Reference:

P. Janik et al., *ESA REACH Office – Introduction and space sector-wide initiatives 2025,* 6th ESA REACH Workshop, ESA ESTEC, Noordwijk, the Netherlands, 17th June 2025

Author affiliation:
Premysl Janik, REACH Officer, European Space Agency

ESA REACH Office – Introduction and space sector-wide initiatives 2025

P. Janik, ESA REACH Officer and MPTB Chair, European Space Agency

With help of ESA REACH Office and REACHLaw organising teams

6th ESA REACH Workshop, 17th June 2025
ESA-TECSFS-HO-2025-001884

Outline

- Welcome
- Introduction to ESA REACH Workshop
- REACH/related impacts on space activities
- REACH organisation – MPTB and Task Forces
- European Space Sector joint responses on REACH and related requirements
- Substances in focus - PFAS
- REACH among other legislative challenges
- Conclusions and outlook

ESA REACH WORKSHOPS - REFLECTIONS

5th ESA REACH Workshop 2024

- The 5th workshop raised the interest of 90 participants from 3 continents, 12 countries.
- Executive summary as well as all presentations can be found on: https://atpi.eventsair.com/esa-5th-reach-workshop

Feedback from 2024

Supply chain challenges for the European space sector:

(created by ESA REACH workshop participants in June 2024)

Feedback from 2024

What is the most challenging legal framework for your business?

(created by ESA REACH workshop participants in June 2024)

6th ESA REACH Workshop 17th June 2025 - agenda

Time CEST	#	Invited Speakers	Topic/Titles
09:15-09:20	1	Nicoletta Wagner (ESA ESTEC)	Introduction & Welcome
09:20-09:50	2	Premysl Janik (ESA, REACH Officer)	ESA REACH Office - Introduction and space sector-wide initiatives
09:50-10:20	3	European Commission: Julien Fabre (DG ENV), Martijn Beekman (DG GROW) and Fabio Vitobello (DG DEFIS)	European Commission update on REACH with focus on Space
10:20-10:50	4	Simone Doyle (ECHA)	Authorisation and Restriction – Updates from ECHA
10:50-11:15		BREAK	
11:15-11:45	5	Fabien Michelin (European Defence Agency)	REACH & Defence: Challenges and perspectives for strengthening European military capabilities
11:45-12:15	6	Tim Becker (REACHLaw)	Update on European Space Sector activities to jointly address EU REACH and related laws
12:15-12:45	7	Paolo Serafini (Thales Alenia Space)	Views and regulatory challenges of large Space Integrator in Europe
12:45-14:00		LUNCH BREAK	
14:00-14:30	8	Oliver Reiff-Musgrove (REACHLaw)	How to use the ESA REACH Tool to monitor regulatory risk and map your PFAS uses
14:30-15:00	9	Leo Fournier (ESA)	Summary of PFAS use mapping across ESA projects
15:00-15:20	10	Miki Kurahashi (JAXA)	JAXA Initiatives for PFAS Obsolescence on Japanese Space Supply Chain
15:20-15:40	11	Premysl Janik + all participants	Response to UPFAS Restriction: brainstorming & how to collect info, data across different uses in the space sector
15:40-16:00		BREAK	
16:00-16:45	12	Panel Discussion Speakers: P. Janik, REACH officer at ESA E. Consoli, ASD Europe R. Boelter , TESAT T. Ziegler, Ariane Group Moderator: A. Coello Vera, REACHLaw	 Group Restriction Initiatives and wider EU Chemicals Policy Space agency perspective ASD perspective As DLR Advisor (representing German SMEs) Launcher Perspective
16:45-17:00		Closing Remarks (P. Janik + A. Coello Vera)	
17:00		END	

6th ESA REACH Workshop 2025 in numbers

Participation:

>130 participants from 24 countries, 4 continents,

32 nationalities, 30 on site + 100 online > 130

Composition:

Authorities, Industry, Space agencies, SMEs,…

Agenda:

Agenda is available on the bottom of the web page:

https://atpi.eventsair.com/6th-esa-reach-workshop

All presentations will be made available on the same link.

Format:

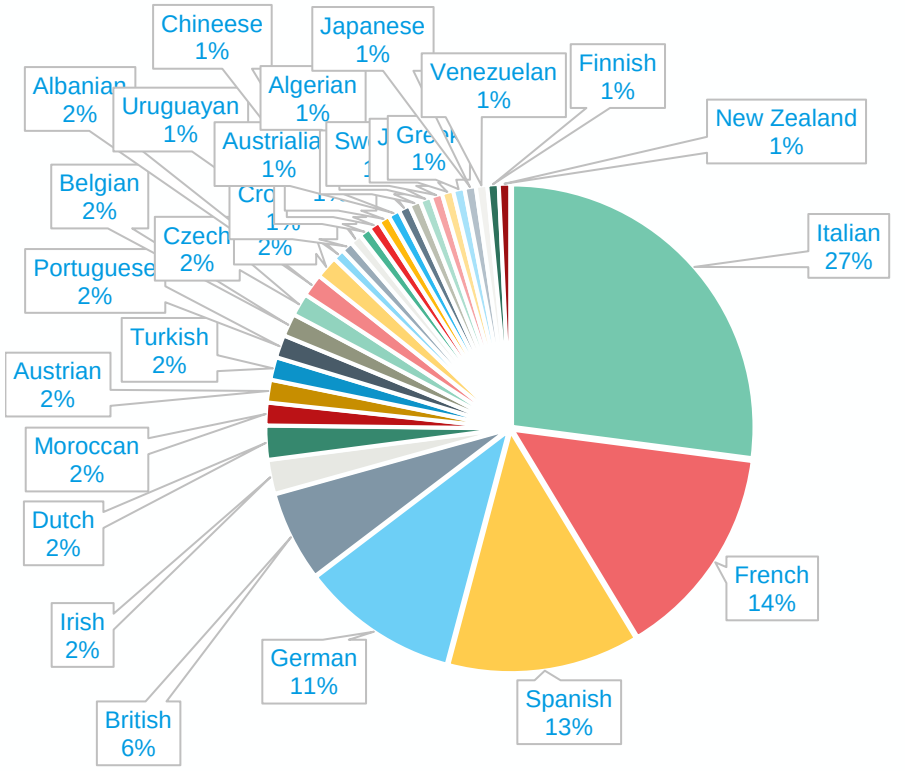
on site + Webex, 10 presentations + Q&A session,

2 coffee breaks, lunch break, Mentimeter sessions

PFAS mapping brainstorming, panel discussion

Who cares about REACH in space?

32 Nationalities on 6th ESA REACH WS



Sustainability Efforts at ESA in the Wider Context

- **ESA Green Agenda (EGA)**: ESA CSR team & ESA's Climate Chief Officer, presenting ESA climate and Sustainability strategy; there are also events and activities of ESA Clean Space team

For more information on EGA and Sustainability you can follow dedicated materials from webinar, or you can contact ESA CSR team:

Web ESA EGA:
https://www.esa.int/About_Us/Responsibility_Sustainability/ESA_Green_Agenda

Web Clean Space:
https://www.esa.int/Space_Safety/Clean_Space

REACH – INTRODUCTION
ESA REACH OFFICE ACTIVITIES

EU REACH

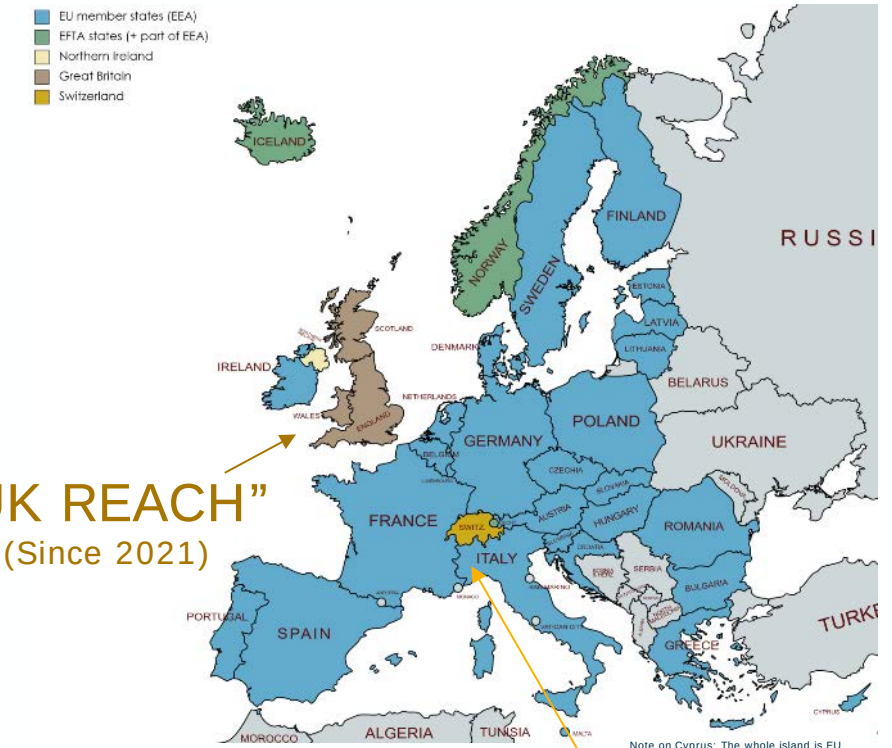
Overview of EU REACH Regulation and associated challenges

- Focuses on chemicals' effects on health and environment
- Numerous chemicals face regulatory obstacles impacting users
- Poses engineering and management challenges for industry
- Regulatory timelines are not compatible with long development time of space missions
- …

- Revision of EU REACH regulation expected by end of 2025

"EU REACH" territories

EU-27 + Iceland, Norway and Lichtenstein (= EEA) + Northern Ireland



"UK REACH"
(Since 2021)

Created with mapchart.net

Swiss chemicals regulation

* Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

ESA REACH Office

Primary Objectives:

- Support ESA projects in achieving REACH compliance and managing obsolescence risks.
- Monitor regulatory changes impacting the space sector.

Main Challenges:

- Evolving regulations resulting in material shortages, including chromates, hydrazine, bisphenols, PFAS, and metallic lead.
- EU initiatives involve authorisation and restrictions on commonly used substances, the REACH revision process, and the Essential Use Concept.

Key Contributions:

- Established a network with agencies and primes/LSIs for REACH implementation and regulation updates.
- Engaged in public consultations, contributed to guidelines, internal reporting.
- Developed the ESA REACH tool and awareness sessions.
- Organised REACH workshops for stakeholders and held an internal session for ESA payload developers (CFIs)

ESA REACH Office Supporting European Space Sector

ESA REACH office initiatives:

- **ESA REACH tool v5.4:** European entities active in space sector can subscribe (link), active yearly users **>100**
- Exchange with national agencies on “global” regulatory matters (JAXA and NASA)
- *NEW*: Advocacy and participation in SEAC meetings as occasional observer (Chromates, PFAS restriction)
- *NEW:* Engaged with ESA projects and industry in PFAS mapping to complement sectorial response

ESA REACH Office with support of ESA’s SME Office and REACHLaw Ltd.:

- **REACH Awareness Webinar for SMEs**, 29th January 2025 (link), >150 participants
- **ESA REACH tool Webinar for SMEs**, 26th February 2025 (link), ~ 100 participants

Sector-wide: Materials and Processes Technology Board (MPTB) / ESCC (link)

- Coordination, support to multiple working groups and sub-groups, regulatory intelligence & drafting position papers; obsolescence monitoring,…
- Exchange of relevant information with ESA’s supply chain, support SMEs, …

REACH Update by Numbers in 2025 Q1

Registration, Evaluation, Authorisation and Restriction of Chemicals

ECHA
EUROPEAN CHEMICALS AGENCY

- ECHA C&L inventory: information on the classification of ~ **350 000*** substances on the EU market
- EU REACH Registered substances: **23,025***
- EU REACH registrations: **110,010***
- ECHA's Cand. List -Substances of Very High Concern (SVHCs): **247** entries (**497** ref. substances)
- REACH Annex XIV – Authorization list: **59**
- REACH Annex XVII – chemical(s)-specific restrictions: **75** entries (~ 2,100 substances, excluding PFAS)
- **all regulatorily listed subst. + PFAS = > 18,000 CAS nrs!**

* note: numbers frequently changing

Impact on space sector

ESA REACH Tool v5.4

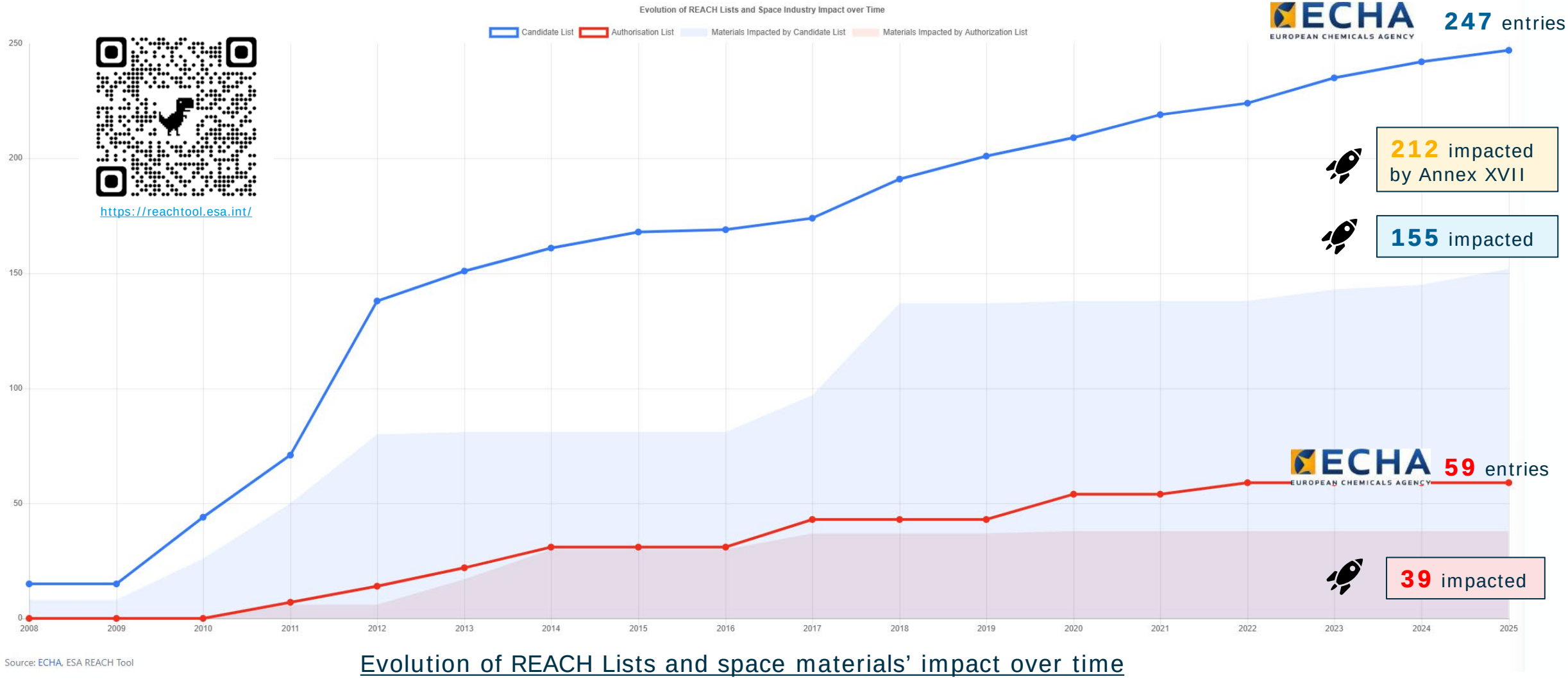
Regulatory risk tracker for space-relevant materials

- We trace @ 1160 Materials & Mixtures relevant to space
  - > 200 space-relevant materials affected by REACH (~18.2%)
- Obsolescence Splinter group /REACH Tool analysis by Q1 2025
  - **49** SVHC entries impact 155 (~15%) of tracked materials
  - **13** REACH Annex XIV entries impact 39 (~4%) of tracked materials
  - **21** Space-relevant Annex XVII entries impact 212 (~19%) of tracked materials
  - **67*** materials/mixtures in active use have very high risk of obsolescence!
  - (*last number space-relevant materials impacted by either Annex XIV or relevant restriction Annex XVII

REACH Update by Numbers in 2025 Q1

Registration, Evaluation, Authorisation and Restriction of Chemicals

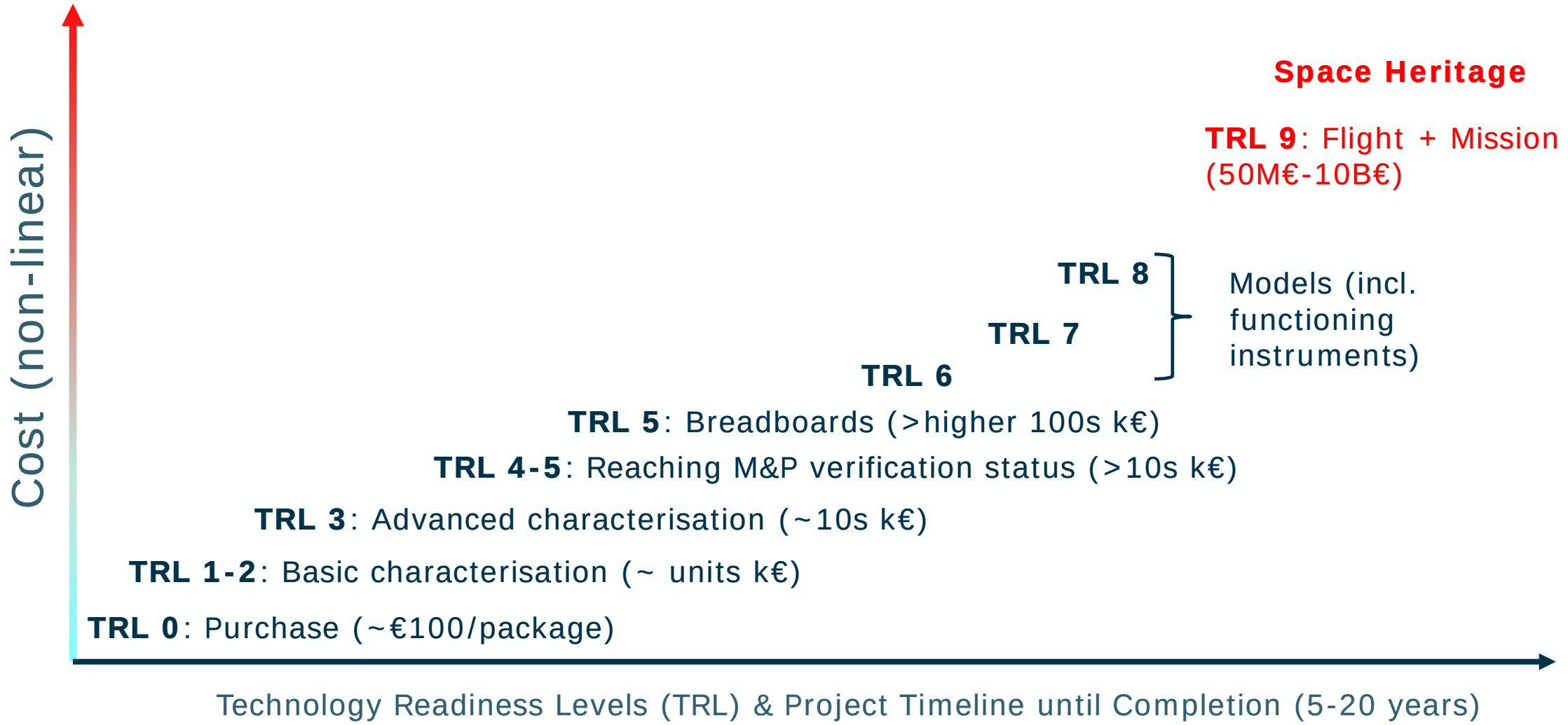
https://reachtool.esa.int/



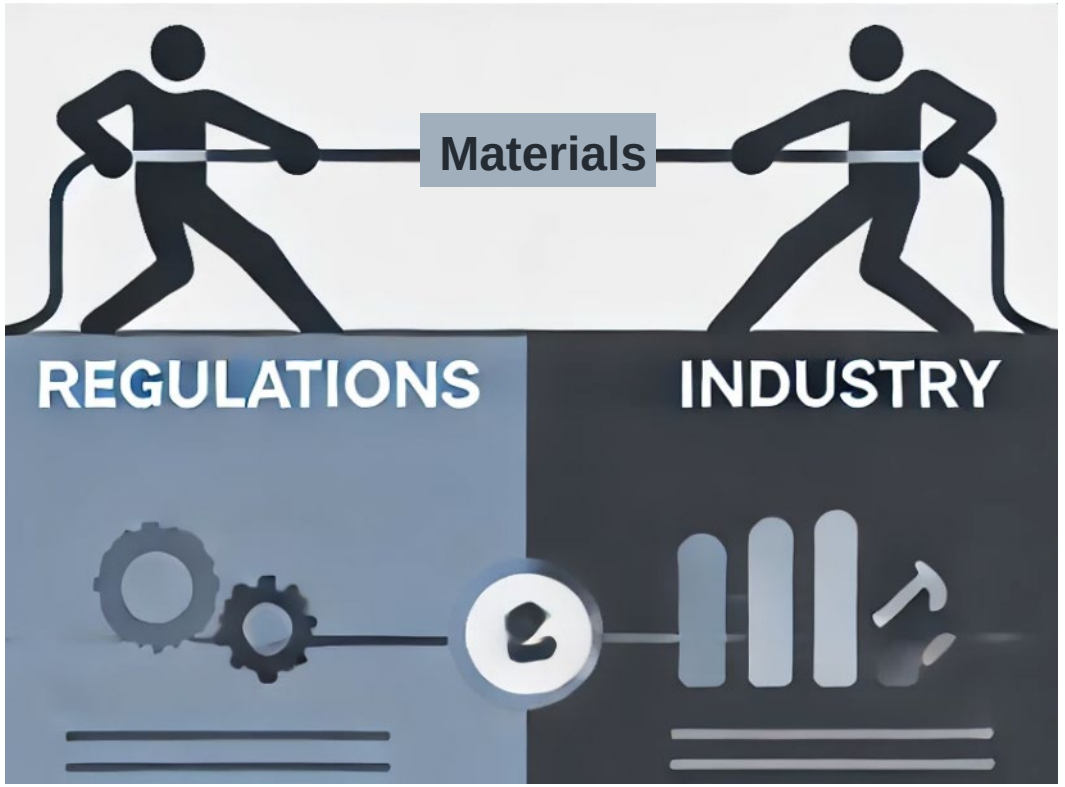
Evolution of REACH Lists and space materials' impact over time

IMPACT OF REGULATIONS ON SPACE SECTOR => OBSOLESCENCE

Obsolescence Impact: Cost and Delay – example of a new adhesive in optics



RESPONSE OF EUROPEAN SPACE SECTOR



Materials and Processes Technology Board (MPTB) Members

Materials and Processes Technology Board of the European Space Components Coordination (ESCC MPTB). The ESCC MPTB is a partnership between the **European Space Agency (ESA)**, **national space agencies**, and the European space industry represented by ASD-EUROSPACE; it is chaired at present by ESA. The European Defence Agency (EDA), Leonardo Company, Map Space Coatings, INVENT/AKRK are invited as observers.

Agencies

agenzia spaziale italiana

cnes

DLR

esa

Industry

ASD-EUROSPACE
The Space group in ASD

AIRBUS DEFENCE & SPACE

ThalesAlenia Space
A Thales / Finmeccanica Company

AVIO

arianeGROUP

OHB

beyond gravity

MT AEROSPACE

sener

TESAT

Observers

EUROPEAN DEFENCE AGENCY

MAP SPACE COATINGS

LEONARDO

INVENT

REACH Task forces and Working group coordinator

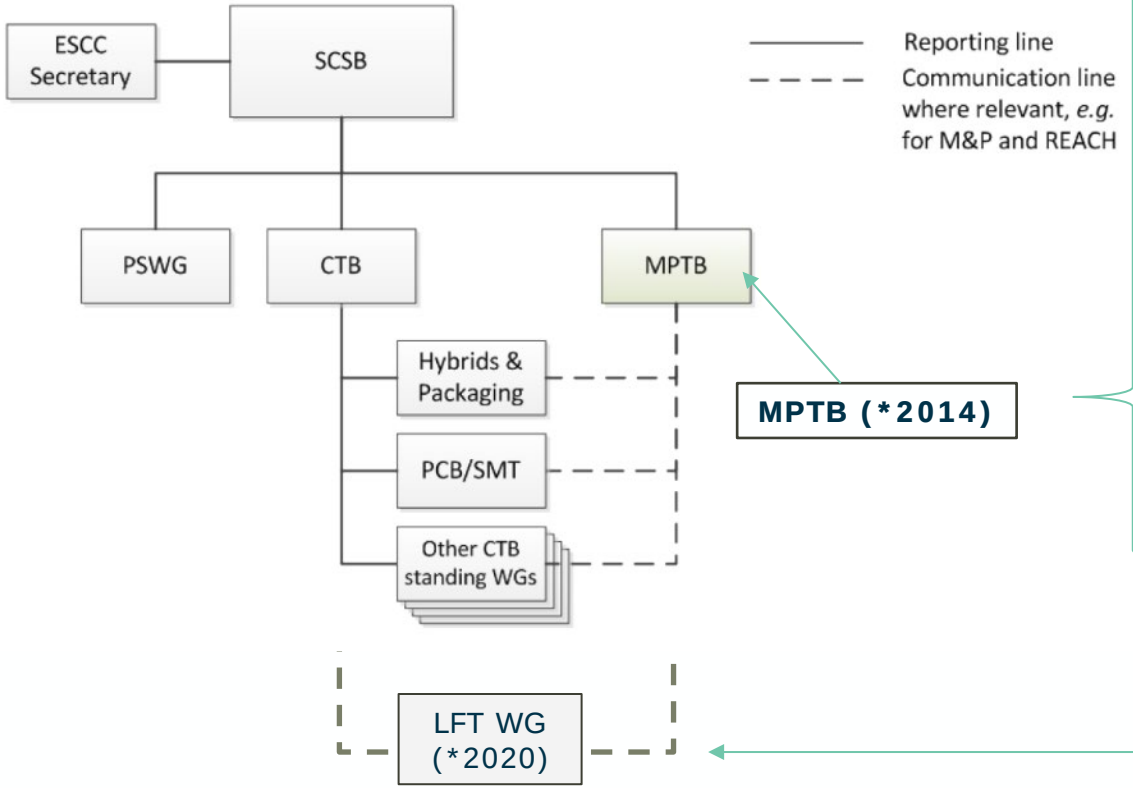
REACHLAW

MPTB Organisation and Groups

MPTB Chair: P. Janik, ESA representative

MPTB Deputy Chair: ArianeGroup representative

Main distribution: 59+ members, 18+ entities



Working groups and Task Forces:

- **Chromates** Space TF (STF)
- **Lead TF** (LTF)
- **W**aste **F**ramework **D**irective **- SCIP Notification** (WFD**/SCIP** TF)
- **Energetic Materials** WG (EMWG) – including also former scope of Hydrazine TF (HTF)
- **C**hem. **S**trategy for **S**ustainability Space Focus Group (CSS SFG)
- **Restrictions Task Force** (RTF), including currently “universal” PFAS, bisphenols, D4/D5/D6 – covering REACH and POPs Regulation
- **Obsolescence** Splinter Group (OSG)
- **E**uropean **S**pace **M**aterials **D**atabase (ESMDB) Steering Board
- **Long Term Storage** (LTS) Splinter Group
- **M**aterials **S**pace **E**nvironmental **S**urvivability (MSES) WG
- Composite splinter (not active, collecting members/interest)

CTB/MPTB shared WGs:

- Lead-free transition WG (LFT WG)

REACH-related Regulatory Task Forces under the MPTB

MPTB

REACH obsolescence risk analysis. Regulatory monitoring. General studies and sector positions

initiates

report

communicate

coordinate

exchange

- Member States
- EU Parliament
- EU Commission
- ECHA

ASD-Eurospace

ASD

REACH & CHEM WG

Third party groups & associations (SMEs, CEFIC)

Space Task Forces

REACH dossier development. Enhanced focus

Hydrazine Task Force* "HTF" (2011-2022)

Chromates Task Force* "STF" (2013-)	Lead Metal Task Force* "LTF" (2018-)	WFD / SCIP Task Force (2019-)	Energetic Materials WG* ("EMWG") (2020-)	CSS Space Focus Group (SFG) (2021-)	Restrictions Task Force* (RTF) (2023-)

*Includes also Non-MPTB members

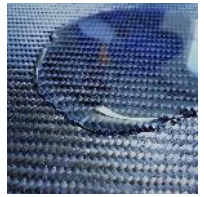
PRIORITY ACTIONS
PFAS AND OTHER SUBSTANCES

Substances in focus

- **CrO_3/Chromates,** used for chromating, chemical conversion coatings, in space projects often referred as Alodine 1200/Bonderite family of CrO3 mixtures, MPTB/STF -> latest memo on Eurospace pages, pending update iss.8 (link)

- **Lead metal:** use: e.g. soldering**, ...** No significant change since last WS, efforts for replacement of lead and lead-free transition WG ongoing, more on ESCIES/MPTB Memos

- **D4, D5 and D6 (cyclic siloxanes**, used in conformal coatings, paints...**):** potential EU proposal to list to the Stockholm Convention on POPs, adding to EU REACH initiatives (ECHA Annex XIV Recommendation & EU REACH Restriction – updated Entry 70), concern over adverse impacts for silicone polymers and global supply chains (CEFIC SiE DU paper)



- **Bisphenol A (BPA) & certain bisphenols of similar concern:** European Space Sector comments dated 22.5.2023 on the REACH Restriction proposal by Germany (BAuA) (link to comments), Germany withdrew the proposal.

- **Per- and Polyfluoroalkyl Substances (PFAS)** – universal restriction proposal

NOTE: This list is not exhaustive! Many other substances e.g., from energetic materials (space propellants such as hydrazine and explosives) are being followed by MPTB

PFAS Challenge

What is/are PFAS?

Per- and Poly**f**luoro**a**lkyl **S**ubstances (PFAS), often referred as “forever” chemicals; definition in the restriction proposal based on molecular structure as follows: *Any substance that contains at least one fully fluorinated methyl (CF3-) or methylene (-CF2-) carbon atom (without any H/Cl/Br/I attached to it)* → **Encompasses >10,000 substances!**

In February 2023, ECHA published a **proposal by five national authorities (from Denmark, Germany, the Netherlands, Norway and Sweden) for a universal PFAS restriction.** The proposed restriction has a very broad scope; therefore, it could hit all ESA missions, sub-systems etc.

What is new since 2024?

ECHA/SEAC reminded us, that scientific committees cannot assess strategic/political messages submitted via consultations. Volumes of PFAS used in the sector, emissions, costs associated with impact of restriction, job losses, etc… should be reported instead. Political, programmatic and strategic messages should be submitted to European Commission.

Potential uPFAS REACH restriction, without suitable and exhaustive derogations, represents major risk to ESA and to entire European space sector

PFAS use cases in launchers & spacecraft

Ariane 6

PFAS is in some form used in following:

- Lubricants,
- Coatings,
- Creep barriers,
- Functionalised polymer surfaces,
- Cleaning agents,
- Coolant fluids,
- Fluoro-elastomeric sealants,
- Pyrotechnic compositions,
- Blowing agents for thermal insulation,
- Adhesives,
- Fire suppressants,
- Cables insulation,
- Shrink sleeves,
- PCBs,
- Processes for electronic assembly
- …

Exemplar spacecraft: EarthCare

Where are PFAS used in spacecraft?: MLI, PCBs, lubricants, cables, connectors, insulation, gaskets, tubes, …

> 110 out of 2700 DML items, mostly **PTFE**, **ETFE**, **FEP**, **PVDF**, **FKM***-based (5-10% of all declared material uses)

*FKM= fluoro-rubber (Fluorine Kautchuk Material)

If EU REACH PFAS restriction is adopted without space-specific derogation, the European Space Sector would face serious issues!
(worst case scenario: to comply within 18 months period after PFAS restriction adoption)

PFAS mapping follow up: impact assessment

- At some point there will be public consultation on SEAC opinion on PFAS restriction by Jan 2026(?) (60 days)
- Sectorial ***action*** to complement uPFAS draft restriction response paper (61 distinct PFAS uses):

  Be ready to provide detailed information about PFAS mass, costs for replacements and impact on employment in your business in case of PFAS ban!

How?

Participate in **ESA-industry PFAS survey phase 2** (link), goal is to estimate PFAS mass, financial loss due to elimination of systems relying on PFAS materials + confirm no suitable alternatives are available for space technologies

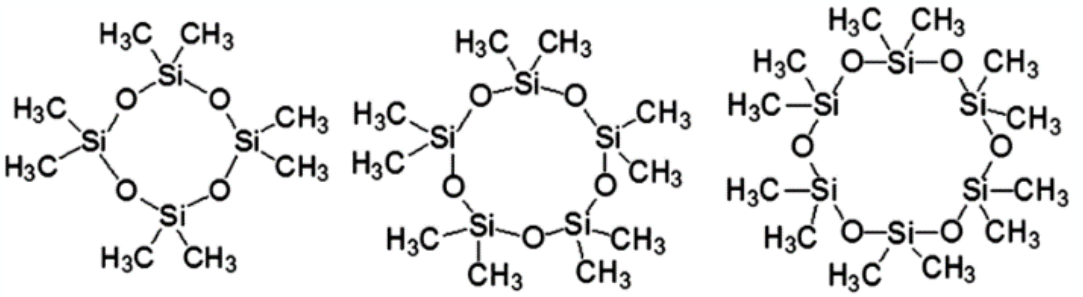
What is missing?

Assessment of the uPFAS restriction's impact on strategic space capabilities

But, who is going to convey such "strategic/programmatic" message?

Use case

D4, D5 & D6 CYCLIC SILOXANES



D4
Octamethylcyclotetrasiloxane (D4)

D5
Decamethylcyclopentasiloxane (D5)

D6
Dodecamethylcyclohexasiloxane (D6)

- Included on REACH Candidate List of SVHCs + Part of ECHA's 10th Annex XIV recommendation (14.4.2021)
- New REACH Restriction adopted: Commission Regulation (EU) 2024/1328 of 16.5.2024
- **In addition**: Potential EU proposal to list to the Stockholm Convention on POPs → serious concern over adverse impacts for silicone polymers and global supply chains (CEFIC SiE DU paper)

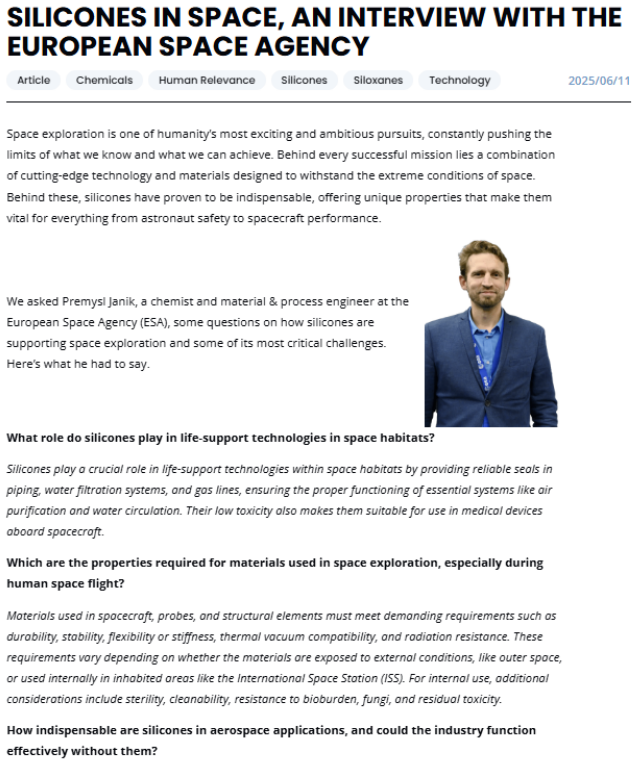
Silicones declared in space materials (not exhaustive)

- **Statistics by Chemical Composition:**
  - There are 54 unique silicone mixtures, with only 16 showing D4, D5, and D6 in their Safety Data Sheets.
  - These compounds represent 1-2% of all recorded materials, which include numerous items and processes.

- **D4, D5, and D6 by Material Category:**
  - Adhesives: silicone-based
  - Lubricants and greases
  - Potting compounds, sealants, and foams
  - Rubbers & Elastomers: silicone elastomers

- **Silicone Elastomers – by functions:**
  - Used in electronic components: opaque white and clear silicone coatings.
  - Play role in specific ESCC component criteria.
  - Applied to printed circuit boards and mechanical parts.
  - Low volatility grades are used for optical bonding.

Article about Silicones in Space



SILICONES IN SPACE, AN INTERVIEW WITH THE EUROPEAN SPACE AGENCY

Article | Chemicals | Human Relevance | Silicones | Siloxanes | Technology 2025/06/11

Space exploration is one of humanity's most exciting and ambitious pursuits, constantly pushing the limits of what we know and what we can achieve. Behind every successful mission lies a combination of cutting-edge technology and materials designed to withstand the extreme conditions of space. Behind these, silicones have proven to be indispensable, offering unique properties that make them vital for everything from astronaut safety to spacecraft performance.

We asked Premysl Janik, a chemist and material & process engineer at the European Space Agency (ESA), some questions on how silicones are supporting space exploration and some of its most critical challenges. Here's what he had to say.

What role do silicones play in life-support technologies in space habitats?

Silicones play a crucial role in life-support technologies within space habitats by providing reliable seals in piping, water filtration systems, and gas lines, ensuring the proper functioning of essential systems like air purification and water circulation. Their low toxicity also makes them suitable for use in medical devices aboard spacecraft.

Which are the properties required for materials used in space exploration, especially during human space flight?

Materials used in spacecraft, probes, and structural elements must meet demanding requirements such as durability, stability, flexibility or stiffness, thermal vacuum compatibility, and radiation resistance. These requirements vary depending on whether the materials are exposed to external conditions, like outer space, or used internally in inhabited areas like the International Space Station (ISS). For internal use, additional considerations include sterility, cleanability, resistance to bioburden, fungi, and residual toxicity.

How indispensable are silicones in aerospace applications, and could the industry function effectively without them?

https://www.silicones.eu/silicones-in-space-an-interview-with-the-european-space-agency/

Complexity linked to overall regulatory compliance

Not exhaustive…

Supply chain resilience/ethics

Conflict Minerals, Critical Raw Material Act, Chips Act, multiple **EU sanctions,…**

ESA's additional requirements on suppliers, such **as ESA CSR Code of Conduct** (reflecting on Procedure 2022/0051/COD Corporate Sustainability Due Diligence and amending Directive (EU) 2019/1937), status?

Legislation focused on Circularity, Sustainability (Environmental Footprint)

Waste Framework Directive/**WFD/SCIP**, **EEE Waste directive,** Reg. on **batteries and waste batteries**

NEW:

Ecodesign directive -> **ESP Reg.**; **Corporate Social Responsibility Reporting Directive** (CSRD), Directive on **Corporate Sustainability due diligence** (CSDDD), **Green Claims Directive,…**

Legislation focused on Chemicals & Materials

ROHS, REACH, CLP, CMD, CAD, OELs

Mercury reg., POPs,…

CONCLUSIONS AND OUTLOOK

Conclusions

- The growing number of **regulatory constraints** in Europe is leading to a considerable rise in **obsolescence** cases within the M&P domain, which significantly **impacts the space industry**.
- Effective **management of M&P obsolescence** is a **crucial** element for business success, with regulatory monitoring being a vital component of this process.
- The **proposed EU REACH PFAS restriction**, in its current state, would impose an **unmanageable** burden on the European space sector, potentially resulting in legal non-compliance or introducing technological risks due to the reliance on untested and largely unavailable PFAS-free alternatives.
- It is essential to foster **collaboration and communication** regarding regulatory matters within the Space Sector and across related fields such as **aerospace and defence**, automotive, and electronics.
- For more insights into Space sector activities concerning REACH and related topics, visit: https://eurospace.org/working-bodies/#reach
- Additional details can be found on the MPTB Web page: https://escies.org/webdocument/showArticle?id=1045&groupid=6

Thank you for your attention!

Questions?

Contact: reach.officer@esa.int

MPTB REACH-related info, templates and guidelines

Link to the MPTB's page with publications: https://escies.org/webdocument/showArticle?id=1049&groupid=6

Short title	Reference number with hyperlink
Regulatory status of Lead metal	MPTB_RL_MO_0156 issue 1.2
Guidelines on Cont. Use of Chromium Trioxide	Eurospace news of 12.5.2025 *To be updated to issue 8*
Slides on PFAS restriction –sectorial update	MPTB-ES-HO-0159, version 1.1
Regulatory memo on Bisphenol A (BPA)	MPTB-RL-MO-0164, Issue 1
SCIP Best Practice Guidelines	MPTB-ES-GD-0158 issue 1.3
REACH Article 33 Template	MPTB-RL-TPL-0092, version 1.2
Comparison between EU REACH Annex XIV (authorisation) and Annex XVII (restriction)	MPTB-RL-HO-0171

Important references and links

EUROSPACE, trade association of the European Space Industry: https://eurospace.org/

HEISKANEN P. et al., Regulatory and Commercial Obsolescence Risks of Materials and Processes (International Chemical Regulatory and Law Review, Volume 3 (2020), Issue 1): https://doi.org/10.21552/icrl/2020/1/4

MATREX, CNES space materials and regulatory risk tracking database: https://matrex.cnes.fr

MAPTIS, Materials And Processes Technical Information System of NASA: https://maptis.nasa.gov/

REACH-Related:

ECHA list of Annex XIV substances (authorisation list): https://echa.europa.eu/authorisation-list

ECHA list of Annex VXII restrictions (restriction list): https://echa.europa.eu/substances-restricted-under-reach

ECHA's SVHC list (Candidate list for Annex XIV): https://echa.europa.eu/candidate-list-table

ECHA SCIP database: https://echa.europa.eu/scip-database

REACH & Obsolescence management relevant ECSS (https://ecss.nl/)

- ECSS-Q-ST-70C rev2 - Materials, mechanical parts and processes
- ECSS-Q-HB-70-23A – Materials, mechanical parts and processes obsolescence management HB

Databases M&P & EEE component relevant info:

- ESA REACH Tool: https://reachtool.esa.int (for European entities active in space-relevant activities)
- MODESA, outgassing database: https://modesa.esa.int/
- ESCIES: European Space Component Information Exchange System: https://escies.org/ -> MPTB web (link)

Mentimeter sessions

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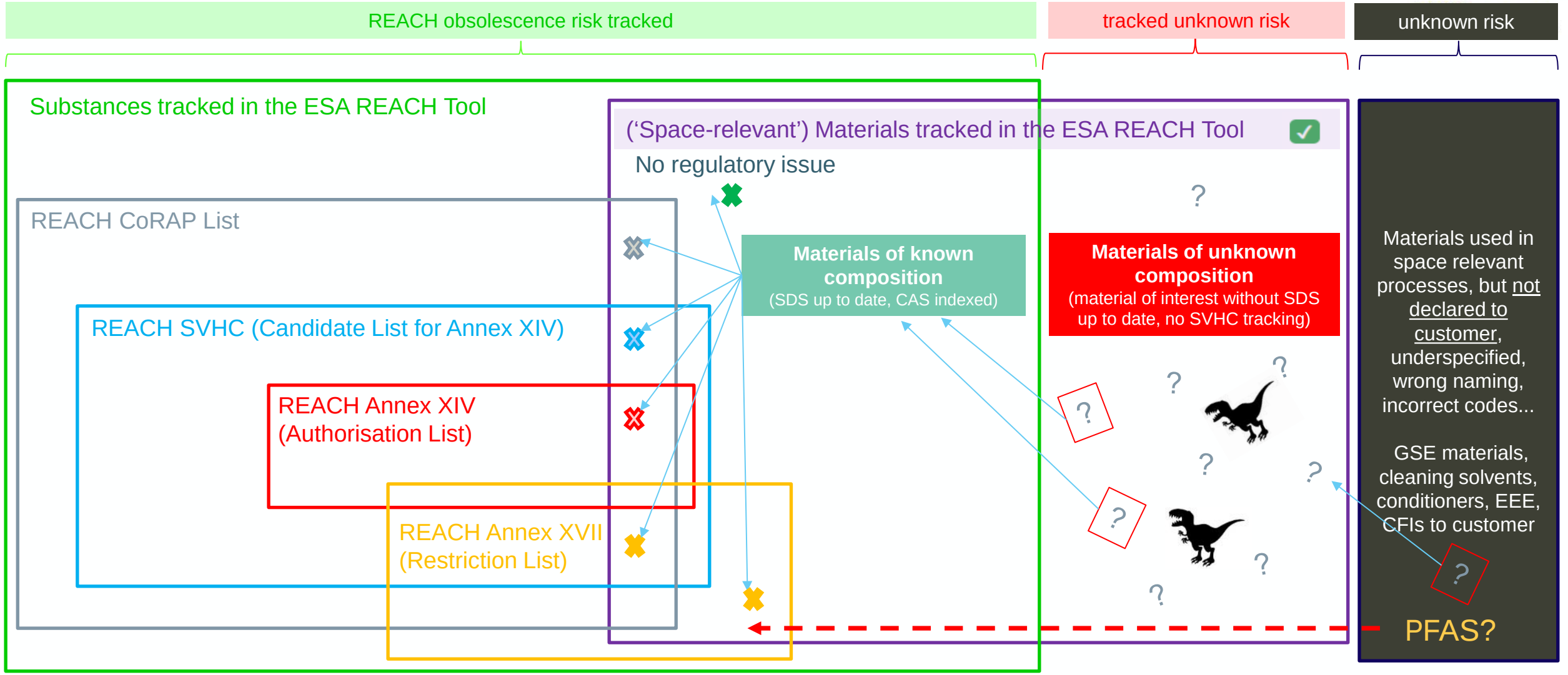
https://www.menti.com/alpvsax6eq23

Substances vs. REACH lists – overview of “intersections”



Note: It is impossible to perform any REACH cross-check/regulatory risk assessment if the substances present in materials & process are not traced/identified

PFAS mapping discussion – brainstorm session

How to do it most efficiently and with sufficient accuracy?

Does your article contain PFAS? Yes or no? (DMLs, DPLs, SDS, TDS, etc)

If **yes**, do you have any immediate suitable alternative? **No**? then you are impacted

Impact assessment – data collection

Cost impact? Cost at Completion (**CaC**, development + operation)

Associated FTEs: ? – all programme stops = all jobs associated with the programme lost

Mass of PFAS? Declared Material Lists (DMLs), summation of individual DML PFAS items

-> M0 (range between 0-1g)

-> M1 (range between 1-10g)

-> M2 (range between 100-1000g)

…

Identification among declared materials as per ECSS

ECSS-Q-ST-70c

ECSS-Q-ST-70C Rev.2
15 October 2019

<2> Contents of the DML

ECSS-Q-ST-70_0490169

a. The DML shall include the information stated in Figure A-1, where the header information identifies the list as the declared materials list and includes the issue number and date of issue, as follows:

1. Item number (applicable to equipment manufacturer level only)

(a) This consists of the material group identifier and the user code. It takes the form of:

<group number>.<identifier within the group>.<running number>.<user code>

NOTE For example: 11.5.1.KOF.

(b) Characteristics of the item number are:

- The user, identified by an agreed user code for the project.
- One only per material type.
- Does not change during the life of the materials list (sub-items are permitted when deemed necessary).

Chemical nature, Product type, Material Category,...

Mass/Volume...

ECSS-Q-ST-70_0490280

Table A-3: Size code

Size code	Value
0	$0 < A$ or V or $M \leq 1$
1	$1 < A$ or V or $M \leq 10$
2	$10 < A$ or V or $M \leq 100$
3	$100 < A$ or V or $M \leq 1\,000$
4	…

where: A is the area, in cm^2
V is the volume, in cm^3
M is the mass, in g

PFAS quantification: PTFE identification as example

Focus on ***PTFE*** in a “spacecraft”:

DML, as per ECSS-Q-ST-70c -> category “***Chemical nature***” AND “***Product type***”,

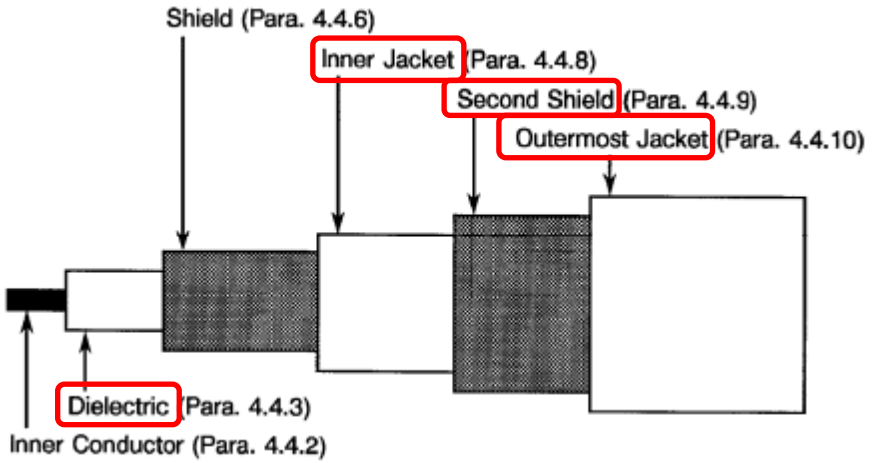
Total number of items: **1400+ , 1225 items with defined mass ranges**

Seach phrases: PTFE, Fluor-, Teflon, Polyfluoro, Tetrafluoro,… x PTFE-containing articles with mass range

Most significant mass items with PTFE (M4): harness + cabling

Exemplar “article” – ESCC cable analysis

Triaxial Cable – ESCC 3902/002 (Wires and Cables) Figure 2(a)



- Dielectric made of PTFE
- Inner Jacket made of PTFE
- Second shield made of PTFE
- Outermost Jacket made of PTFE copolymer PFA

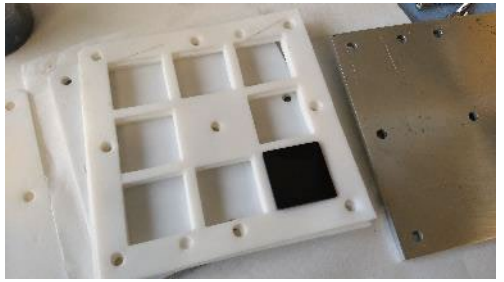
Collective PFAS mass?

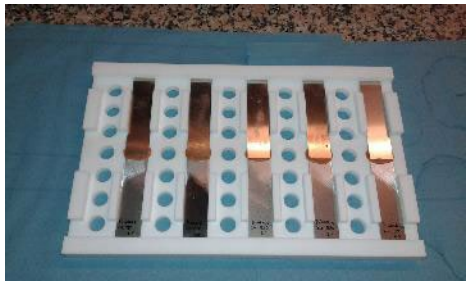
Very coarse approximation that smallest article is entirely “contaminated” with PFAS
- for cables it is obviously extremely conservative due to significant mass of metallic component

Final PTFE item list + avoidance of duplicates: **80 items**, -> summed range: **2.6 - 26kg of items with PTFE**

Mapping of PFAS in processes (process aids)

- Example: DPL mentions PTFE from GSE, (stays on ground or not part of final article after acceptance)
- Which methodology to use to identify PFAS?
- Does any quantification make sense for PFAS which is reused over and over (e.g. Al- PTFE coated moulds?)





PFAS, materials and processes which are undeclared?

- Parts and components, not declared in DML nor in DPL
- ESCC spec does not always provide polymer nature, exact mass calculation for individual materials unavailable?
- **Perform destructive analysis to prove how much % PFAS does this or that component contain?**

Panel discussion

1. **Universal PFAS restriction proposal**:

a. How do you see the impacts of the proposal on your company / supply chain already as of today and looking ahead, regardless of the future outcome of the EU restriction process?

b. How do you see the need and potential for PFAS emission reductions to the environment that could be achieved by means other than a ban?

2. **Chromates**:

a. What are the remaining compliance challenges (if any) with the REACH authorisation requirements and expected to be forthcoming in a future restriction to replace the authorisation system for chromates?

b. What are the remaining areas and challenges for complete substitution of Cr(VI) in the production of space hardware?

Panel discussion cont.

3. **Regarding EU chemicals policy in general:**

a. The Commission proposal to “simplify REACH” is expected for Q4 of 2025: What would you like to see in the REACH Revision to improve European space sector competitiveness?/How can REACH be simplified to improve competitiveness?

b. Chemicals regulatory requirements are increasingly addressed outside of the REACH Regulation as well (examples: Stockholm Convention/POPs, WFD/SCIP, ESPR/DPP, “Substances of Concern” identified under different EU laws): How do you see this development in terms of challenges, risks and opportunities?