

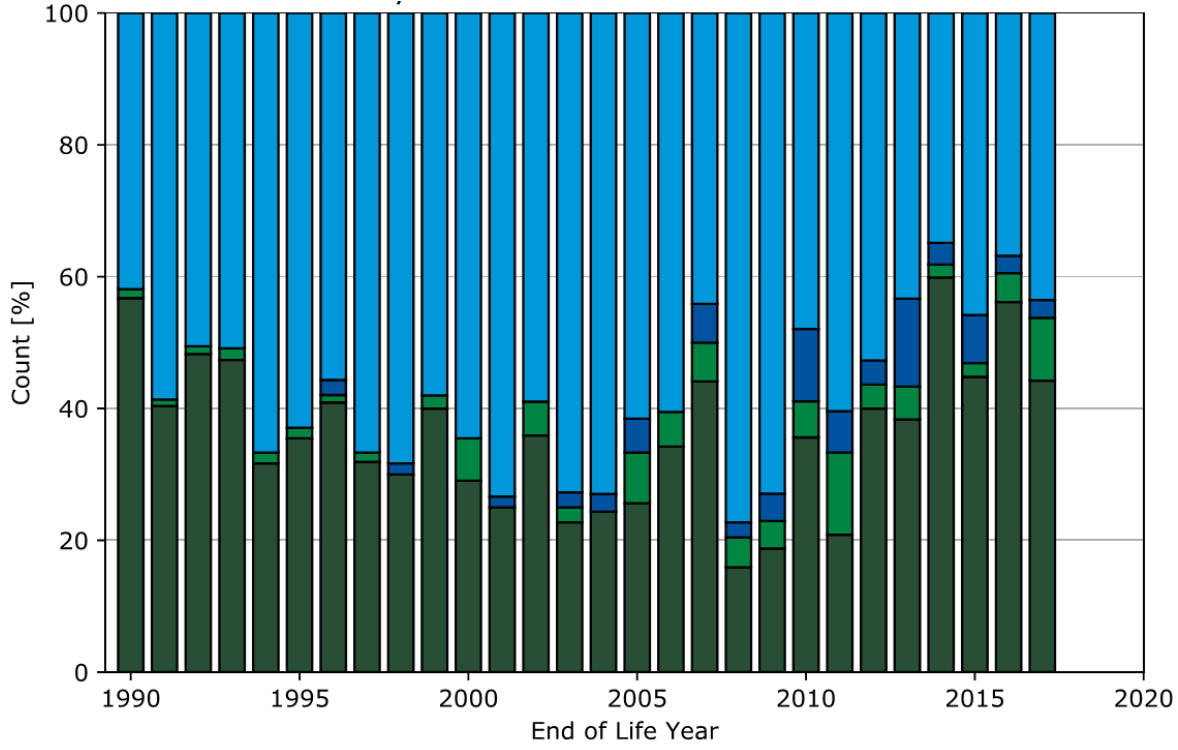


UN/Turkey/APSCO Conference
THEME 1: Promoting responsible, peaceful and safe use of outer space

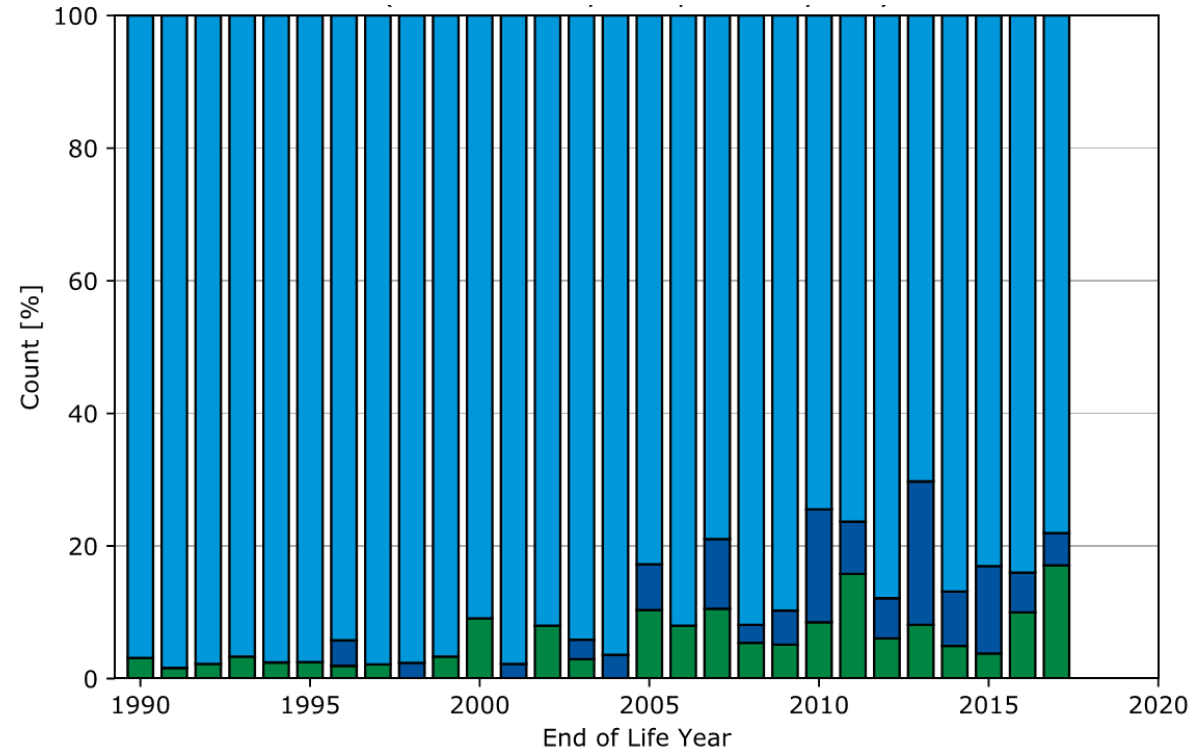
**THE CASE FOR NO WASTE:
AUTONOMOUS DECOMMISSIONING
DEVICES AS A REQUIREMENT
FOR SATELLITES.
AN APPROACH FOR EUROPE**



PAYLOAD CLEARANCE IN LOW EARTH ORBIT

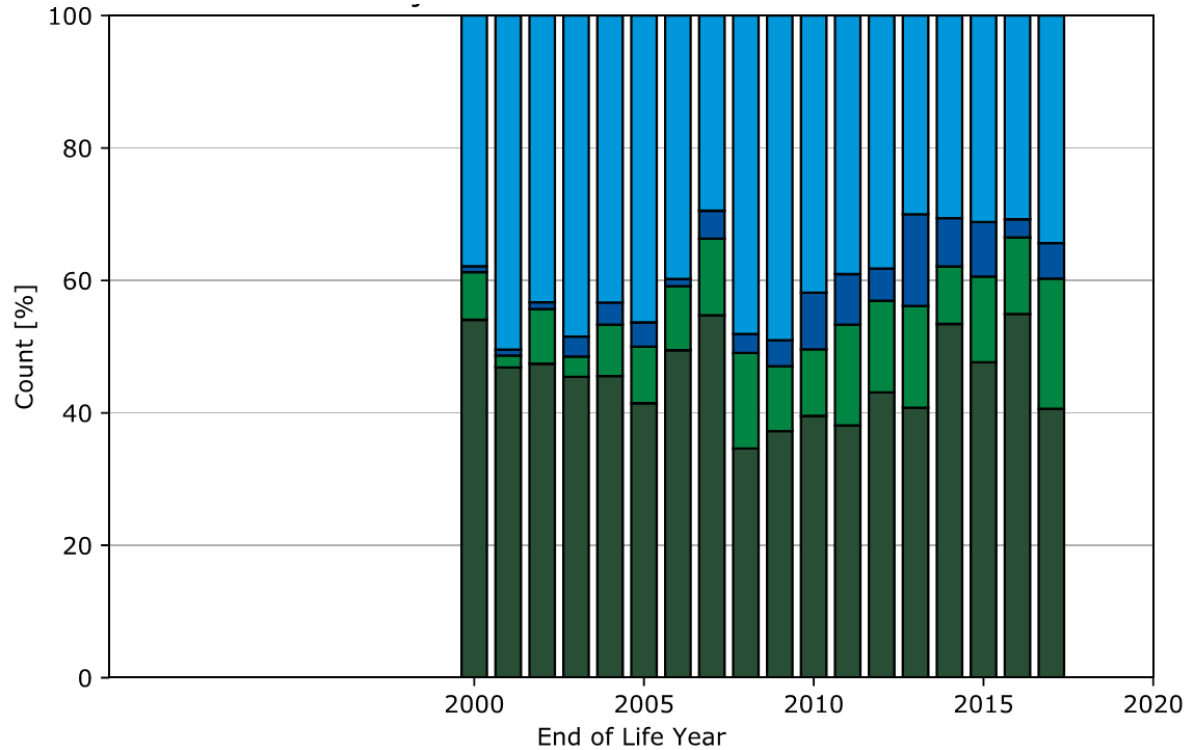


- No Attempt
- Insufficient Attempt
- Successful Attempt
- Naturally Compliant

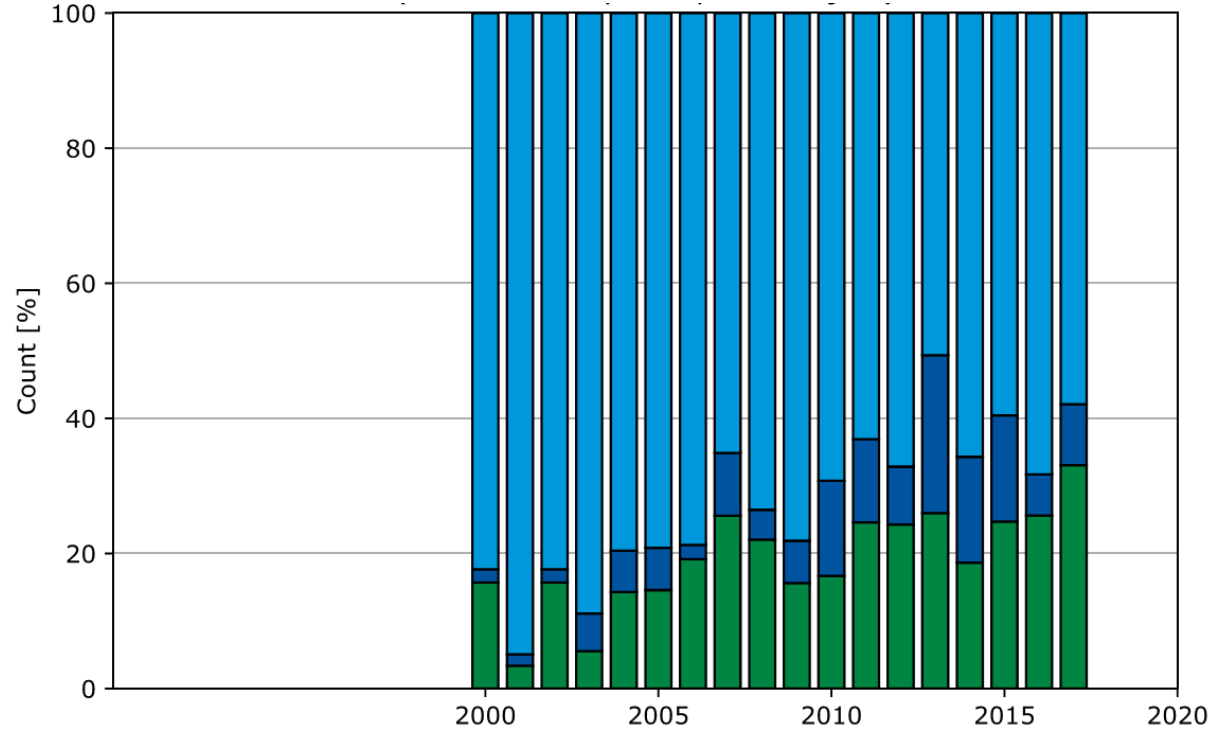


- No Attempt
- Insufficient Attempt
- Successful Attempt

OBJECT CLEARANCE IN LOW EARTH ORBIT



- No Attempt
- Insufficient Attempt
- Successful Attempt
- Naturally Compliant



- No Attempt
- Insufficient Attempt
- Successful Attempt

THE CASE FOR NO WASTE 



TECHNICAL SOLUTION FOR
COMPLIANCE WITH POST-MISSION
DISPOSAL REQUIREMENTS

DECOMMISSIONING SOLUTIONS



- Manoeuvre by **station keeping motors** of a satellite to re-enter into Earth atmosphere or move to a graveyard orbit:
 - **Risk 1:** the fuel allocated to the decommissioning manoeuvre is more profitably used to extend the operational life of a satellite;
 - **Risk 2:** if the satellite malfunctions, the station keeping motors may not work;
 - **Risk 3:** only 60% of the satellite comply with decommissioning regulations, and only 10% of the satellites perform decommissioning manoeuvre.
- **Passive propulsion systems:**
 - **Risk:** not capable of executing a controlled manoeuvre.

DECOMMISSIONING SOLUTIONS



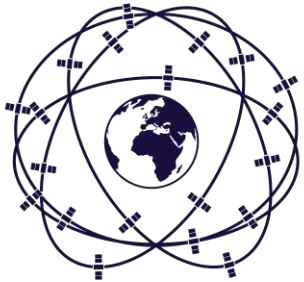
- Manoeuvre by a **dedicated autonomous subsystem** of a satellite to re-enter into Earth atmosphere or move to a graveyard orbit:
 - **Advantage 1:** A system that can perform the de-orbit task without continuous guidance from ground, also if the satellite malfunctions;
 - **Advantage 2:** extremely reduced time of re-entry (within a few hours);
 - **Advantage 3:** the capability to perform an active and controlled re-entry (that is already a requirement for larger satellites).
 - **Risk 1:** current technology capabilities depending on the power of the engine and propulsion used;
 - **Risk 2:** reluctance to implement sustainable practices.

THE CASE FOR NO WASTE 



NEED FOR MANDATORY END-OF-LIFE
DECOMMISSIONING SUBSYSTEMS
FOR SPACE OBJECTS

THE NEED IN A NUTSHELL



- Control and mitigate space debris and associated threats in the context of ever-expanding space activities and increased number of space objects in the near-Earth space;

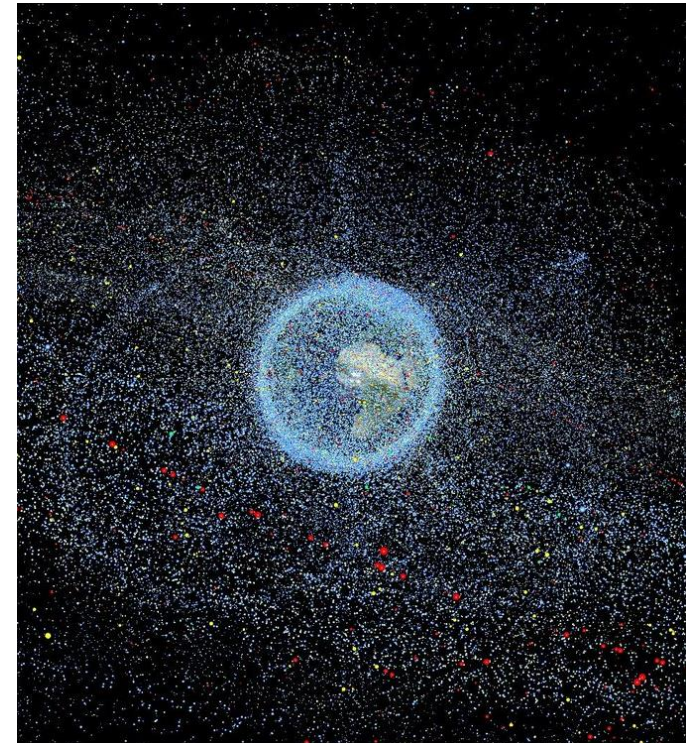


- Meet strategic needs of the European Union for space safety, security and leadership as required by applicable policy and regulatory framework.

CONTROL AND MITIGATE SPACE DEBRIS



- Ensure sustainability of space activities;
- Ensure that near-Earth space does not become as congested as predicted;
- Minimise threats posed by obsolete satellites and space debris in general to the operating spacecraft.



EU STRATEGIC NEEDS



- Sustain **safe and secure space environment** while executing its space programme;
- Integrate **environmental protection requirements** into EU policies and activities;
- Sustain leadership in the area of **combating space debris**
 - including space situational awareness and space surveillance and tracking, complemented by synergies with initiatives of active removal of space debris and passivation measures;
- Increase its **competitiveness** world-wide through support to the European space industry.

THE CASE FOR NO WASTE 



EU LEGAL BASIS

EU REGULATORY BASIS



- Article 189 of the Treaty of Lisbon: EU space policy shall promote scientific and technical progress, industrial competitiveness and the implementation of EU policies;
- Space Strategy for Europe (2016): strategic autonomy in accessing and using space in a secure and safe environment;
- Promotion of various space debris mitigation guidelines;
- Principles of procurement stipulating the obligation to satisfy appropriate social and environmental criteria (included in the EC 2018 Proposal for Space Programme Regulation).

REGULATORY ACTIONS



- **Goal:** reshape operational procedures and manufacturing designs to ensure responsible monitoring and control of space objects to effectively reduce generation of debris.
- **Means:**
 - public procurement mechanisms for space objects with clear and assessable requirements regarding integration of independent and autonomous decommissioning devices in procured satellites;
 - incorporation of such requirements as award criteria in the relevant tendering procedures;
 - evolution of public procurement requirements into industry standards.

THE CASE FOR NO WASTE 



MACRO-LEVEL BENEFITS

BENEFITS



- **For society:** new jobs, technology transfer and spin-offs, continuity of space-based services;



- **For the industry:** development of a new market, competitive position of domestic/regional industry, stimulation and uptake of innovation, reduction of costs of space operations;



- **For Europe:** sustained EU leadership that safeguards the strategic interest in secure and safe environment for outer space activities;



- **For space and for the future:** enhanced environmental performance of satellites; reinforcement of sustainable development goals, *inter alia* by establishing a community realisation that outer space is an environment that must be protected and respected.

CONCLUDING THOUGHTS



- The approach can be useful to space-faring nations who:
 - consider adopting **regulatory steps** to ensure long-term sustainability of space activities they conduct, authorise or supervise;
 - aim at setting up and implementing an effective **space debris mitigation strategy**;
 - wish to act as a facilitator of the uptake of **innovative and sustainable technologies** by introducing procurement mechanisms with requirements to furnish space objects capable of performing controlled and autonomous re-entry manoeuvre at the end of their operational life;
 - recognise **sustainable behavior** of its space actors.



D - O R B I T
N E W S P A C E S O L U T I O N S

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THANK YOU!