Reduction achieved through agreed ecodesign solutions (%)



Example phase B2/C/D tasks and requirements

[SOW-LCA-100] The Contractor shall propose and evaluate potential mitigation actions aimed at reducing the environmental impact of future programmes and to be included in the Ecodesign Technical Roadmap

- Other possible ecodesign Solutions

Ecodesign Technical Roadmap

[SOW-LCA-110] The Contractor shall identify, document and provide to the Agency lessons learned to support future improvements of the ecodesign and LCA process

- Lessons Learned

Ecodesign Lessons learned repository

Today’s agenda

1. Introduction and context
2. ESA Ecodesign Policy
3. Policy working instructions Focus on Space systems and technologies
4. Conclusion
5. Q&A

Policy shift in a nutshell

Policy shift: from late measurement to earlier, actionable ecodesign measures across missions

	FROM		TO
PURPOSE	Reporting	→	**Mitigating & reporting impacts**
TIMING	Late LCA	→	**Simplified LCA in early phases and LCA in later phases**
ADOPTION	One-off studies	→	**Systematic application in space systems and selected technologies**
DATA	Systematic data collection	→	**Optimised and tailored data collection**
EFFORT	Fixed requirements	→	**Implementation effort proportional to mission type**

Useful materials & Contacts

ESA LCA Handbook

ESA LCA Database

The session has been **recorded** and will be soon available on **ESA Learning Hub dedicated page**!

For any question: esa.sustainability@esa.int & cleanspace@esa.int

Ecodesign webpage

Our LinkedIn pages

- **ESA Responsibility & Sustainability LinkedIn**
- **ESA Clean Space LinkedIn**

Today’s agenda

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EUROPEAN SPACE AGENCY

THANK YOU!