

WRAP UP

Clean Space

24/09/2021

FSA UNCLASSIFIED - For FSA Official Use Only



2021 CSID in numbers



90+ Speakers

100+ Presentations

560 Registrations

Ecodesign and Green Technologies

EOL Management

In-Orbit Servicing

Design for Removal



EOL in numbers



8 Sessions 27 Presentations 3 Lectures

50+ Registrations

Various Topics

Space debris mitigation and re-entry safety framework

EoL management current challenges and future solutions

Power and Propulsion Passivation

Controlled re-entry

Demise models

Passive de-orbiting

DIVE guidelines

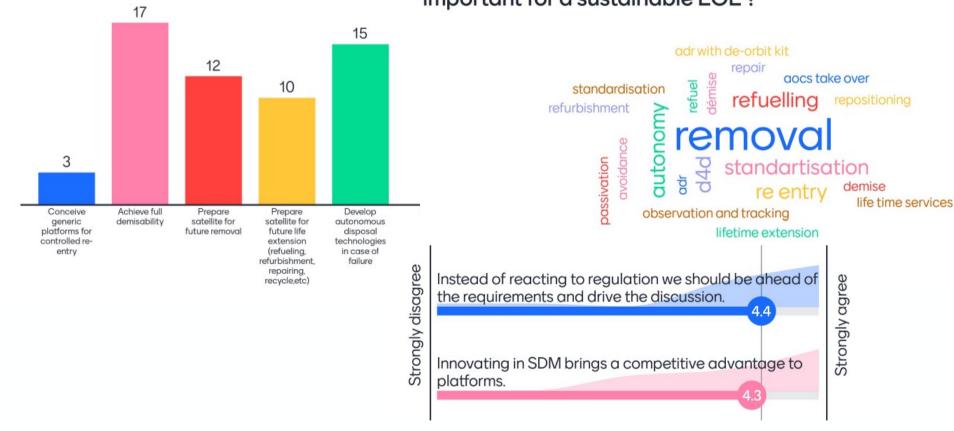
Designing Demisable Spacecrafts

Space Sustainability Rating

EOL viewed by the audience



What should be the priority for EOL management for the future? What type of future servicing do you think is more important for a sustainable EOL?



The EOL CSID in discussion



Optical payload demisability

Integration at design level On-ground testing

Conjoint effort

Exponential debris generation

New constraints

Design for Removal

Passivation

Life extension

Better robustness at low temperature

Passive deorbiting devices

Rotating samples testing

Re-entry experiment

Higher

Competitive '

Opportunity for innovation

Need for a convergence of the tools

reliability

Achieve full demisability

Containment

Uncontrolled vs

controlled

Uncertainties in re-entry analysis

Reduce impact on product lines

Standardisation

Fragmentation process

Increased survivability

Modularity

Robust mode required

Representativeness Generic platforms

Open source I/F

DIVE quidelines Observability

Re-entry tools

Automated disposal

Successful disposal

Detumbling function

System level

Plug and play re-entry

modules

Recurring critical elements

Specific hardware

6







Active debris removal and in-orbit servicing



IOS in numbers



10 Sessions

45+ Presentations

~70 Registrations

In-Orbit Demonstration
Missions for In-Orbit
Servicing

In-Orbit Servicign Missions and Mission Preparation

GNC Technologies for In-Orbit Servicing

Robotic Technologies for In-Orbit Servicing On-Orbit Manufacturing
Assembly and Recycling
Studies

On-orbit manufacturing Technology Developments

Design for removal technologies and implementation

→ THE EUROPEAN SPACE AGENCY

Ecodesign in discussion



significant effort

commercial In-Orbit Servicing Missions

near-term IOS services

the role that IOS plays in support the responsible use of space

Al or neural networks

European

preparation and implementation

inspection support rendezvous

Low-cost IOS In-Orbit
Demonstration missions

key developments on-going

industry

debris removal

3D manufacturing experiment

Documentation harmonisation

long-term

critical

AOCS takeover

capture systems
need to prepare
technologies

standardised guidelines and interfaces for IOS identifying critical IOS technologies

On-Orbit Manufacturing, Assembly and Recycling (OMAR)

System studies

transitioning a circular economy in space





Ecodesign in numbers



10 Sessions

30+ Presentations

~50 Registrations

Environmental Impact of space activities

Communicating on environmental impacts

Methodology and tools

LCA application

Green Technologies

Ecodesign in discussion



Time consuming

In situ data

Cut-Off

Recurrent hotspots

Requirements clearly stated

Awareness

Efficient and transparent reporting

needed Lesson learned from LCA

Customer expectation and internal

motivation

Separated eco-design guidelines

Evolution

Supplier awareness

I evel of details

Top-down and bottom-up approach

Conjoint effort

Documentation harmonisation

Eco-design

Generational topic

Confidentiality

Handbook and

Green Technos

Expertise required

database needed

Prioritisation

Collaboration

Big effort

Uncertainties and need for Better Characterisation

