

Clean Space

Julian Austin

16/05/2017





“

**Guaranteeing the future of space activities
by protecting the environment ”**

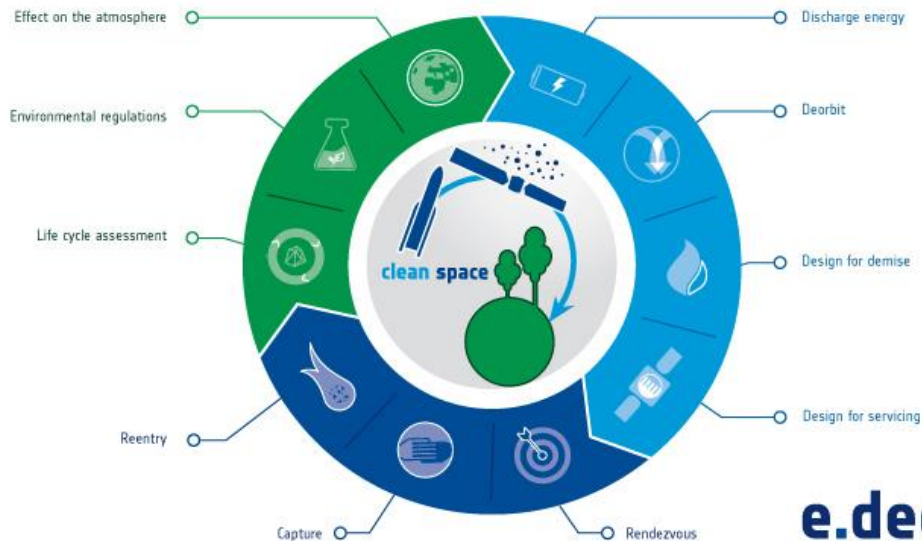


ecodesign

→ REDUCING IMPACTS

cleansat

→ SPACE DEBRIS REDUCTION



e.deorbit

→ ACTIVE DEBRIS REMOVAL

→ WE SHOULD

Climate change is an issue affecting everyone

→ WE WILL HAVE TO

Environmental regulation exists already and is fast evolving, increasing number of countries already demand environmental reporting

→ THERE ARE ALSO BENEFITS

Supply chain knowledge mitigates obsolescence risk and cost savings due to the more efficient use of energy and resources

United Nations



General Assembly

**Committee on the Peaceful
Uses of Outer Space**
Scientific and Technical Subcommittee
Fifty-fourth session
Vienna, 30 January-10 February 2017

27.3 States and international intergovernmental organizations should **promote the development of technologies that minimize the environmental impact** of manufacturing and launching space assets and that maximize the use of renewable resources and the reusability or repurposing of space assets to enhance the long-term sustainability of those activities.

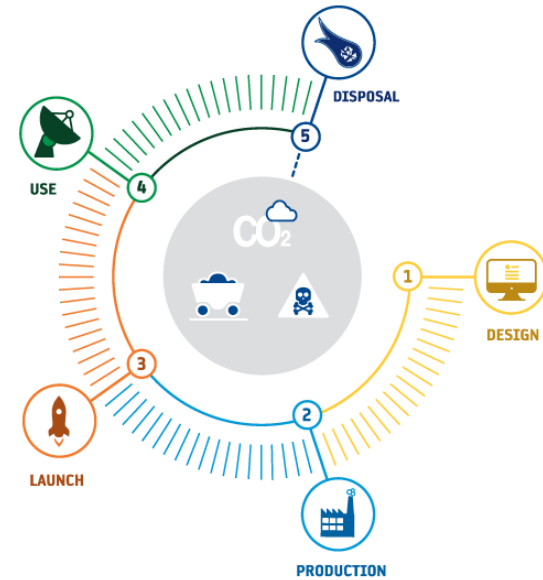
Clean Space centralised and cross cutting, making use of experts from different departments and all different funding schemes (GSP/TRP/GSTP/FLPP/ARTES etc.)

3 areas

Life Cycle Assessment

Effect on the Atmosphere

Environmental Regulation



EcoDesign, where are we now?



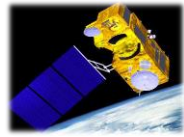
LCA

Building the framework

LCA Launch Segment



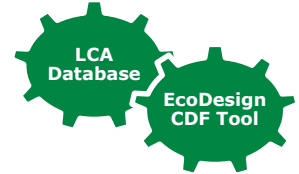
LCA Space Segment

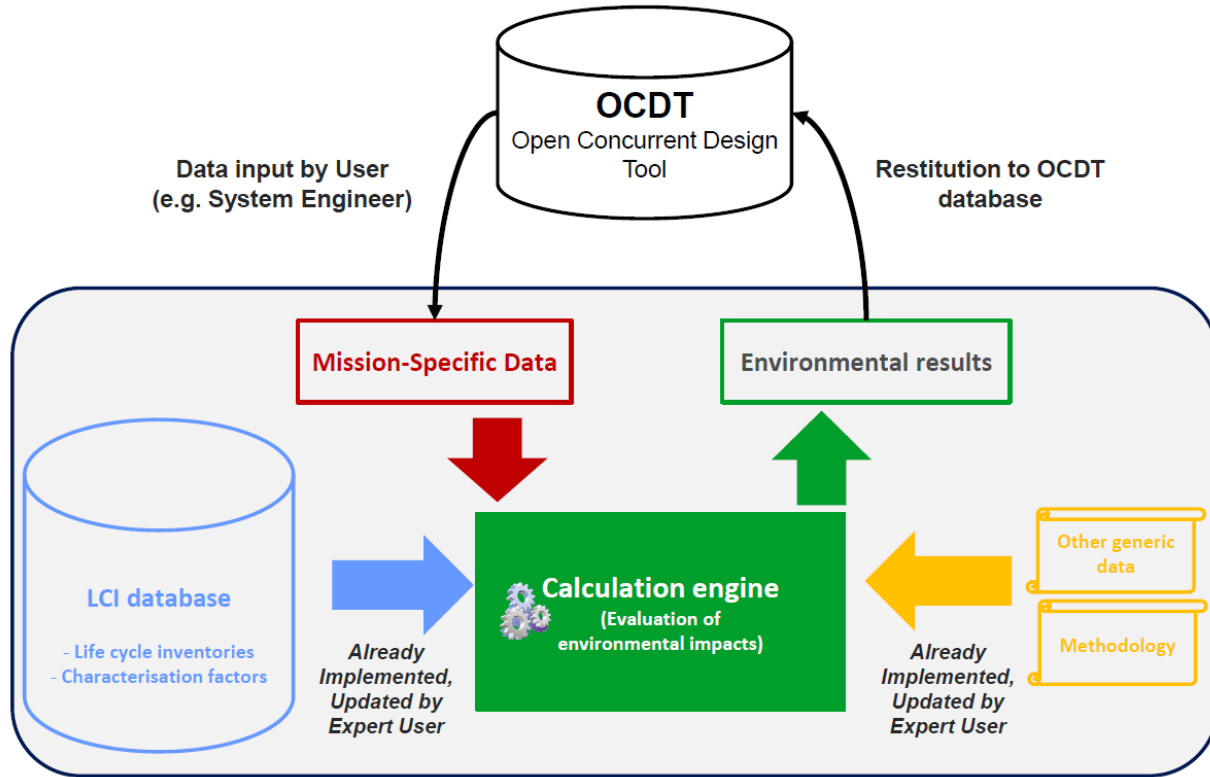


LCA Ground Segment



- Materials and processes LCA
- Ozone atmospheric impact
- Space debris LCA indicator
- REACH into LCA
- Impact of demise
- Deep sea impact
- GreenSat
- Materials and processes devs





EcoDesign, where are we now?



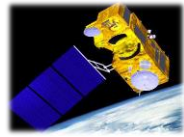
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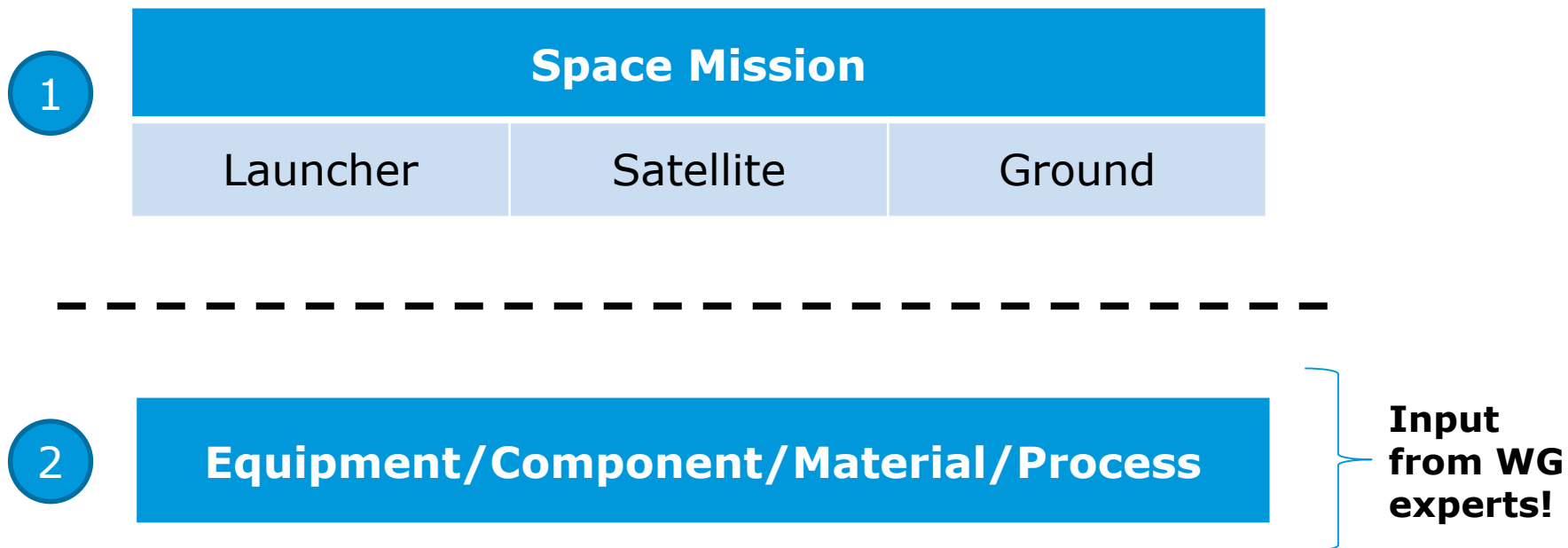
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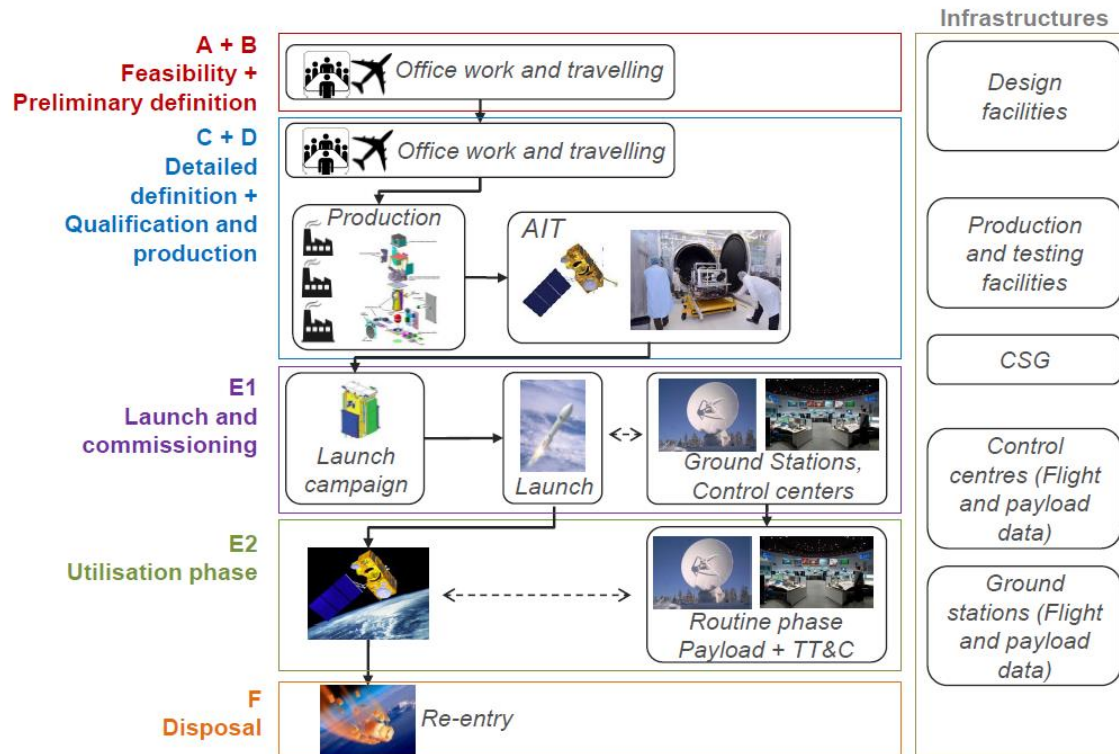
- Additional Studies
 - Materials and processes LCA
 - Ozone atmospheric impact
 - Space debris LCA indicator
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An internal working group was created to produce an ESA handbook containing guidelines for **2 main types of LCA** in the space sector:



Scope of space mission LCA



To avoid...

- *Green washing is when the 'green' label is used for marketing purposes without substantial evidence*



ESA UNCLASSIFIED - For Official Use

grams less plastic than our prior Eco-Shape bottles and caps... more than just a trend, it's our commitment that will continue to grow as we move into the future... .5L bottles across twelve... Over 130 different .5L bottles were weighed across the water, soda, juice and tea categories. On average, the Eco-Shape bottle was found to be the lightest .5L bottle on the market, containing 30% less plastic when compared to the average of other .5L beverage bottles.

Let's all make a difference. Please recycle.



Julian Austin | 16/05/2017 | Slide 12

EcoDesign, where are we now?

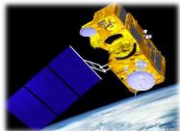


LCA

LCA Launch Segment



LCA Space Segment



LCA Ground Segment



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Currently here

Application



→ TEC – Green Technologies



→ ESA Projects



Sustainable Space Industry



Green Technologies



Try to develop materials and processes, either to reduce environmental impact or to find REACH-affected substitutes

1. Chromates replacement testing
2. Citric acid as replacement for nitric acid
3. Replacement of pyrotechnic initiators powders
4. Biocomposite structures
5. Others (Advanced manufacturing)



EcoDesign, where are we now?

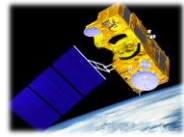


LCA

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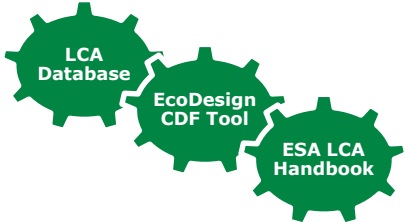


LCA Ground Segment



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Sustainable Space Industry

Already underway in Ariane 6

A6-SOW-1-RQ-076

Title: Environmental impact

Description:

The environmental impact of the exploitation of the Ariane 6 launcher system (Life Cycle Assessment considering production & assembly, launch campaign, and launch event) shall be analysed and compared to that of A5 ECA on the basis of:

- One launch
- Yearly equivalent P/L mass delivered in orbit.

Notes:

Expected answer

Due Item: [DRL-67]Environmental impact of the exploitation of the Ariane 6 Launcher System

Reduce the environmental impact of the space sector by developing green technologies and applying ecodesign during space missions

THANKS FOR YOUR ATTENTION