Leonardo Space Business Unit

Space engineering practices for sustainability: the eco-design approach

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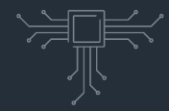

Electronics


Helicopters


Aircraft


Cyber & Security


Space

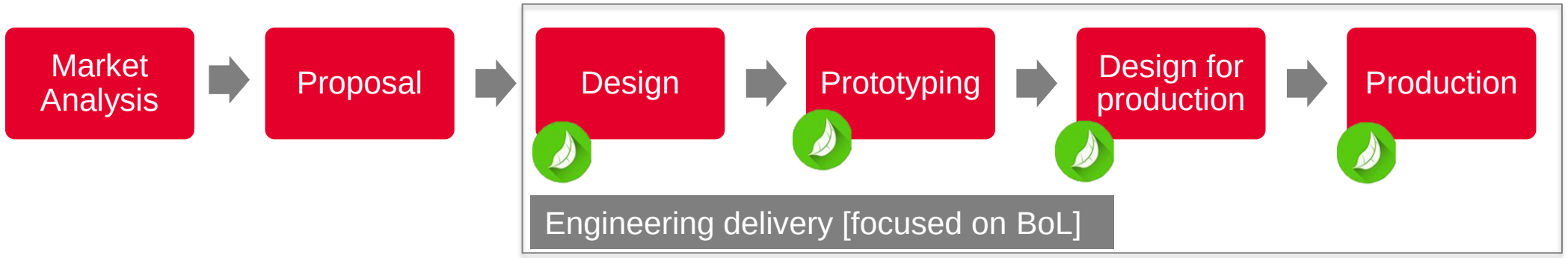

Unmanned Systems


Aerostructures

The eco-design approach: Application of sustainable practices through the Product Life-Cycle

Leonardo embraces a new sustainable engineering paradigma - from the ***design phase*** to the ***dismissal phase*** of its products & practices- with the aim of reducing the Carbon Footprint *as per Target 13- Reduce the impact of Climate Change of Agenda 2030.*

The ***Product life cycle assessment*** consists of three main phases: *Beginning of life* (BOL), *Middle of life* (MOL) and *End of life* (EOL).

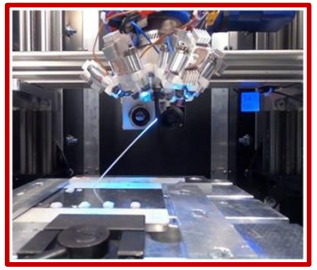


Eco-Design Approach

DIGITALIZATION

Digital Twin; Neural Network;
High-Performance Computing (HPC)

SUSTAINABLE RAW MATERIAL & IMPROVED TECHNOLOGICAL PROCESS



Additive manufacturing; Selection of bio-sourced composite; Exclusion of materials part of list filled by the European Union's **R**egistration, **E**valuation, **A**uthorisation and Restriction of **C**hemicals [**REACH**]

Act as if what you do makes the difference, it does!

Efficient use of resources

Minimization of residuals production

Less Hardware Manufacturing

Less Test Activities

Efficient use of resources

Improved manpower time management

Obtain More…
[higher performances]

With Less !
[less material, less CO2, less power]

Reduced time for rework and re-testing activities

Higher Hardware Reliability

Less CO2 Emission

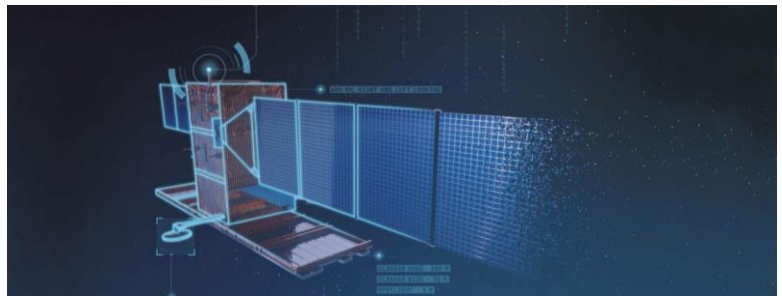
Minimization of the impact on biodiversity

ANNEX
Digitalisation role into the eco-design approach

The application of sustainable practices through the Product Life-Cycle

Digitalisation can contribute to the reduction of environmental impact leveraging on different tools:

The activities mentioned above can be supported with the **High-performance computing** (HPC) platform, that can enable digitalisation of the industry though its cloud computing infrastructure. Leonardo can leverage on its own HPC called **Davinci-1**.



Through the usage of **Neural networks** and **Digital twins** it is possible to support the real-time prototyping and semi-virtual testing evaluation. In this way it is possible to reduce the usage of hardware for the testing phase, directly *improving the environmental footprint* without compromising the design validation;

ANNEX
Sustainable raw materials & technological process selection

The application of sustainable practices through the Product Life-Cycle

Leonardo Space Business Unit aims at reducing its ***carbon footprint*** through:

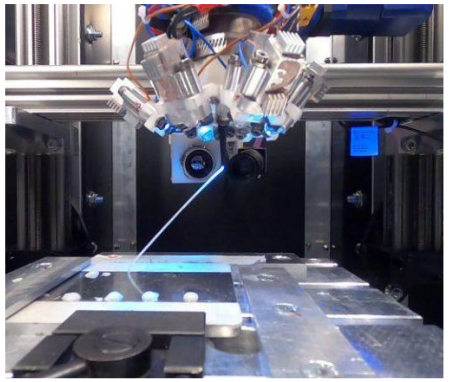
IMPROVED RAW MATERIAL SELECTION PROCESS

Improve the raw material selection aiming at excluding the materials that falls into the list filled by the European Union's **R**egistration, **E**valuation, **A**uthorisation and Restriction of **C**hemicals (REACH).

BIO-SOURCED COMPOSITES

The selection of raw materials, such as **100% bio-sourced** composites, that can replace the already-in-use composites that are made of non-renewable and non-recyclable materials;

ADDITIVE MANUFACTURING



Improve the **technological process** through the **additive manufacturing**, it is also possible to **reduce the material residuals produced.**

ANNEX

Sustainable raw materials & technological process selection

The application of sustainable practices through the Product Life-Cycle

- Less Hardware Manufacturing
  - Saving of Raw Material
  - Improved time effort required for prototyping
  - Minimisation of residuals production
- Less CO2 Emission
  - Less impact on biodiversity [thanks to bio-compatible materials]
  - Less impact on waste production [thanks to use of recyclable materials]

ANNEX

Digitalisation role into the eco-design approach

The application of sustainable practices through the Product Life-Cycle

Leveraging on these digital tools, the gaining earned by the company can be:

- Less Hardware Manufacturing
  - Saving of Raw Material
  - Saving of required energy
  - Residuals minimization
- Higher Hardware Reliability
  - Reducing rework or re-testing activities
- Less Test Activities
  - Saving of required energy
  - Saving of Raw material
  - Improved manpower time management

ANNEX

Drivers for «greener» processes – Leonardo role for a sustainable future

Being a leader in the space sector, Leonardo Space Business Unit has a major role in taking into consideration the changes, the influences and the impact that sustainable practices can generate on the market.

As a growing reality, it is now important- *more than ever*- embracing sustainable practices into the company culture in agreement with the higher global awareness as a competitive leverage in the reference market.

Nowadays, the concept of «*Sustainability*» is more and more intertwined with the «*Digitalization*». Moving towards new technologies, such as the ones presented and now implemented by Leonardo company, the gaining earned by the company can influence its performances in a sustainable perspective.

Leveraging on digital tools can positively impact the processes carried on by the company, addressing new challenges with a more structured and **less resource-intensive approach** and at the same time, **increasing the know-how in the company**.

Higher performances obtained with less consumption of natural resources, raw materials and energy !

It is worth mentioning that the benefits introduced by digitalization are not only confined to the carbon footprint impact generated by the company itself, but also to the people involved in such activities, making more efficient the every-day activities !

ANNEX

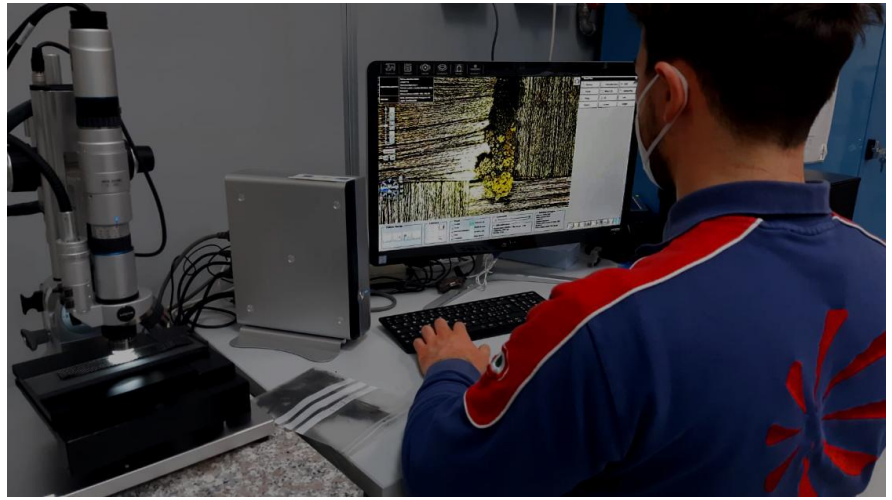
From theory to practice – Our key enablers for sustainable transition

Leonardo Company leverages on its supercomputer '**Davinci-1**', that allowed to achieve **19% of reduction of CO2 emission** due to the **improved and optimized manufacturing processes**.

Additionally, Leonardo started '**Leonardo-IIT Join Labs**' (Italian Institute of Technology), dedicated to the digitalization of industrial processes.

The *Digital Design* allows to decrease the development-time and to reduce costs and energy consumption.

For what concerns the **Additive manufacturing**, the implementation of such technology in the production processes reduces the residuals generation and exploit as much as possible the employed resources. Additionally, it is possible to decrease the time dedicated to the protype an design activities.



For what concerns the sustainable raw material selection, Leonardo Company founded a '***Joint Research Virtual Lab***' with Solvay. The Lab research is focused on *Thermoplastic composite,* with the aim *of* reducing the weight associated to the vehicles and consequently reduce the fuel used by vehicles.

Additionally, this partnership aims at researching more innovative solutions **to decrease the impact of CO2 generated** by aerospace activities.

ANNEX

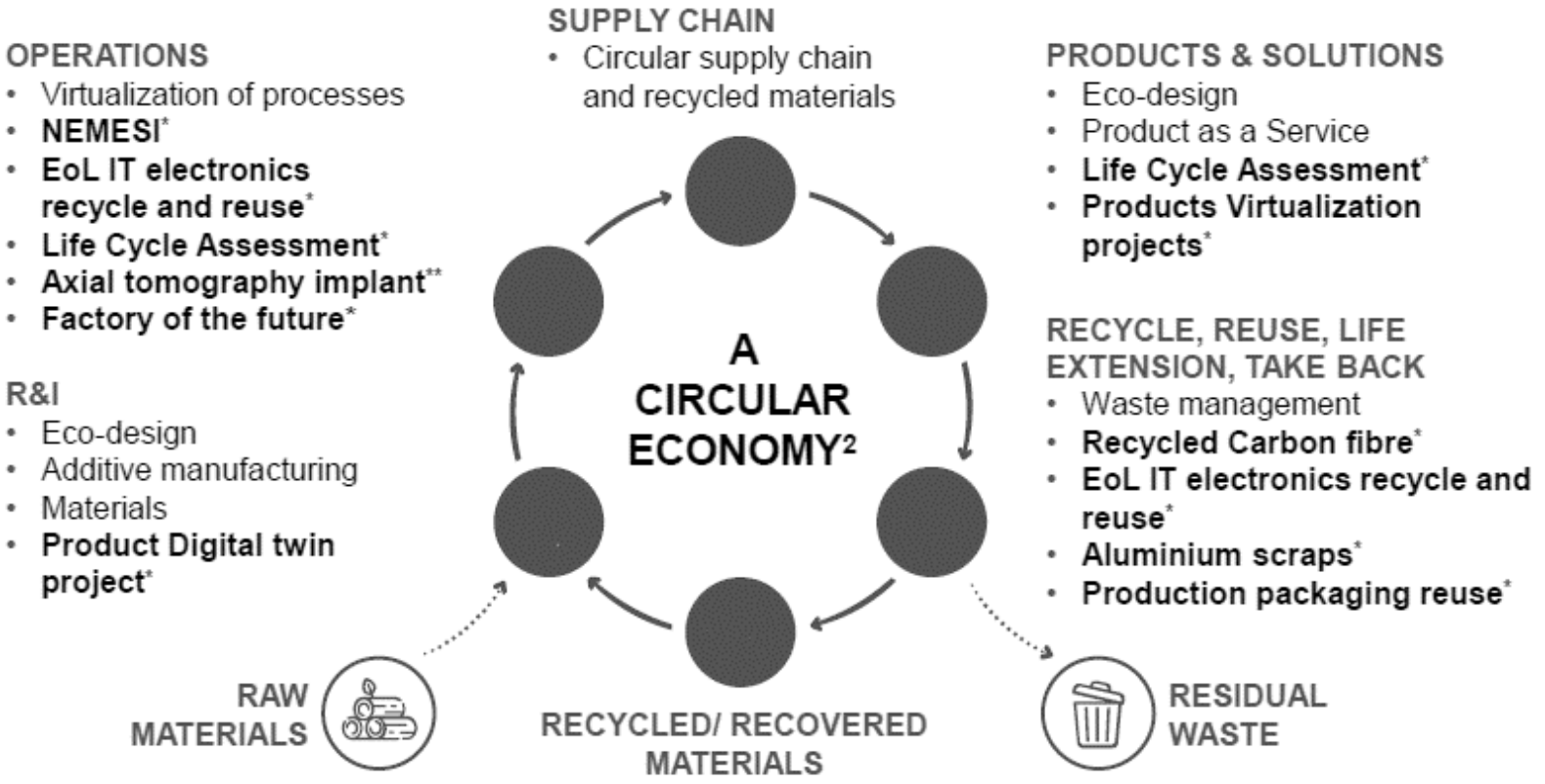
Drivers for «greener» processes – Leonardo role for a sustainable future

Leonardo Space Business Unit seeks at being a landmark, in the space market, for other companies that wish to include the eco-design practices into their own processes.

Additionally, the company aims at embracing such methodology deeper in the internal review procedures, to create the *necessary boost* to spread the *sustainability vision* bottom-up: from operations until top management!

The company goal is to extend this sustainable approach to the whole supply chain, selecting suppliers and partners which adopt the same practices & procedure with a positive impact on the environmental perspective but also on the social one, investing on people, on their skills and training.

This target is an on-going plan that Leonardo wish to carry on and improve in its **Sustainability Plan 2024-2028**, under the definition of ***Circular Economy***.



ANNEX
Who are we?

GUIA PASTORINI

Guia Pastorini holds a PhD in Astronomy and Astrophysics and has been with Leonardo since 2008, specializing in Space. She began as a Verification Engineer and later led the Assembly Integration and Verification discipline for Electro-Optical Payloads. As Project Engineering Manager, Guia oversaw the Lightning Imager Instrument, successfully launched in 2022 from French Guiana. She was responsible for System Engineering Capability and is now Head of the Integrated Industrial Governance Department for Leonardo Space BU.

ELEONORA TRITTO

Eleonora completed her educational path with a master degree in Industrial engineering in Politecnico di Milano. She joined the Leonardo company in July 2023 and she is now part of the Continuous Improvement in Space BU since June 2024.