International Council on Systems Engineering
*A better world through a systems approach*

# Configuration Management as a driver for Sustainability

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# Agenda


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Sustainability and Configuration Management Why? And why not?
Sustainability

# Sustainability

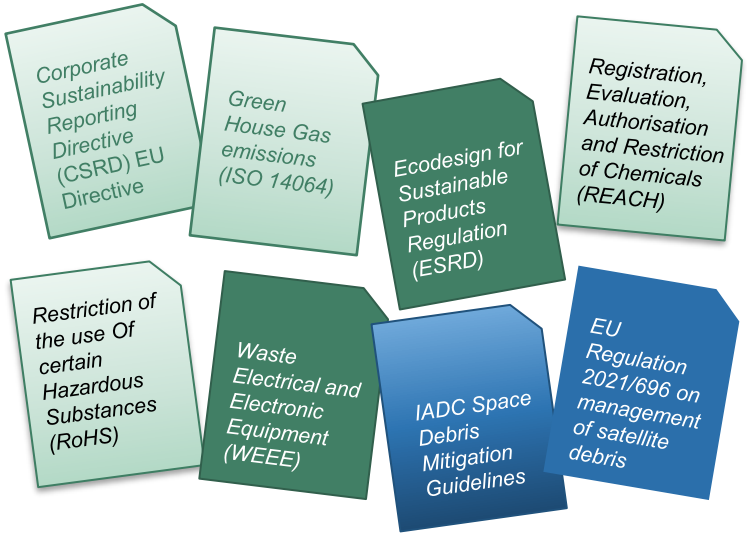
# In today's complex and ever-evolving world, the urgency for sustainability is unmistakable.

Pressures on the environment and natural resources

Increasing number of policies that prioritize sustainability


Global Megatrend 1 in INCOSE SE Vision 2035

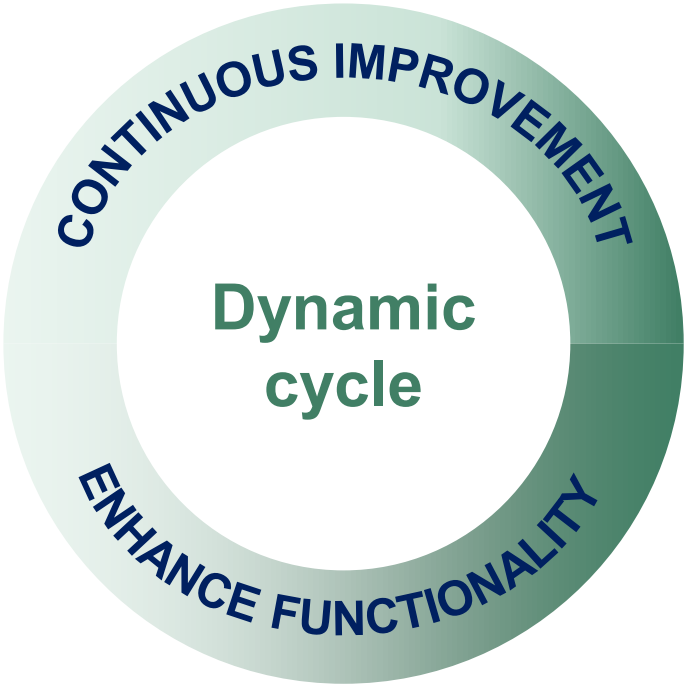
## Sustainability policies increase worldwide




## Our guiding framework


Sustainable Development Goals [United Nations. (2015)]

## The critical question is: how can we effect meaningful change?




while embracing

SUSTAINABLE DESIGN
CIRCULARITY
FRUGALITY

pave the way for a resilient future

# Sustainability and Configuration Management
# Why? And why not?

# Sustainability and Configuration Management, a logical partnership

**Risks**

non-compliance, sanctions, loss of confidence, disruptions, restrictions,…

**Opportunities**

attractivity, influence, confidence, decreased vulnerability in disruptions

**Need to Master**

compliance with regulations,

composition of systems, design and production processes,

interdependencies with the surrounding environment, operating conditions, …

**Configuration Management**

as a **key player** in **enhancing** strategies for **sustainability**

**evolving** to incorporate **sustainability** considerations

**CM tackled challenges**

- Tracked, managed, and optimized system elements
- Unified, adequate and consistent source of data & documentation
- Reliable **traceability**
- Holistic approach to systems, from ideation til retirement.

Created in the 1950s, evolved into a discipline with a **comprehensive framework** of norms and guidelines, as reflected in standards like

- ISO 10007:2017 (ISO, 2017),
- EIA649C (SAE, 2019),
- ECSS-M-ST-40C Rev.1 (European Cooperation for Space Standardization, 2009).

Configuration Management (CM) should serve as a key enhancer through its **5 activities.**

Suitable to offer consistent support for achieving sustainability objectives:

- Integrate sustainable features
- Enhance re-use and circularity
- Manage risks wrt policies
- Provide means for checks and preventive actions.


**'As for the future, your task is not to foresee it, but to enable it'**
**Antoine de Saint Exupéry**

# Configuration Management as an enabler


## All along lifecycle

Plan sustainability requirements and constraints (raw materials, water, energy, circularity…)

Include roles in charge of Sustainability in CM,

Consider checkpoints, indicators, environmental impacts measures, …

Consumption footprint of the industrial ecosystem (incl. PLM/CM tools)

Environmental impacts considered in design and process choices, corresponding information part of CM verifications

CM training including sustainability objectives


Reuse building blocks, design for sustainability (frugality); assess sustainability in change process

Flow down sustainability requirements, considered in CM baselines

Gender equality in CM functions



- Enhance re-usability (foster building blocks, increase granularity)
- Manage constraints
- Guide design decisions with identified critical factors
- Materials traceability
- Manufacturing Process compliance


- Foster pro-active maintenance and obsolescence management
- Assess changes wrt sustainability criteria



- Evaluate compliance with sustainable standards and norms (system, interfaces, enabling systems)


- Assessing environmental impacts and critical sustainability factors for changes
- Assess sustainability break
- Involve sustainability stakeholders



- Enable reports on **compliance** to regulations
- Enhance **visibility** on sustainability measures, features, critical factors


- Enable digital **thread** optimizing CM reports elaboration and dissemination
- Create new reports to **monitor sustainable objectives** with the expected level of **accuracy**


- **Collect and capitalize** sustainable information along the supply chain
- Holistic view of the entire product over full lifecycle



- Verify and audit **sustainable critical factors**
- **Protect** from deploying products that don't comply with sustainable or safety objectives
- Extend practices to consider sustainable objectives, circularity, and end of life

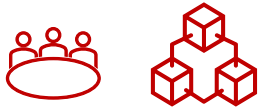

- Incorporate **checkpoints for sustainability**
- Capitalize **lessons learnt** for future products
- Extend practices to consider do-not-harm and recycling objectives

# One real-case example

# One real world example
# The Deepwater Horizon Oil Spill

- **April 2010, Gulf of Mexico**: explosion on the **Deepwater Horizon** offshore drilling platform, followed by a fire and subsequent oil spill
- Resulting of a series of failures and mistakes. Key safety devices were non-operational, and crucial data related to safety were outdated. Several indices indicated improper CM practices.

  - **11 crewmen died**
  - **Inextinguishable fireball visible 40 miles (64 km) away**
  - **Environmental disaster: 1300 miles of shoreline impacted, thousand of marine mammals and sea turtles killed, enduring consequences on coastal communities**



## Identification

- technical documentation not reflecting actual blow-out preventer device configuration

***=> safety device impossible to activate***

## Change Management & Status Accounting

- undisclosed design modifications not thoroughly assessed nor documented

***=> deployed preventive devices not actionable***

***=> delays to evaluate alternative emergency strategies***

## Verification and Audit

- significant gaps in verification processes on critical safety equipment

***=> unactivable or unoperational devices***

***=> compromised human and environmental safety***

## Planning & Management

- missing safety requirements
- inadequate documentation
- lack of verification and audits
- lack of traceability

***=> complex interlinked series of failures or approximations***

# Conclusion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# Configuration Management as an enabler for Sustainability

CM inherent qualities, such as providing a **reliable source of truth** and ensuring traceability, position it as a pivotal supporter allowing for the seamless integration of sustainability constraints and requirements throughout the product life cycle.

Leveraging the ongoing digital transformation will further enhance these efforts, **facilitating collaboration** with Product Lifecycle Management to collectively address shared sustainability challenges.

By strengthening product integrity through robust CM practices, organizations can significantly contribute to **achieving broader SDGs** essential for both industry and society.

This proactive approach will ensure that sustainability becomes ingrained in the very fabric of organizational operations, setting a **benchmark for future practices.**

Ultimately, the commitment of CM professionals to sustainability also fosters a corporate culture that **prioritizes environmental stewardship,** social responsibility, and the long-term viability of resources.

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# Let’s connect


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