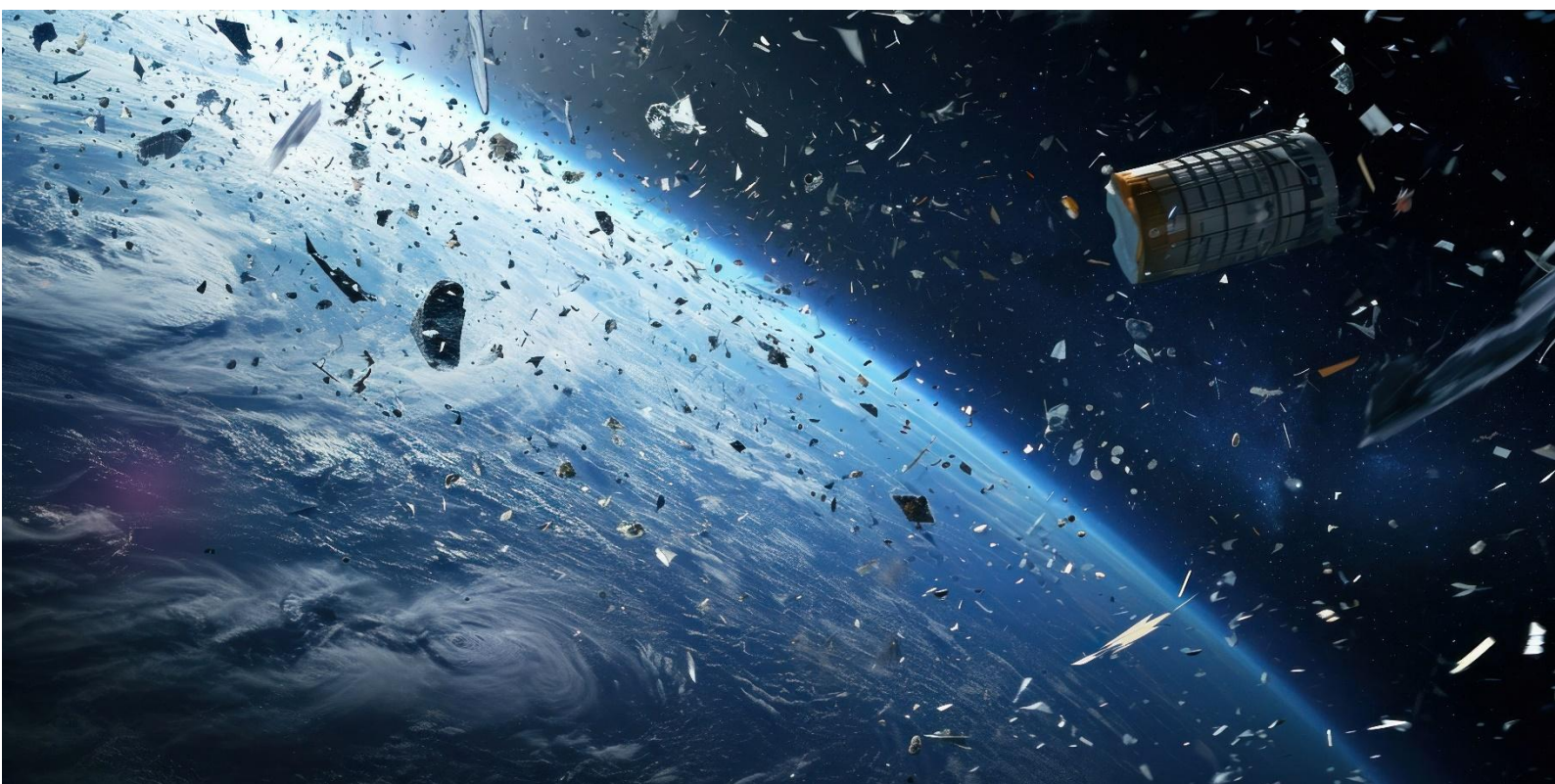


EU media coverage on space debris

A data-driven analysis

2025



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Abstract

The purpose of this document is to illustrate, using text mining techniques, what topics related to space debris are covered by European online media. It intends to provide an overview of the most important news headlines and reporting trends related to this topic. The sources of our analysis include a selection of the most important online media outlets in the 27 Member States.

This report summarises the findings of the analysis on data collected from 1 January 2020 until 9 February 2025.

Key findings:

- Media coverage of space debris: 9,101 articles mentioned space waste, with space debris being the central topic in 2,754 of them. Of these, 126 news items made a reference to legislation, addressing calls for regulation.
- The main reporting countries in the EU are Hungary, followed by Luxembourg, Germany, and Portugal.
- The three most prominent reporting peaks included the International Space Station (ISS) being threatened by debris from a Russian satellite destruction in November 2021; warnings about ISS battery junk potentially falling over Germany in March 2024; and global concerns over Chinese rocket debris falling into the Indian Ocean in May 2021.
- Overall, media reporting was focused on the growing amount of space waste. The main topics in news coverage of space waste included the following key issues: safety threats from debris crashing into homes and villages and risks posed to space operations (such as the ISS requiring evasive manoeuvres). There was a focus on accountability, with scrutiny on actors such as China, SpaceX, and Russia, and on legal actions such as lawsuits against NASA. The media also covered efforts to mitigate space debris, including international initiatives and technological innovations like AI, lasers, and new satellite materials. Additionally, there were growing calls from astronomers and stakeholders for international legislation addressing the increasing risks of collisions and uncontrolled re-entries due to continued satellite launches and replacements.
- The overall sentiment for news related to space debris was negative, with 47.8% of the articles having a negative tone, compared to 8.1% positively classified articles. The media framed the topic in terms of *Resources and Security*, with a focus on the values of *Universalism* (well-being of all people and the planet) and *Security*, emphasising the urgency and risks rather than the legal implications.
- Elon Musk, CEO of SpaceX, was the most frequently mentioned person in the media (14.3% of articles) amidst criticism that the company's satellite Starlink generates space waste.
- The lack of comprehensive international regulations was highlighted in the media, showing the need for strong global cooperation and governance. While some efforts are underway, media coverage indicates the necessity for more decisive action to ensure space sustainability.

The findings of this report emphasise the importance of intervention by policymakers around space waste and demonstrates that text mining can provide valuable insights into media discourse on space debris. This report supports media analysts, communication experts, and policymakers in developing informed communication strategies and assessing the impact of EU communications on media narratives.

Introduction

This science media intelligence report is part of the joint publication series by the European Science-Media Hub (ESMH) and the Joint Research Centre's (JRC) Text and Data Mining Unit. This series covers a wide range of scientific topics relevant to the work of the European Parliament's Panel for the Future of Science and Technology (STOA). In this report, the focus lies on space debris, i.e. all non-functional, man-made objects in orbit [[esa.int](https://www.esa.int)], ranging from small fragments to large pieces of wreckage.

In recent years, the realm of outer space has witnessed an unprecedented surge in activity, marked by the burgeoning presence of both international organisations and private enterprises such as SpaceX, OneWeb, and Blue Origin. This expansion is driven by advancements in technology, declining costs of satellite launches, and an insatiable quest for connectivity and exploration. Global internet access initiatives, such as those offered by the aforementioned companies, promise to connect isolated regions and enhance digital transformation worldwide. However, the rapid growth of space activities has highlighted significant challenges concerning space sustainability, notably space debris.

The number of active satellites orbiting Earth has skyrocketed in recent years. This proliferation is not solely driven by the need to enhance global communications or Earth observation capabilities, but also by a desire to demonstrate technological advancements and unlock new economic opportunities. Yet, this progress comes with a cost, including an increasing risk of collisions, and contributes to the growing problem of space waste.

The absence of comprehensive regulatory frameworks governing space activities has led to a situation where the risks associated with space debris are escalating. Defunct satellites, spent rocket stages, and fragments from collisions contribute to a growing cloud of debris, posing a threat to both existing and future missions. The potential for collisions increases as more objects are launched, endangering critical infrastructure and even human lives on manned missions. This endangers not only the sustainability of space operations but also the long-term viability of space as a shared resource.

The challenge of managing space pollution is made worse by the fact that space is a global commons, requiring cooperative international governance to ensure its sustainable use. Current efforts to address these issues, though commendable, remain fragmented and insufficient. For this reason, the European Council has called for a European approach to space traffic management [consilium.europa.eu, [heise.de](https://www.heise.de)]. The need for collective action and robust regulatory measures has never been more urgent. [[Van Woensel et al.](#)]

In this context, media monitoring becomes a very valuable tool. It makes it possible to track and analyse the discourse surrounding space sustainability, providing insights into the information and narratives that citizens are exposed to. Understanding this media landscape is crucial, as public perception and awareness can significantly influence policymaking and drive collective action. In this new era of space exploration, providing the public with clear and complete information is necessary to promote informed discussions and encourage responsible management of shared space resources.

The purpose of this report is thus to monitor how the European online media has covered space debris so far. This report illustrates the main topics and events that stood out in EU media and reporting trends and peaks.

The analysis was conducted on online articles published by European online media between 1 January 2020 and 9 February 2025. To identify the most relevant topics, an automated topic-clustering algorithm was used to identify the main events and narratives appearing in the media. The data was collected by the Europe Media Monitor (EMM) on a selection of the most popular online media sources in the 27 EU Member States, including 581 media outlets from all Member States.¹

For a detailed description of the methodology and applied techniques, please refer to the Annexes.

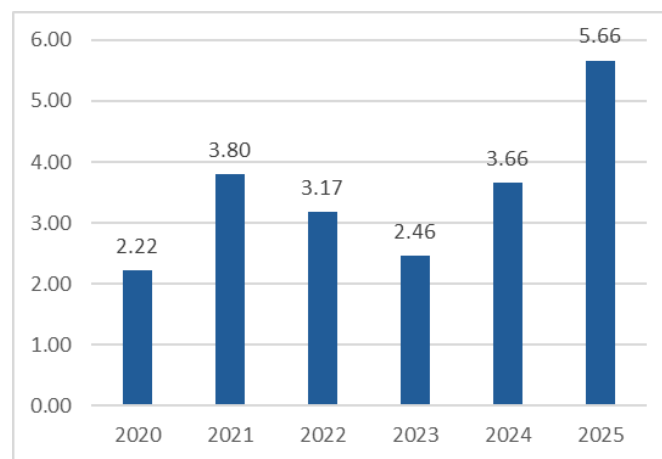
¹ The number of sources was weighted based on the countries' population.

1. Reporting trends and peaks

This section provides an overview of the volume of media reporting on space debris. In total, over the time period considered, 9,101 articles mentioning space debris were retrieved. The media puts particular focus on the topic in at least 2,754 articles (relevant keywords found in the title or in the first 300 characters of the article). Of these, 126 news items made direct reference to legislation.

Figure 1 underlines that the topic of space debris has gained attention over the years, with some fluctuations. After the lowest point in 2020, when it accounted for a ratio of 2:100,000 articles, the issue has gained more traction in the media landscape. The proportion had almost tripled by early 2025, indicating a growing focus on the issue and a rising awareness of its importance.

Figure 1 Proportion of news on space debris in 100,000 online media articles



Source: EMM "EE24campaign" index. Period: 01-01-2020 to 09-02-2025. (Query 1, total: 9,101).

Figure 2 displays the weekly total number of articles that contain keywords related to the concept of 'space waste' (see Query 1 described in the Data selection of the Appendix). The reporting trend exhibits periodic spikes, suggesting that certain events related to space debris led to significant attention in the media. The reporting peaks are related to the impact of space junk on orbital activities, to risks and impacts on Earth, and to space debris mitigation measures.

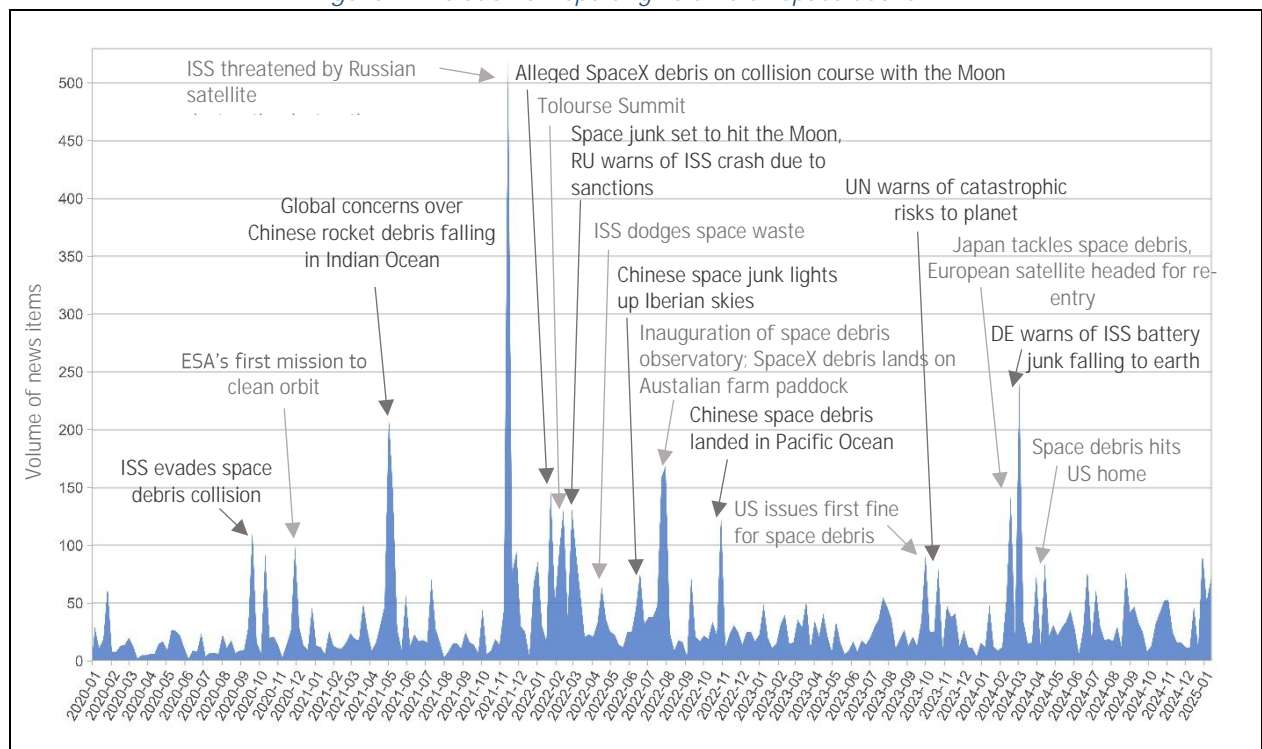
The significant reporting peaks standing out in Figure 2 relate to the following news:

- In September 2020, space debris forced astronauts on the International Space Station (ISS) to take precautionary measures. [\[hbl.f\]](#) According to NASA's calculations, the space debris of unknown origin would have missed the space station by kilometres but they decided to modify the orbit of the ISS as a precaution. [\[hirado.hu\]](#)
- In December 2020, the European Space Agency (ESA) launched its first mission to clean up space debris, having signed a contract with the Swiss company ClearSpace. [\[zpravy.aktualne.cz\]](#), [t-online.de](#), [infostart.hu\]](#)
- In May 2021, Chinese rocket debris re-entered Earth's atmosphere and landed in the Indian Ocean near the Maldives. The uncontrolled descent, which drew global concern and criticism, especially from NASA, highlighted the uncertainties in predicting debris impact locations and the need for better space debris management. Although China claimed that most of the rocket would burn up and the likelihood of damage was low, the incident sparked international discussions on improving space debris regulations and the responsibilities of space-faring nations. [\[derstandard.at\]](#), [hs.fi](#), [cmjornal.pt\]](#)
- In November 2021, Russia was accused of putting the ISS in danger after destroying one of its satellites with a missile, causing a massive amount of space debris. The US, NATO, and other

countries have condemned Russia's actions as "irresponsible" and "dangerous" [ekstrabladet.dk]. The ISS astronauts were forced to take shelter due to the debris, which posed a significant threat to the space station. Russia has denied any wrongdoing and claims that the debris was not a result of their actions. The incident sparked a new wave of tension between Russia and the US, with the latter accusing the former of violating space security protocols. The US also warned that Russia's actions could lead to a "catastrophic" risk to the ISS and future space missions. The incident sparked fears of a new space race reminiscent of the Cold War and raised concerns about the security of space exploration.

- In January 2022, space debris allegedly from a SpaceX rocket was set to collide with the Moon, raising concerns over increasing space junk, its potential consequences on celestial bodies, and the unpredictable nature of space debris in Earth's orbit. Later, in March 2022, it was suggested that the waste was actually part of a Chinese rocket that eventually collided with the Moon's far side. The incident underscores the need for better tracking and management of space debris to prevent unintended consequences in space exploration. [elcorreo.com, glastistre.hr]
- In February 2022, EU ministers responsible for space affairs outlined the EU's ambitions in space, focusing on secure satellite communications and space debris management during the Toulouse Summit. [esa.int]
- In March 2022, Dmitry Rogozin, who was head of the Russian space agency Roscosmos at the time, called for the removal of Western sanctions imposed on Russia due to the invasion of Ukraine, citing their impact on the operation of Russian spacecraft that supply the ISS. This disruption could affect the Russian segment of the station, which is crucial for maintaining the station's orbit. Rogozin emphasised the potential risks to global space collaboration and the safety of the ISS, should the current restrictions remain in place. [libertatea.ro]
- In August 2022, debris from a SpaceX Crew Dragon cargo ship crashed in Australia. A farmer was reported to have found a piece of space junk from the ship on his property after hearing a loud bang. [stirileprotv.ro, 20minutes.fr]

Figure 2 Evolution of reporting volume on space debris



Source: EMM "EE24campaign" index. Period: 01-01-2020 to 09-02-2025. Weekly total of news (Query 1).

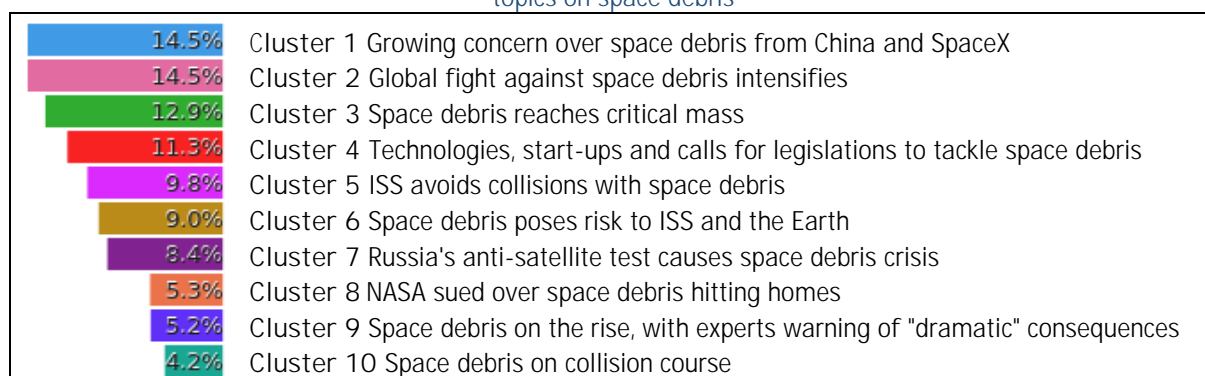
- In November 2022, Chinese rocket debris re-entered Earth's atmosphere uncontrollably, causing widespread concern and temporary airspace closures in Spain and other regions.
- In October 2023, the US Federal Communications Commission (FCC) was reported to have imposed a fine of USD 150,000 on the satellite operator Dish for failing to properly shut down the EchoStar-7 satellite. This historic penalty marks a significant step forward in regulating space waste and promoting responsible satellite operations. [[vz.lt](#), [hvg.hu](#), [fanpage.it](#)] Moreover, the *UN Interconnected Disaster Risks Report [UNU EHS]* was in the headlines, warning of six catastrophic planetary risks, including space debris, considered by researchers as potential irreversible tipping points. The report emphasised the urgency of addressing these issues before critical thresholds are reached. [[ansa.it](#), [rtp.pt](#), [lessentiel.lu](#)]
- In February 2024, the European satellite ERS-2, launched in 1995, was set to re-enter Earth's atmosphere after nearly 30 years in space. The two-ton satellite, expected to largely disintegrate upon re-entry, posed minimal risk to populated areas. Its mission ended 13 years ago.
- In March 2024, a battery from the ISS re-entered Earth's atmosphere and it was announced that it would hit Germany, affecting a 35-kilometer-wide corridor [[merkur.de](#)]. The space junk was visible in the sky as a streak of stars and caused excitement and concern among the population. Authorities warned the public not to touch any debris, while experts estimated a low risk of danger. The incident raised questions about who is responsible for cleaning up space junk and who will bear the costs of any damage caused. Eventually, the space debris crashed over the Atlantic Ocean [[derstandard.at](#)].
Additionally, the media picked up on ESA's *Space Environment Report* from 2022 [[esa.int](#)], addressing 30,000 pieces of space debris – objects exceeding a centimetre in length wandering uncontrollably in our space surroundings – recorded in orbit and estimating the real number of objects to be over one million. [[abc.es](#), [rr.pt](#)]
- In April 2024, a piece of space debris from the ISS crashed through the roof of a house in Florida, causing significant damage and almost hitting the family's son. NASA confirmed the origin of the debris, which was not destroyed upon re-entry into Earth's atmosphere. The incident raised concerns about the risks of space debris collisions. [[mediafax.ro](#), [aftonbladet.se](#), [zdf.de](#)]

2. Main reported topics

This section presents the main topics related to space debris, covered by European online media. The topics have been identified by grouping the articles based on their titles' semantic similarity.² This technique allows to highlight debates on topics from various perspectives and to identify aspects that were relevant over a few weeks rather than peaking on specific dates only, which might therefore not stand out as single peaks in the time series described above.

Figure 3 offers a general overview of the topics' portrayal in the media, from largest to smallest volume of articles.

Figure 3. Volume (percentage of clustered articles) and most frequent keywords for the top 10 reported topics on space debris



Source: EMM "EE24campaign" index. Period: 01-01-2020 to 09-02-2025. (Query 2).

Note: Clustering was performed on headlines. Headlines that are not similar to any of the groups are not considered in the distribution across topics (Clustered: 2,327, Total: 2,754). Similarity also includes the similar length of titles and mentions of names.

We could identify the following six themes across the clusters. For each theme, we provide headlines to underline the angle taken in each cluster.³

1. Increasing amount of space waste and associated risks
2. Alerts and incidents of space debris, posing a threat to human safety
3. Collisions of satellites and danger to space travel
4. Polluting actors and responsibility of cleaning up space debris
5. International efforts and new technologies to combat space debris
6. Astronomers and other stakeholders demanding international legislation to address these issue

First, concerns about the increasing pollution in space are highlighted in nearly all relevant news articles. The accumulation of space debris around Earth is increasing, with over 30,000 objects in orbit. This increases the risk of collision and damage to astronauts and operational satellites as well as an increase in uncontrolled re-entries in the atmosphere posing a danger for inhabitants of Earth. On top of this, media has picked up the UN identifying space waste as one of six major risk tipping points which can have irreversible catastrophic effects, stressing the urgency of addressing space debris. Due to the increasing amount and the enormous speed of debris pieces, collisions not only with operational satellites but also with other waste are more likely. Due to the enormous speed, collisions of small debris can break them into even smaller pieces This could lead to a chain reaction, spreading space and light polluting space as well as destroying the satellite infrastructure for space and

² 2,327 articles could be grouped into clusters based on semantic similarity (equal to 84.5% of the full dataset, represented by 2,754 single articles). The computed clusters provide a comprehensive overview of the main topics discussed regarding space debris.

³ All headlines provided in this report have been automatically translated into English.

climate monitoring. Additionally, launching satellites would become more difficult, leading to a halt of human activities in space (see cluster 9).

- “Danger from space? How Much Space Debris Orbits Earth” [[tz.de](#)]
- “Space debris falls will become more frequent” [[vesti.bg](#)]
- “Space - the new garbage dump?” [[sueddeutsche.de](#)]
- “The problem of space debris is getting worse” [[postimees.ee](#)]
- “From extinctions to heat, six dangers for the future of the planet” [[ansa.it](#)]
- “UN University report warns of six threats to human life” [[rtp.pt](#)]

Box 1. Low media attention on the potential impacts on Earth's climate

Beyond the increasing number of satellites and growing pollution, only a few news articles report in detail that scientists caution that the rising number of satellites could lead to metal particles contaminating many sulfuric acid droplets in the stratosphere. These particles might affect cloud formation and weather patterns, but their true impact on the climate is still largely unknown—raising concerns among researchers [[sat1.de](#)].

Source: EMM “EE24campaign” index. Period: 01-01-2020 to 09-02-2025.

Second, the majority of news reporting focused on alerts and actual incidents of space debris crashing into homes, villages, and other locations posing a threat to human safety across the globe (see clusters 1, 6, and 8):

- “Chinese space debris lights up Spain’s sky as it enters the atmosphere” [[antena3.com](#)]
- “SpaceX space debris on Canadian farms” [[deutschlandfunk.de](#)]
- “A mysterious phenomenon over Warsaw. A “fireball” appeared in the sky. What was it?” [[onet.pl](#)]
- “A 500-kilogramme metal ring fell from space on a village in Kenya, fortunately no one was injured” [[24hod.sk](#)]

Third, the media highlighted collisions of satellites and threats to space travel, such as the risks posed to the ISS, which had to perform evasive manoeuvres to avoid collisions with space debris (see clusters 5 to 7, and 10):

- “Space junk damages the arm of the International Space Station” [[sapo.pt](#)]
- “Space: the ISS had to manoeuvre to avoid a cloud of space debris” [[tf1info.fr](#)]

Fourth, media coverage drew attention to the polluting actors on the one hand, and the question of responsibility to clean up space debris on the other hand. The Chinese space programme and SpaceX are often mentioned (cluster 1), as well as Russia’s anti-satellite test putting the ISS at risk (cluster 7). NASA made headlines for being sued by a US family seeking compensation after ISS debris hit their home and almost hit their son (see cluster 8):

- “Village in Kenya hit by space debris – search for owner continues” [[merkur.de](#)]
- “Space war: ASAT can ruin everyone for a thousand years, an idiotic military order is enough” [[blikk.hu](#)]
- “US family sues Nasa for 75,000 euros for damage caused by space debris” [[focus.de](#)]

Fifth, efforts to clean up Earth's orbit were reported. Media covered international efforts to combat space debris (see cluster 4). Technologies like AI models, lasers, magnets, and inflatable bags are being developed to detect, track, and remove space junk. Wooden satellites are being tested to minimise pollution, as they would burn up upon re-entering the atmosphere without releasing

harmful substances and would not leave debris falling to Earth. The European Space Agency has signed contracts with companies like ClearSpace to clean up space debris, and some companies are facing fines for littering in space. However, the media highlighted that more needs to be done to tackle the issue and ensure the long-term sustainability of human activities in space.

- “Scientists want to use a laser beam to bring space debris down from the sky” [teadus.postimees.ee]
- “Start-up wants to become the traffic information service of space to avoid collisions in the great orbital traffic jam” [20minutes.fr]
- “Clean-up in space: ClearSpace-1 to remove space debris” [swr.de]
- “Koblenz as a space city: Radar system searches for debris in space” [welt.de]
- “Space debris: This is how Great Britain wants to clean up in space” [morgenpost.de]
- “A new telescope at the Côte d’Azur Observatory spots satellite debris 36,000 kilometres in the sky” [francetvinfo.fr]
- “Why Japan wants to send a wooden satellite into space” [morgenpost.de]

Sixth, as space agencies and companies continue to launch satellites and other objects into space, the risk of collisions and uncontrolled re-entries escalates. This was highlighted in the media, with astronomers and other stakeholders demanding international legislation to address these issues (see cluster 4).

Box 2. Low media coverage on the legal discussion regarding space debris

Only 126 news items made an explicit reference to legislation in the title or text (see Query 3 in the [Data selection](#) of the Annex).

The legal considerations surrounding space waste primarily flagged the need for international regulations to manage and mitigate the risks associated with debris in Earth’s orbit. Several articles highlighted the urgency, describing space like the “Wild West” [sueddeutsche.de], and recognising the “lawless” nature of space [publico.es].

- “UN calls for voluntary guidelines for space debris” [orf.at]
- “We need international regulations on space debris” [la-croix.com]
- “Combatting and regulating debris in space” [24ur.com]
- “Binding rules are needed” – OHB warns of space debris” [bild.de]
- “Danger in space – The lack of regulation of space debris” [tageblatt.lu]

The European Union is actively working on space legislation, with discussions around a potential law focused on space debris management and the protection of space assets.

- “According to an ESA survey Europeans want a strong space policy” [paperjam.lu]
- “EU Space Law: European Commission official unveils cyber aspects of legislation” [euractiv.fr]

Some countries were reported to be addressing the problem at a national level, discussing national legislation to regulate space activities more effectively.

- In Germany, the “Federal Cabinet adopts key points for a space law”. “The law⁴ is intended to regulate technical questions such as approval procedures and liabilities of civil (operational) safety of space activities and launch facilities and thus make a significant contribution to the prevention of space debris, the Ministry of Economics announced”. [rp-online.de]

⁴ <https://www.bundesregierung.de/breg-de/aktuelles/bundesregierung-beschliesst-weltraumgesetz-2306100>

- Also Italy showed efforts to develop comprehensive space laws in line with the planned European Space Act, "Tabacci: G20, Italy works for a new law on space" [[askanews.it](https://www.askanews.it)] and "Space, Urso: framework law on the Space Economy in manoeuvre" [finanza.repubblica.it]
- The US Federal Communications Commission (FCC) said NASA's 1990 guidelines should be changed and the 25-year wreck period should be reduced to 5 years in the future. This would require US satellite operators and companies seeking to enter the US market to get rid of their non-functioning satellites as soon as possible. [[24.hu](https://www.24.hu)]

These headlines illustrate the ongoing political and legal efforts at both national and international levels to address the challenges posed by space waste, highlighting the need for comprehensive and coordinated legal frameworks.

Source: EMM "EE24campaign" index. Period: 01-01-2020 to 09-02-2025.

3. Sentiment, values, framing and most reported persons in the top 10 topics

In addition to the content analysis, algorithms were applied for sentiment classification as well as for detection of persons and basic human values (for details see the Methodology in the Annex). Figure 4 presents the overall reporting tonality for the ten main clusters, based on this automated analysis.

The predominant sentiment of the articles on space waste was negative (with 47.8% negative and only 8.1% positive news items), i.e. the topic was introduced with negatively connoted headlines to the reader, stressing the risks and damages posed by space debris.

The most mentioned persons were:

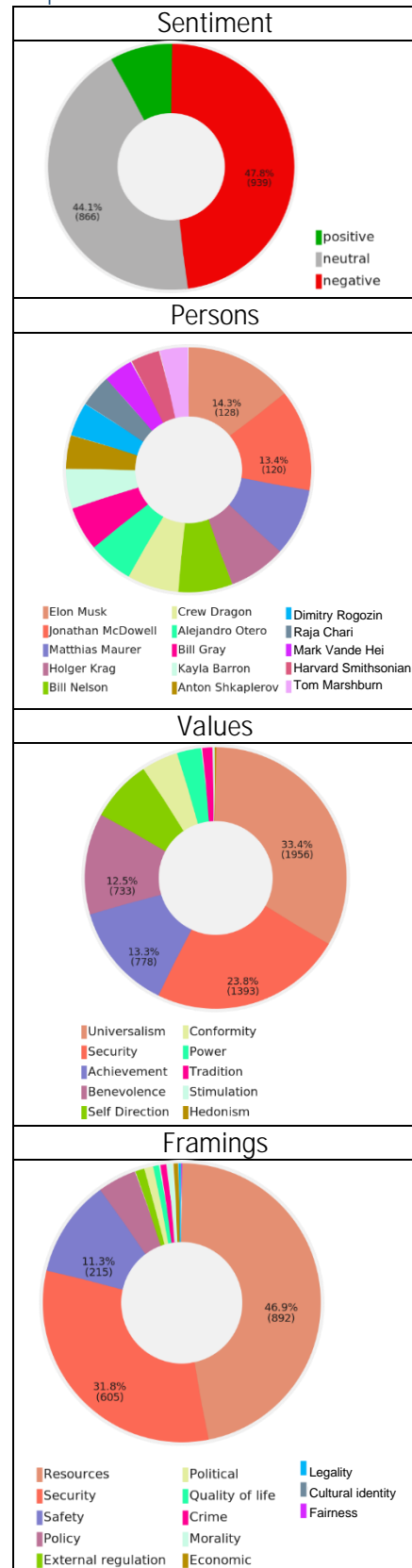
- SpaceX CEO Elon Musk (14.3%), as the company was criticised for generating space waste, without any concrete measures to combat pollution.
- The British-American astronomer and astrophysicist Jonathan McDowell (13.4%) as he commented on the risks and challenges associated with space debris and offered insights into the tracking and mitigation of these objects.
- German ESA astronaut and materials scientist Matthias Maurer (8.9%) was frequently mentioned regarding taking refuge on the ISS due to collision risks with space debris. Media picked up his quote, stressing that “It is therefore very important that the space companies dispose of everything as safely as possible”.[\[krone.at\]](https://www.krone.at)

Regarding basic human values, which refer to desirable goals that motivate action, the expressions of *UNIVERSALISM*, *SECURITY*, *ACHIEVEMENT*, and *BENEVOLENCE* were the most frequent values.

- The prominence of *UNIVERSALISM* (33.4%) and *BENEVOLENCE* (12.5%) implies that the reporting on space waste conveys concerns for the well-being of all – with the aim to avoid any damage to space travellers and earth inhabitants – and a commitment to justice – making polluters responsible for space debris and its mitigation.
- *SECURITY*, the second most prevalent value (23.8%), underscores that safety and health were addressed, with space debris portrayed as posing risks in space but also to Earth.
- The high score for *ACHIEVEMENT* (13.3%) could reflect the efforts to develop techniques for space cleaning.

Regarding the framing, which refers to the perspective from which an issue is presented, *RESOURCES* and *SECURITY* scored

Figure 4. Reporting tonality for the top 10 clusters



Source: EMM “EE24campaign” index. Period: 01-01-2020 to 09-02-2025.

the highest, underlining that the articles were focused on the impact on satellite resources and space activities, and on the concern for safety both in space and on Earth. The limited POLICY and POLITICAL framings suggest that the perspective of the media is not (yet) on the legal and regulatory solutions but predominantly portrays on the immediate concerns of space debris and its impact on travel and human life on Earth.

4. Country comparison

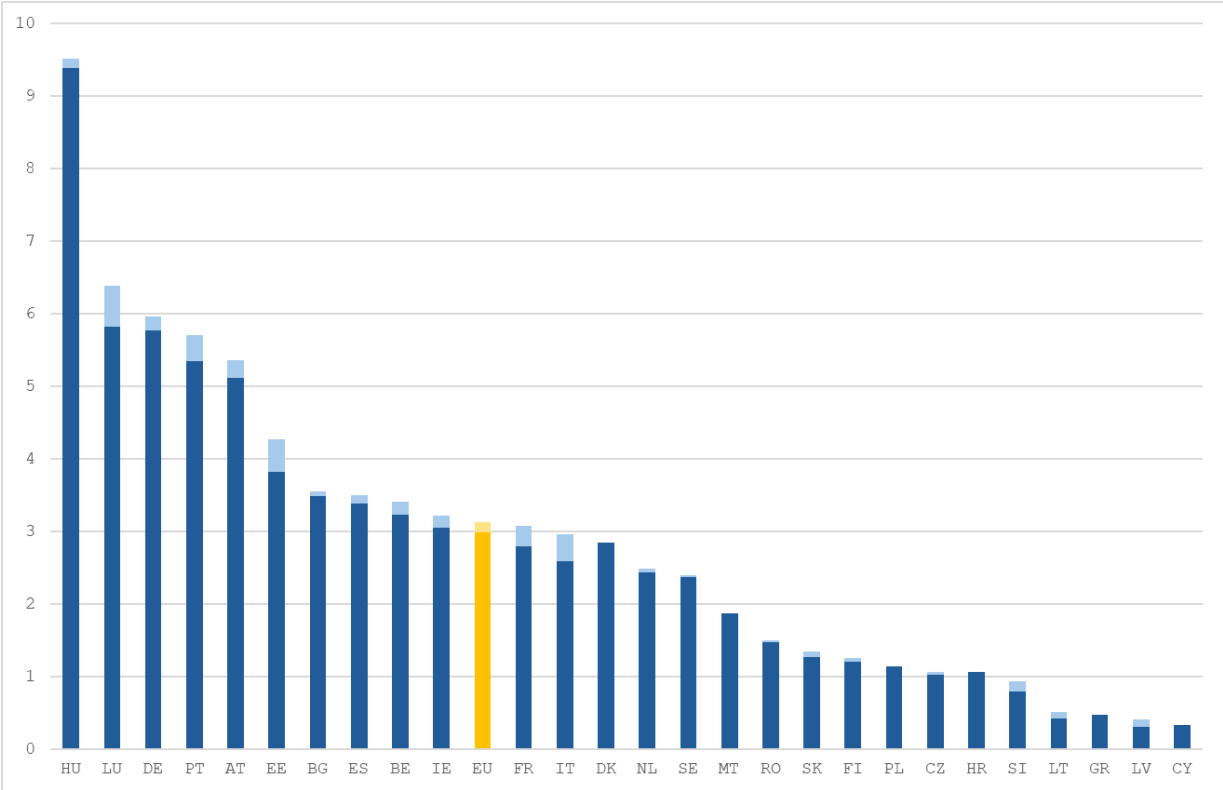
Figure 5 compares the media attention to space debris with the overall reporting volume in the EU and its 27 Member States. While the topic was mentioned in approximately 3 out of every 100,000 articles within the EU media landscape, the largest proportion of media coverage was found in Hungary with a ratio of 9:100,000 articles, followed by Luxembourg, Germany, Portugal (each 6:100,000) and Austria (5:100,000). The topic achieved the smallest shares of reporting in Cypriot, Latvian, and Greek media (each less than 0.5:100,000). Articles explicitly mentioning legislation are rare, with a ratio of 0.2:100,000 articles in EU online news. Despite the low volumes, such articles achieved the largest proportion in Luxembourg (0.5:100,000).

Regarding countries with heightened media interest in space debris, Hungary and Luxembourg had a significant share of negative news, with 60.8% and 55.9% respectively. In contrast, neutral sentiment prevailed in Germany (neutral: 64.9%, negative 31.5%), Portugal (neutral: 50.8%, negative: 33.5%), and Austria (neutral: 61%, negative: 33.3%).

More than 60% of the articles were also negatively connoted in Slovenia, Denmark, Czechia, Poland, Sweden, and Cyprus.

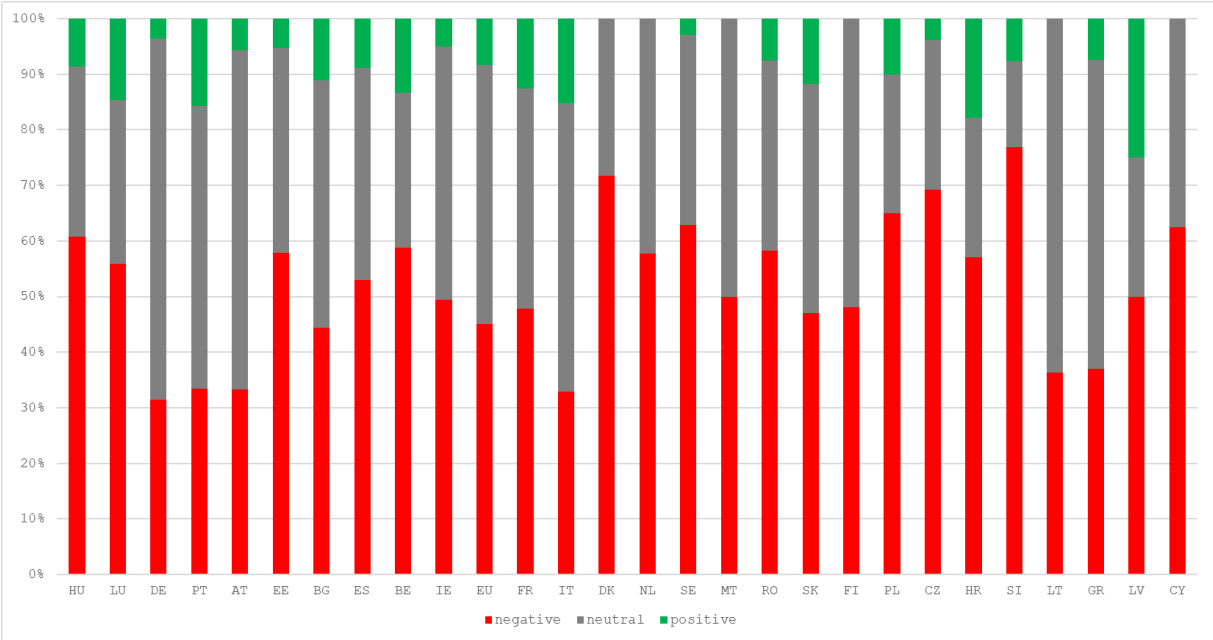
The countries with the highest positive share were Latvia (25%) and Croatia (17.9%), followed by Portugal (15.7%) and Italy (15.2%). These shares of positive reporting overall are low, with negative and neutral headlines dominating the media coverage in these countries, except for Latvia where the positive share equals the neutral share, although negative headlines still account for half of the coverage. Overall, positive headlines revolved around ESA's first mission to remove space junk from Earth's orbit and that several countries and companies are working together to develop technologies to reduce space debris. Portuguese start-ups and researchers were reported to be at the forefront of the European programme to screen and prevent satellites from colliding with debris. Space debris was reported to be a growing concern, but with the help of new technologies and international cooperation, it would be possible to reduce it.

Figure 5. News items addressing space debris per 100,000 online news articles by Member State



Bar chart displaying the number of articles addressing space debris (query 2) per 100,000 articles of overall online news by Member State. (The light part of the bars represents the share of news mentioning legislation.)
 Source: EMM "EE24campaign" index. Period: 01-01-2020 to 09-02-2025.

Figure 6. Sentiment distribution by Member State



Bar chart displaying the shares of negative, neutral, and positive news articles addressing space debris (query 2) by Member State.
 Source: EMM "EE24campaign" index. Period: 01-01-2020 to 09-02-2025.

Conclusions

This report presents the results of automated text analysis techniques applied to news about satellite pollution and space debris from European online media.

Our analysis shows that:

- Most news articles highlighted the growing presence of space debris in Earth's orbit and its potential threats to space travel, and human safety. Meanwhile, some articles discussed appeals for legislation and actions by countries and companies to combat this issue.
- Space debris has gained media attention in recent years, with an increase in reporting volume. The topic is increasingly discussed due to the rising number of incidents and the potential risks posed to both space operations and Earth.
- Some countries, such as Hungary, Luxembourg, Germany, and Portugal, have shown heightened media interest in space debris, often focusing on incidents, the need for regulation, and efforts to mitigate the problem.
- The absence of comprehensive international regulations and the "lawless" nature of space pose significant challenges. There are calls for robust regulatory measures and international cooperation to manage and mitigate the risks associated with space debris.
- Various international efforts are underway to combat space debris, including new technologies for tracking and removing debris. Initiatives by the European Space Agency and private companies like ClearSpace are highlighted, but more needs to be done to ensure the long-term sustainability of the shared space environment.
- The media portrayal of space debris is predominantly negative, focusing on risks and damage. The reporting trends, mostly driven by particular events rather than a consistent interest in the topic, as well as the framings and values, suggest that the media focus lay on the urgency of catastrophic risks as opposed to legal considerations, which are barely present in the media coverage.

Overall, the analysis shows that the media conveys the urgent need for collective action and international governance to manage space debris, ensuring the sustainability of space as a shared resource. This report is relevant for policymakers as it highlights the need for action. The results show that applying text mining techniques on media articles provides important insights on the discourse on space debris and can highlight trends and country-specific reporting. This is of particular interest to media analysts, communication experts, and policymakers. The approach can be used to inform external communication strategies, based on an improved understanding of the way in which issues have been framed in the media. It can also be used to assess the impact of communication from EU institutions, by seeing if there is an influence on media discourse around specific issues.

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Appendix

Data selection

Articles relevant for the analysis are selected by searching for a set of relevant keywords or keyword combinations that appear in the title, description, or text of the article. Description refers to ca. the first 300 characters of the article, following the title. These keywords are translated into all EU24 languages. The keyword combinations have been selected carefully to include all important articles but to avoid irrelevant ‘noise’ in the news collection.

Box 3 Overview of the queries to select relevant data

Query	Articles are included in the data set if they contain at least one keyword/expression of:		Article count
Query 1 – Space debris (broad)	SOURCE: EMM “EE24CAMPAIGN” <i>index. Period: 01-01-2020 to 09-02-2025.</i> GROUP 1: SPACE DEBRIS	In title or text	9,101
Query 2 – Space debris (focused)	SOURCE: EMM “EE24CAMPAIGN” <i>index. Period: 01-01-2020 to 09-02-2025.</i> GROUP 1: SPACE DEBRIS	In title or description	2,754
Query 3 – Space debris & legislation	Query 2 – SPACE DEBRIS (focused)		126
	AND		
	GROUP 2: LEGISLATION	In title or text	

Source: EMM “EE24campaign” index. Period: 01-01-2020 to 09-02-2025.

GROUP 1: SPACE DEBRIS

space debris, space junk, space waste, space pollution, orbital debris, orbital decay, satellite debris, space trash, space garbage, orbital junk, Weltraumschrott, Weltraummüll, Orbitalschrott, Orbitalmüll, Satellitenschrott, Weltraumverschmutzung, Orbitale Verunreinigung, Orbitaler Zerfall, Schrott im Weltraum, Verschmutzung im Weltraum, Müll im Weltraum, débris spatiaux, ordures spatiales, pollution spatiale, déchets spatiaux, débris en orbite, dégradation orbitale, débris de satellite, poubelle spatiale, déchets en orbite, διαστημικά συντρίμια, διαστημικά απορρίμματα, ρύπανση του διαστήματος, συντρίμια σε τροχιά, αποσύνθεση σε τροχιά, συντρίμια δορυφόρων, σκουπίδια στο διάστημα, απορρίμματα σε τροχιά, орбитални отпадъци, декрадация на орбита, сателитни отпадъци, отпадъци в орбита, космически% отпадъци, космически% отломки, космически% боклук, космически% боклуци, отпадъци% в космическото пространство, отпадъци% в космоса, космическо% замърсяване, замърсяване% на космоса, боклук в космоса, боклуци в космоса, отпадъци в космоса, vesmírný odpad, kosmické smetí, znečištění vesmíru, orbitalní odpad, rozpad na oběžné dráze, satelitní trosky, odpad na oběžné dráze, rumaffald, rumskrot, rumforurening, orbital forfald, satellitaffald, affald i kredsløb, escombros espaciales, basura espacial, contaminación espacial, desechos espaciales, escombros orbitales, decadencia orbital, desechos de satélites, residuos en órbita, chatarra espacial, kosmoseprügi, orbiidprügi, kosmosejäätmed, kosmose saastatus, orbiidjäätmed, orbiidi lagunemine, satelliidjäätmed, avaruusromu, kierraderomu, avaruusjätteet, avaruussaaste, satelliittijätteet, kiertoradan hajoaminen, brúscar spáis, dramhail spáis, trueilliú spáis, brúscar fithiseach, meath fithiseach, brúscar sataillite, svemirski otpad, svemirsko smeće, onečišćenje svemira, orbitalni otpad, propadanje orbite, satelitski ostaci, úrszemét, úrhulladék, úrszennyezés, orbitális törmelék, pályasüllyedés, múholdtörmelék, detriti spaziali, spazzatura spaziale, inquinamento spaziale, rifiuti spaziali, detriti orbitali, decadimento orbitale, detriti satellitari, kosmosa atkritumi, kosmosa gruži, kosmosa piesārņojums, orbitālie atkritumi, orbitālā sairšana, satelītu gruži, skart spazjali, ģmieģ spazjali, trīgģis spazjali, skart orbitanti, dekadiment orbitanti, fdalijiet satellitari, ruimteafval, ruimteschroot, ruimtevervuiling, orbitale puin, orbitaal verval, satellietpuin, kosmiczne śmieci, odpady kosmiczne, zanieczyszczenie kosmiczne, orbitalne śmieci, rozpad orbitalny, satelitarne szczątki, detritos espaciais, lixo espacial, poluição espacial, resíduos espaciais, detritos orbitais, detritos de satélites, deșeuri spațiale, gunoi spațial, poluare spațială, deșeuri orbitale, decădere orbitală, resturi de satelit, vesmírny odpad, vesmírne smetie, znečistenie vesmíru, orbitálny odpad, rozpad na orbite, satelitné trosky, kozmický odpad, kozmické smetie, znečistenie kozmu, odpad na orbite, odpad na obežnej dráhe, rozpadu na obežnej dráhe, rozpadu telesa na obežnej dráhe, trosky satelitov, úlomky družíc, úlomky satelitov, vesoljske smeti, vesoljski odpadki, onesnaževanje vesolja, orbitalni odpadki, razpad orbite, satelitski ostanki, rymdskrot, rymdavfall, rymdförörening, orbitalskrot, orbitalt förfall, satellitskrot, kosminės šiukšlės, kosmoso atliekos, kosmoso tarša, orbitalinės šiukšlės, orbitos irimas, palydovų nuolaužos, сателитно замърсяване, satelitsko onečišćenje, satelítní znečištění, satellitforurening, satellietvervuiling, satelliidireostus, satelliittisaaste, pollution par satellites, Satellitenverschmutzung, ρύπανση από δορυφόρους, múholdszennyezés,

inquinamento da satelliti, satelītu piesārņojums, palydovų tarša, triūģis mis-satelliti, zanieczyszczenie satelitarne, poluição por satélites, poluare de la sateliți, satelitrné znečistenie, onesnaževanje s sateliti, contaminación por satélites, satellitförorening"

GROUP 2: LEGISLATION

law, laws, legislation, policies, policy, regulation, regulations, закон, закони, законодательство, политики, политика, регламент, регламенти, zakon, zakoni, zakonodavstvo, politike, politika, uredba, uredbe, zákon, zákony, legislativa, politiky, politika, nařízení, lov, love, lovgivning, politikker, politik, forordning, forordninger, wet, wetten, wetgeving, beleidslijnen, beleid, verordening, verordeningen, seadus, seadused, seadusandlus, poliitikad, poliitika, määrus, määrused, laki, lait, lainsäädäntö, poliitiikat, poliitiikka, asetus, asetukset, loi, lois, législation, politiques, politique, règlement, règlements, Gesetz, Gesetze, Gesetzgebung, Politiken, Politik, Verordnung, Verordnungen, νόμος, νόμοι, νομοθεσία, πολιτικές, πολιτική, κανονισμός, κανονισμοί, törvény, törvények, jogszabály, politikák, politika, rendelet, rendeletek, dli, dlithe, reachtaiocht, beartais, beartas, rialachán, rialacháin, legge, leggi, legislazione, politiche, politica, regolamento, regolamenti, likums, likumi, likumdošana, politikas, politika, regula, regulas, įstatymas, įstatymai, teisė, politikos, politika, reglamentas, reglamentai, liģi, liģijiet, legizlazzjoni, politiki, politika, regolament, regolamenti, prawo, prawa, ustawodawstwo, polityki, polityka, rozporządzenie, rozporządzenia, lei, leis, legislação, políticas, política, regulamento, regulamentos, lege, legi, legislație, politici, politică, regulament, regulamente, zákon, zákony, legislativa, politiky, politika, nariadenie, nariadenia, zakon, zakoni, zakonodaja, politike, politika, uredba, uredbe, ley, leyes, legislación, políticas, política, reglamento, reglamentos, lag, lagar, lagstiftning, policyer, policy, förordning, förordningar

Annex I - Methodology

This science media intelligence briefing is part of the series of joint publications of the European Science-Media Hub (ESMH) and the JRC Text and Data Mining Unit, covering topics relevant for specific policy domains, ranging from water scarcity, genetically modified organisms, and new-genomic techniques to artificial intelligence in science communication as well as in healthcare. For further information please consults <https://sciencemediahub.eu/science-media-intelligence-reports/>.

Source selection

The manually curated list of online media outlets used for this report is composed of 581 EU27 online media sources monitored as index [pi_ee24campaign] by Europe Media Monitor (EMM). This sample of sources represents the most popular open news websites in each EU country in terms of visitors. The number of outlets per country was weighted based on the Member States' population.

Automated clustering

Clusters are computed by a community-based algorithm on the basis of the original language titles of the articles, using semantic similarity. Stopwords were not removed from the titles but are not shown in the keyword section. The model transforms sentences into language-independent vectors, suiting our need to compare articles coming from the various EU countries.

The minimum cluster size is set to 5 articles. The maximum cluster size is not fixed. Depending on the distribution of its neighbours (in terms of semantic similarity), one document may belong to a cluster or not. In other words, not all articles can be clustered. Using this approach, the clusters found correspond to the main topics present in the dataset.

For more information see:

Stefanovitch, N., Jacquet, G., De Longueville, B., Graph and Embedding based Approach for Text Clustering: Topic Detection in a Large Multilingual Public Consultation, [Publisher], 2023, [Document Number]. <https://doi.org/10.1145/3543873.3587627>

Automated titles and summaries

To generate automated summaries for each cluster, we use Large Language Models (LLM). For this use case, the model – an instantiated LLama 3.3 70b – is treated like a news-digest AI which is capable of analysing a list of news articles and generating a high-level summary with a significant title. For each cluster, the translated headlines of the articles are provided as input, and a title and a summary are generated. If the cluster's size is bigger than 500 articles, 500 titles are chosen randomly. The LLama model allows to receive good quality output in combination with a very fast response time. A carefully crafted prompt is used so that the model is not too generic but instead always focused on the listed facts. The temperature of the model is set to "0" to reduce the likelihood of hallucinations.

Named entity recognition

Names Entity Recognition has been done using the NEROne module which has been developed in the context of the Europe Media Monitoring project. For detailed information, see:

Jacquet, G., Piskorski, J., Chesney, S., Out-of-context fine-grained multi-word entity classification. In Proceedings of the 34th ACM/SIGAPP Symposium On Applied Computing (SAC 2019), 2019

Sentiment classifier

In our sentiment analysis, we utilise a state-of-the-art sentiment model, namely the XLM-RLnews-8 model, which is specifically designed for document-level sentiment analysis across multiple languages. Based on XLM-RoBERTa-Large, this model has been fine-tuned for sentiment analysis using the Unified Multilingual Sentiment Analysis Benchmark (UMSAB) dataset. The sentiment classes are computed on the English translation of the headlines.

To develop this model adapted to the news domain, we started with a multilingual news dataset extracted using the Europe Media Monitor (EMM) pipeline, which includes 20 000 news headlines and descriptions per language, totalling 24 official languages of the European Union.

We further employed the UMSAB dataset for sentiment fine-tuning, which consists of eight datasets in eight languages, each annotated using three classes: negative, neutral, and positive. XLM-RLnews-8 achieved a macro F1 score of 0.704 on the UMSAB test set, proving its effectiveness in sentiment analysis tasks.

Additionally, the model has been evaluated in out-of-domain scenarios using the IMDb dataset and a silver dataset made of multilingual news headlines in original language and translated to English taken from Europe Media Monitor. On average, the model achieved a weighted F1 score of 0.765, demonstrating its robustness in sentiment analysis across different domains. The model exhibits high precision (0.86) and lower recall (0.77) for the detection of negative sentiment of English translation of headlines. This suggests that the model may miss some negative sentiments but is highly reliable in identifying the sentiment accurately. For positive texts, the model shows a high precision (0.80) and recall (0.71).

More details on the model development are available in:

Di Nuovo, E., Cartier, E., Bertrand De Longueville, Meet XLM-RLnews-8: Not Just Another Sentiment Analysis Model. In Natural Language Processing and Information Systems, 28th International Conference on Applications of Natural Language to Information Systems, NLDB 2024, Turin, Italy, June 25–27, 2024, Proceedings (pp. 1). Springer Science and Business Media Deutschland GmbH, 2024.

Automated framing detection

Automated detection of framing dimensions constituted an extension of our analysis conducted in this report. This work was based on in-house machine learning classifiers that detect framing dimensions in the articles. The machine-learning algorithm trained on a multilingual corpus.

Framing refers to the perspective under which an issue or a piece of news is presented. We consider 14 frames: (1) *Economic*, (2) *Capacity and resources*, (3) *Morality*, (4) *Fairness and equality*, (5) *Legality, constitutionality and jurisprudence*, (6) *Policy prescription and evaluation*, (7) *Crime and punishment*, (8) *Security and defence*, (9) *Health and safety*, (10) *Quality of life*, (11) *Cultural identity*, (12) *Public opinion*, (13) *Political*, (14) *External regulation and reputation*.

For more information see the JRC Technical Report:

Piskorski, J., Stefanovitch, N., Bausier, V. A., Faggiani, N., Linge, J., Kharazi, S., Nakov, P. (2023). News categorization, framing and persuasion techniques: Annotation guidelines. European Commission, Ispra, JRC132862. https://knowledge4policy.ec.europa.eu/text-mining/news-categorization-framing-persuasion-techniques-annotation-guidelines_en

Understanding values

When referring to values in this report, we refer to the personal values model developed in social psychology research and validated in over 80 countries in over 200 samples (Schwartz 1992). These values are expressed as “guiding principles of life”, such as security, freedom, and equality. Research has shown that people everywhere appreciate these values to varying degrees.

The JRC flagship report “Values and Identities – A Policymaker’s Guide” (Scharfbillig et al. 2021) has summarised the most important elements of values for understanding citizens’ concerns and views.

Box 4 Overview of the values’ meaning used in this study

VALUES	INTERPRETATION
SELF-DIRECTION	Valuing independent thought and action – choosing, creating, and exploring
STIMULATION	Valuing excitement, novelty, and challenge in life
HEDONISM	Valuing pleasure or sensuous gratification for oneself
ACHIEVEMENT	Valuing personal success through demonstrating competence
POWER	Valuing social status and prestige, control or mastery over people and resources
SECURITY	Valuing safety, harmony, and stability of society, of relationships, and of own identity
CONFORMITY	Valuing restraint of actions likely to upset or harm others or violate norms and rules
TRADITION	Valuing respect and acceptance of the customs that one’s culture or religion provides
BENEVOLENCE	Valuing preserving and enhancing the welfare of others, especially close ones
UNIVERSALISM	Valuing understanding, tolerance, and protection for the welfare of all people and for nature

Source: Own creation based on Schwartz and Scharfbillig et al.

For detailed information, see:

Schwartz SH. ‘Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries’. *Adv Exp Soc Psychol.* 1992;25(C):1-65. doi:10.1016/S0065-2601(08)60281-6

Scharfbillig, M., Smillie, L., Mair, D., Sienkiewicz, M., Keimer, J., Pinho Dos Santos, R., Vinagreiro Alves, H., Vecchione, E., Scheunemann L., *Values and Identities - a policymaker’s guide – Executive summary*, EUR 30800 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-42444-4, doi:10.2760/128665, JRC126150.

Stefanovitch, N., De Longueville, B., Scharfbillig, M., ‘TeamEC at SemEval-2023 Task 4: Transformers vs. Low-Resource Dictionaries, Expert Dictionary vs. Learned Dictionary.’ In *Proceedings of the 17th International Workshop on Semantic Evaluation (SemEval-2023)*, pages 2107–2111, Toronto, Canada. Association for Computational Linguistics, 2023.

Annex II - About the authors

Text and Data Mining Unit

The JRC.T.5 Text and Data Mining Unit of the European Commission specialises in Data Science for Policy, leveraging vast amounts of data and text to provide actionable insights. The unit delivers data, methods, services, and analysis to scientists and policymakers throughout the JRC and EU institutions.

As part of the Unit's activities, the "Political Intelligence" Team aims to inform and enhance policymaking by providing a comprehensive view of the main topics and entities dominating the media landscape relevant to specific policy domains, and assessing the associated tonality. To achieve this, the team aggregates and analyses various data sources, including news media, political speeches, public opinion, and existing and upcoming legislation. By applying cutting-edge text mining techniques, the team extracts valuable knowledge on key topics, sentiment, framing, and other aspects relevant to informing policymakers.

Please check https://knowledge4policy.ec.europa.eu/text-mining/topic/political-intelligence_en for more information on Political Intelligence.

European Science-Media Hub

The European Science-Media Hub (ESMH), operating under the political responsibility of the European Parliament Panel for the Future of Science and Technology (STOA), is a platform to promote networking, training, and knowledge sharing between the European Parliament, the scientific community, and the media.

The ESMH creates a network among policy-makers, scientists, and media involving science, academia, educational and research entities, and professional associations of journalists and scientists. For journalists and media representatives, the ESMH organises training sessions and workshops on current technological developments, both as subjects of their reporting and as means of facilitating their work. Via media monitoring and media intelligence tools, the ESMH follows the most popular topics in the field of science and technology on different platforms including journals, newspapers, and social media.

The ESMH makes information available to journalists, other media, and citizens about new scientific developments, as well as about scientific topics that attract media attention, and promotes information based on evidence.

Check <https://sciencemediahub.eu/> for more information, methodology and technology.

Europe Media Monitor

Europe Media Monitor (EMM) is a tool developed and maintained by the Text and Data Mining Unit of the Joint Research Centre (JRC) of the European Commission. The main purpose of EMM is to provide monitoring of a large set of online media, reducing the information flow to manageable proportions by clustering related news, categorising articles and applying Language Technology tools to derive further metadata, such as recognising and disambiguating entities in the text, extracting quotes by and about people, applying sentiment/tonality analysis, and more.

A lot of EMM's functionalities are freely available. To access the tool that best fits your need, please check https://knowledge4policy.ec.europa.eu/text-mining/topic/europe-media-monitor-emm_en.

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EU law and related documents

For access to legal information from the EU, including all EU law since 1951 in all the official language versions, go to EUR-Lex (eur-lex.europa.eu).

EU open data

The portal data.europa.eu provides access to open datasets from the EU institutions, bodies and agencies. These can be downloaded and reused for free, for both commercial and non-commercial purposes. The portal also provides access to a wealth of datasets from European countries.

