

The background of the cover is a composite image. It features a view of Earth from space, showing the blue oceans and white clouds. A map of Germany is highlighted in a light yellow color in the lower-left quadrant. Overlaid on the image is a network of glowing blue lines connecting various points, representing a satellite or communication network. Several satellite icons, each with a padlock symbol, are positioned at different points in the network. A large, solid blue rectangle is located in the upper-right portion of the cover, containing the title text.

SPACE SAFETY AND SECURITY STRATEGY



Die
Bundesregierung



First test flight of the German Spectrum rocket on 30 March 2025 in Andøya, Norway.

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Foreword



The engines and exhaust jets of a launching rocket.

Joint Foreword by the Federal Minister of Defence and the Federal Minister for Foreign Affairs

Dear Readers,

Space is no longer simply used for the purposes of peaceful research. Russia's attack on Ukraine in February 2022 in violation of international law began with attacks on Ukraine's satellite-based communication, highlighting that future conflicts will also be carried out in space. The space domain is already an arena for strategic competition and global projection of power. Our freedom, prosperity and security also face threats in space.

From communication and navigation to Earth observation and timing, our society and economy are increasingly dependent on space-based services, which makes space security a political core task. This Space Safety and Security Strategy – the Federal Government's first – addresses the increasingly complex challenges in this domain.

The aim of this strategy is to ensure and secure Germany's long-term ability to act in space – in

both the civilian and military sectors – in times of peace, crises and a state of defence. It builds upon the findings and objectives of the National Security Strategy and the Space Strategy, both of which place a clear focus on the strategic importance of space.

A central pillar of this strategy is close cooperation with our NATO Allies and our European and international partners. Developing and enforcing norms, rules and principles for the peaceful, responsible and sustainable use of space is only possible if we work together.

This Space Safety and Security Strategy forms an important part of Germany's efforts to safeguard its interests and consolidate its position as a responsible actor in space. It is a crucial step towards ensuring that space remains safe, secure, and beneficial for future generations.



Boris Pistorius

Federal Minister of Defence



Johann Wadephul

Federal Minister for Foreign Affairs

Executive Summary



Artist's rendering of the Smart Upper Stage for Innovative Exploration (SUSIE).

In this Space Safety and Security Strategy, the Federal Government sets out the challenges, risks and threats in space and draws the necessary conclusions for the security of our country.

Data, services and products that rely on space form part of the everyday lives of all citizens. We use satellites for positioning, navigation and timing, communication as well as weather and Earth observation. Failure or disruption of these would have a serious impact on our security and prosperity. Fire, police and civil protection services would be severely limited, and satellite-based logistics could fail. Along with the economy and society as a whole, the use of space is also indispensable for government agencies, such as the Bundeswehr, in assessing and taking action in foreign and security policy matters.

An increasing number of states and businesses are seeking to use their own capabilities in space. Competition for access to space and its resources is long underway. Many state and private actors, including the European Union (EU), see space as a key area for future technological innovations and a global capacity to act.

Geostrategic ambitions are increasingly being projected both onto and into space. Some states are developing and testing capabilities to prevent potential adversaries from using space freely. The Federal Government is therefore working with its partners in the United Nations to promote norms and principles for responsible state behaviour in space.

As a data-based and networked industrial and information society, Germany is highly dependent on a functioning space infrastructure as well as the data, services and products it provides.¹ That is why the Federal Government, together with its Allies and partners, is confronting threats and challenges in space by developing its own capabilities.

Civil, state and military aspects – as well as internal and external security – are all inextricably linked in space. Unhindered, safe, secure and sustainable use of space requires a whole-of-government approach and close international cooperation.

It is particularly important, in cooperation with our Allies and partners, that we are able to identify natural and man-made risks and threats as soon as possible and thus protect and defend our shared space infrastructure accordingly. Together, we are committed to responsible behaviour in space based on international law. We are deepening our European and international cooperation as part of our own capability building and are increasing our whole-of-government resilience in space. We will expand Germany's defence capabilities in space decisively and rapidly. We are also promoting the application and further development of space law.

We will actively protect and defend our security, prosperity and freedom, including in space.

¹ The term "space infrastructure" includes all terrestrial and orbital infrastructure and facilities (such as satellites, ground stations, control centres, surveillance sensors, spaceports and associated data processing and communication systems) that are functionally connected to the operation, use, protection and defence of space systems.

Germany's Space Safety and Security

Ground station for satellite communication in Gerolstein, Germany.



Launch of an Ariane 6 rocket.

1. Space as a Security Dimension



Satellite testing inside an anechoic chamber.

As part of the National Security Strategy, the Federal Government has committed itself to a comprehensive understanding of security. We want to protect Germany from war, violence and foreign interference, to defend our freedom within the framework of the free democratic order and to sustainably secure our natural resources.

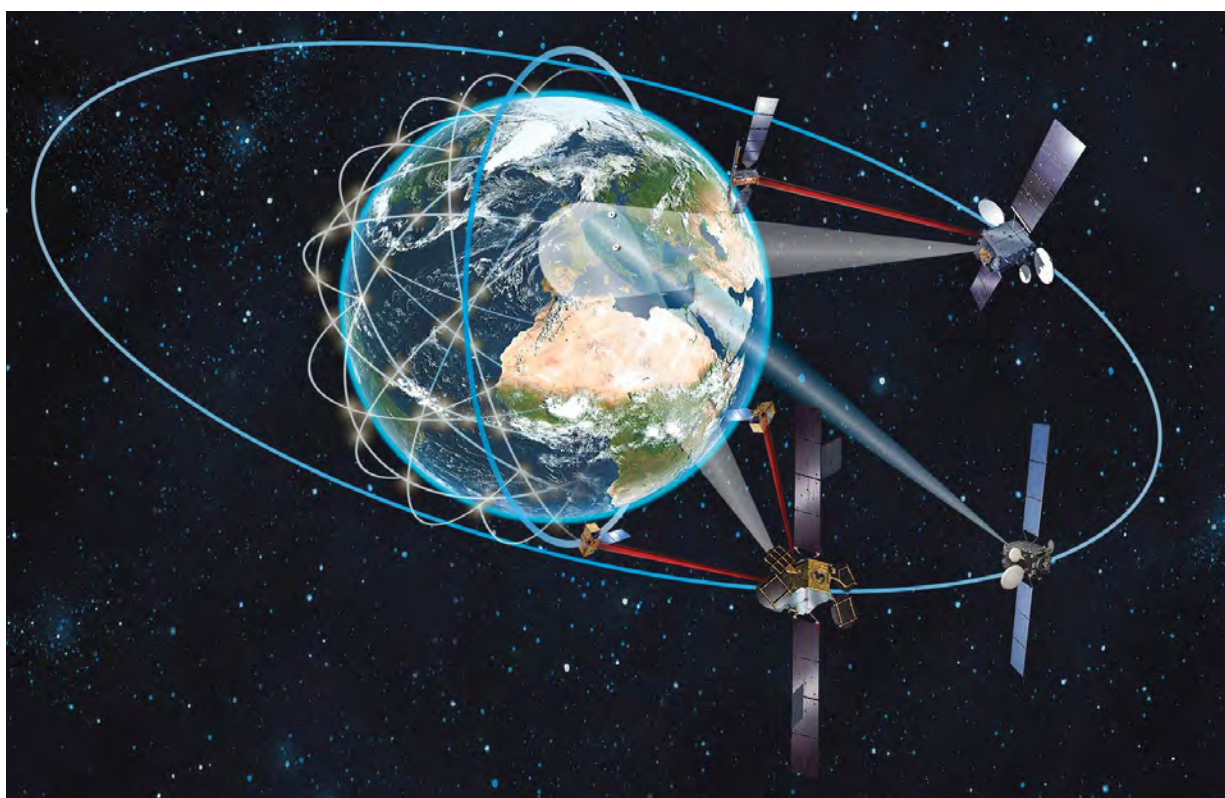
The security environment in Europe has deteriorated dramatically because of the threat posed by Russia. Germany and its NATO Allies and European partners must take on more responsibility for Europe's security. We are strengthening deterrence and defence and contributing to transatlantic burden-sharing by developing and enhancing our military capabilities.

For any modern and technology-driven society, space and its use are essential for a life of freedom, prosperity and security. The importance of

space for our national security is also reflected in the Federal Government's Space Strategy.

As part of our integrated security approach, we are developing our national space safety and security architecture together with German civilian, state, commercial and military space actors as well as with Allies and partners.

The Federal Government's Space Safety and Security Strategy reflects our understanding of space safety and security. It sets out how Germany will decisively and rapidly expand its defence capabilities in space. It promotes the systematic integration of the space domain into defence planning within the context of national and collective defence, thereby contributing to Germany's deterrence and defence capabilities as well as those of its NATO Allies and European partners.



Artist's rendering of a fully meshed multi-orbit constellation.

1.1 Normative, Political and Economic Frameworks

According to the Outer Space Treaty of 1967, the exploration and use of space, including the Moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind. Because of this, no state is allowed to lay claim to space or its celestial bodies. The Outer Space Treaty, now supplemented by several other international conventions, was the first agreement of its kind to anchor in international law the principle of the peaceful use of space. Article IV prohibits the stationing of nuclear weapons and other weapons of mass destruction in space and prohibits the use of the Moon and other celestial bodies for military purposes. However, it does not rule out the military use of space per se. In accordance with Article 51 of the Charter of the United Nations, all nations have the right to individual and collective self-defence in the event of an armed attack – including in space.

While space activities were initially the preserve of a few state actors and large or multinational space agencies, the early 21st century saw a rapid rise in civilian and commercial use of space as more and more private space actors emerged. The steady increase of private-sector providers of new low-cost services made space accessible to a large number of new users and changed how established state actors used space.

These new framework conditions have significantly changed the importance of the space domain. An increasing number of states see space

as a domain in which they can increase their economic, political and even military influence by means of technological innovation, mainly through private companies. Space has become an arena for astropolitical ambitions.² In addition to the exploration of celestial bodies, the use and exploitation of resources in space, such as rare earths, is now also becoming a key factor. Early occupation of strategically important orbits and frequency spectra is also crucial. As a result, strategic rivalries in space encompass civilian and economic as well as state and military aspects. These rivalries especially relate to increasingly used low Earth orbit and strategically relevant geostationary orbit, and they will soon expand to the Moon and beyond.

As a high-tech country, Germany has a strong and innovative space industry. In recent years, an active German NewSpace community has emerged alongside internationally established companies.³ A dynamic and broad research sector supports this industrial base. Close ties and co-operation between industry and science increasingly enable space technologies to be translated into economic applications. This, in turn, facilitates the development of expertise in future-oriented key technologies and of resilient capabilities.

Space technologies and their applications have inherent dual-use potential, meaning they can be used for both civilian and military purposes. Many commercial space systems also have this kind of dual-use capability, which is why they can be strategic and military targets when it comes to armed conflict.

Space is therefore not only a potential arena for global conflicts but increasingly at the centre of conflict itself.

² Astropolitik is the pursuit of a strategic presence – and thus control of key positions and orbits – in space. This is akin to geopolitics on Earth, where state actors contend for control over areas, sea routes and land corridors.

³ The NewSpace community refers to the global community of companies, start-up businesses, investors, researchers and enthusiasts driving the commercial, innovative and more accessible approach to the use and development of space.



Manufacturing of the European Service Module in Bremen, Germany.

1.2 Relevance of the use of Space for our Security

Germany's status as a spacefaring nation is based on its proficiency in key technologies, an excellent scientific and industrial base as well as many years of experience in the development, operation and use of space infrastructure.

Space-based data and services such as positioning, navigation and timing, communication as well as weather and Earth observation are now indispensably part of our everyday lives. A failure of global satellite navigation services would have a massive impact on the worldwide transport of people and goods, financial transactions and trade and, as a result, on national security as well. Fire, police and civil protection services also depend on satellite-based navigation, communication, and weather and Earth observation – and would not be able to perform their full range of tasks without them. Even a brief failure of space-based services would impact both the everyday lives of all citizens and Germany's security. For this reason, space-based infrastructure is increasingly considered part of our critical infrastructure.

Security and defence policy decisions are also based on space-based data and the services derived from it, such as when it comes to obtaining a comprehensive situation picture. German security authorities in particular, such as the Foreign Intelligence Service of Germany and the armed

forces, require worldwide intelligence, surveillance and reconnaissance, weather and Earth observation as well as communication and navigation satellite services for the purposes of information gathering and national and collective defence. Furthermore, modern military operations cannot be conducted without the use of space services.

Today, security-relevant space infrastructure and systems⁴ are as essential a part of defence-related infrastructure as vital and defence-critical facilities on Earth. At the same time, space is rapidly evolving from a primarily supporting domain to a distinct area of operations whose peaceful use must be protected and defended.



Artist's rendering of active satellites and space debris orbiting Earth.

⁴ For the purposes of this strategy, security-relevant space infrastructure and systems are infrastructure and systems that are used directly by state actors or are highly relevant for the defence and functioning of the state, economy and society.

1.3 *Space Safety and Security as a Whole-of-Government Task*

Germany's extensive social, economic, security and military reliance on the use of space necessitates a comprehensive examination of security policy at the national, European and international levels.

In addition to the responsibilities of the federal ministries as well as the Bundeswehr and other state actors, the business and science sectors also play a role in issues of space safety and security. This creates a high need for coordination.

The complexity of space safety and security therefore requires interaction between government, business and science. In line with the Federal Government's National Security Strategy and its Space Strategy, the following priorities must be set:

- ➔ Maintaining, developing and strengthening the ability to operate, protect and defend our own national and European space infrastructure;
- ➔ Supporting a responsive, resilient and innovative space industry, including through the regular awarding of contracts by sovereign customers;
- ➔ Supporting an active, innovative research sector;
- ➔ Achieving the capability for military space operations;
- ➔ Achieving the capability for cyber operations and electromagnetic spectrum operations in the space domain;
- ➔ Closing capability gaps as quickly as possible, for example by pooling and sharing;
- ➔ Ensuring the national ability to take action with core strategic and military capabilities by reducing dependence on non-European actors through the maintenance, development and strengthening of our own space reconnaissance capabilities;
- ➔ Potential inclusion of German space systems into European and international alliances and partnerships such as NATO, space projects and organisations;
- ➔ Potential incorporation of European space infrastructure into national use;
- ➔ Developing the capability to establish space situational awareness as a civil-military task, including by building a sensor network with global coverage;
- ➔ Developing norms, rules and principles for responsible state behaviour within the United Nations framework.

2. Strategic Action Areas



Artist's rendering of ClearSpace-1, a satellite to remove space debris.

From these priorities, we can derive three action areas in which all national space actors must take action in order to achieve the shared objective of safety and security in space:

- ➔ Identify risks and threats, develop options for action;
- ➔ Promote international cooperation and sustainable order;
- ➔ Build deterrence, strengthen defence capabilities and resilience.

2.1 Identify Risks and Threats, Develop Options for Action

Space systems, including the data, services, and products they provide, are vulnerable not only to damage from space weather, space debris, and near-Earth objects (NEOs) but also to dangers arising from ever-increasing space traffic.

The interministerial German Space Situational Awareness Centre in Udem was established and tasked with identifying risks and threats in order to achieve detailed space situational awareness.

Today, we are already facing a complex range of threats in space. The functioning and availability of satellites, ground infrastructure and the data links between them can be compromised and restricted in multiple ways. Generally, the use of counterspace capabilities⁵ against Germany and its Allies and partners must be expected along the entire spectrum from peace to crisis and hybrid

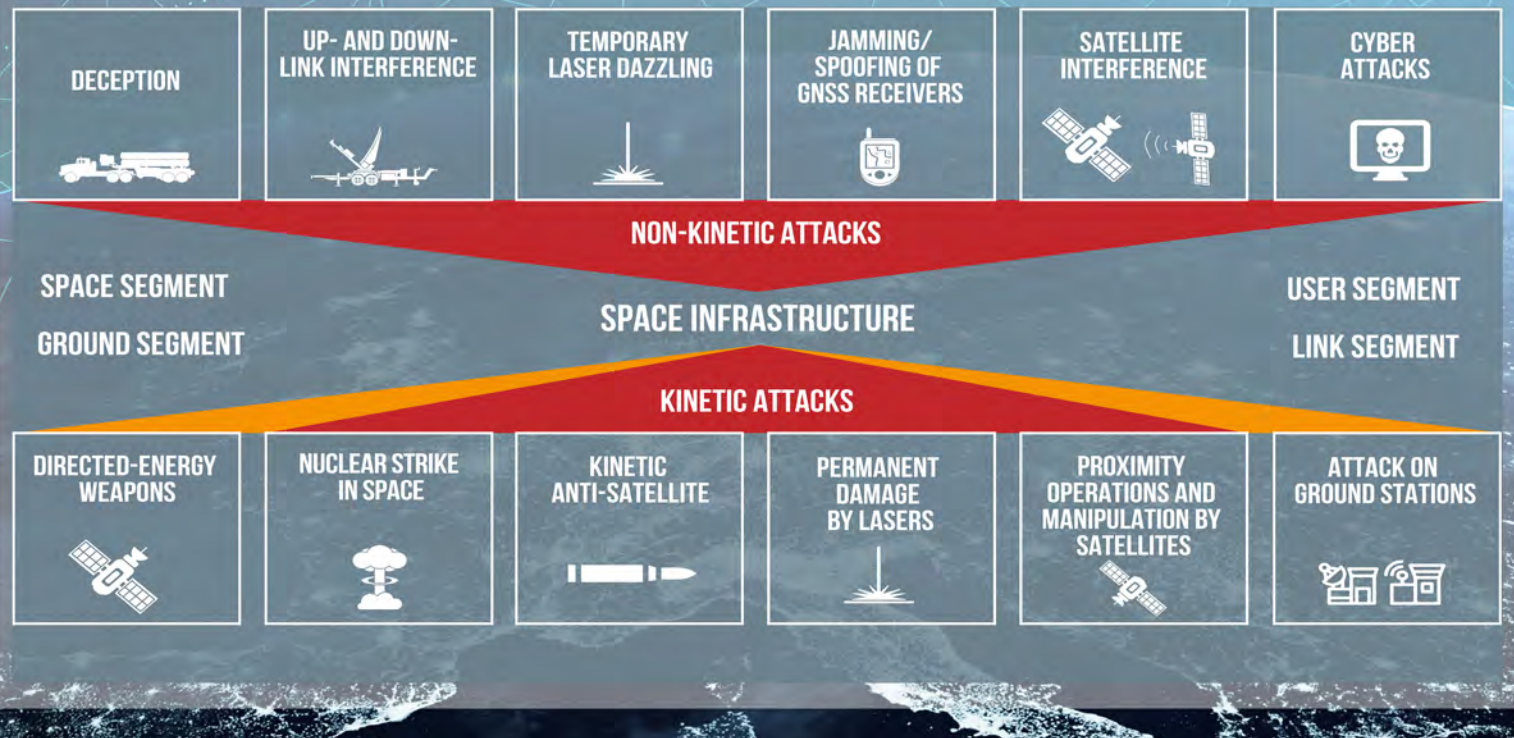
scenarios all the way to armed conflict. Various nations are developing and testing counterspace capabilities and are already using them for operational purposes.

One of the aspects that set counterspace capabilities apart from other threats is the wide range of technologies that can be employed to restrict access to and use of space. Electronic warfare disrupts communication and navigation, for example, and lasers are used to target and disable optical satellite systems. Cyberattacks, on the other hand, may impact security-relevant space infrastructure by compromising its control mechanisms, for example. Destructive directed-energy weapons (such as laser and high-energy weapons) and other types of kinetic effects pose a physical threat to satellites by disrupting, damaging, or destroying them.

In recent years, Russia has demonstrated its space warfare capabilities on several occasions, using kinetic energy to destroy satellites and disrupt, deny or manipulate the use of satellite-generated data and services. In November 2021, Russia test-launched a ground-based anti-satellite (ASAT) missile to destroy an inactive Russian satellite in low Earth orbit, resulting in around 1,500 identified pieces of debris and an estimated tens of thousands of unidentified objects. Manoeuvrable Russian satellites regularly approach other systems unannounced, presumably for reconnaissance purposes. At the beginning of its invasion of Ukraine, Russia conducted a cyberattack on a commercial satellite constellation also used by the Ukrainian armed forces, which resulted in cascade effects that ultimately impacted European terrestrial energy infrastructure as well. Throughout the war, Russia has also regularly interfered with satellite signals for positioning, navigation and timing, which has also affected civilian air

⁵ The purpose of counterspace capabilities is to deny an adversary access to and use of space.

SPACE DOMAIN THREATS



Graphic illustrating Space Domain Threats.

traffic in the EU. These examples show that in its operational planning, Russia specifically and deliberately exploits the dependence of high-tech armed forces on space-based data, services and products. The possible development of a Russian nuclear-capable anti-satellite weapon poses an even greater threat. Positioning such a weapon in space would clearly violate the Outer Space Treaty, which Russia also ratified.

China is rapidly expanding its space programme and investing heavily in the development and enhancement of its space capabilities, including ASAT systems that achieve destructive effects. A ground-based ASAT missile was already tested successfully against a Chinese weather satellite in 2007. In 2015, China declared space to be a new domain of warfare. To this end, China has been continuously developing and testing capabilities for the kinetic destruction of satellites with both ground-based weapon systems and satellites. China also has electromagnetic jamming capabilities that can limit the use of satellite navigation and communication systems and interfere with an adversary's radar and optical reconnaissance sa-

tellites. China has also demonstrated its ability to use robots to tow satellites in orbit. In 2025, China demonstrated close combat manoeuvres between spacecraft in orbit.

What is more, Russia and China support nations such as Iran and North Korea in building their own military space programmes, too. This could result in the proliferation of counterspace capabilities.

Comprehensive awareness of the risks, dangers and threats in the space domain is called space domain awareness and goes beyond space situational awareness to include knowledge of own dependencies, own situational awareness assessment and risk evaluation and the ability to act – not only in the space domain but in all other space-related areas as well. This is a prerequisite for developing political options for action.

The Federal Government's interministerial Space Situational Awareness Centre, operated by the German Air & Space and German Space Agency at the German Aerospace Centre (DLR), monitors

near-Earth space in 24/7 shifts, detects potential risks and threats to our satellites and analyses the effects of space weather on orbital and terrestrial systems. The German Space Agency operates the database and the orbital data catalogue at the German Space Situational Awareness Centre as central elements of the EU Space Surveillance and Tracking (EU SST) partnership.

In addition to establishing space situational awareness, the ability to detect and fend off risks includes the following aspects:

- ➔ Space-based navigation systems such as Galileo and GPS are indispensable for civilian applications and military operations. Precise
- ➔ Satellite-based early warning systems are essential for detecting and tracking enemy missiles. The collected data allow us to identify threats at an early stage and to coordinate countermeasures, which shortens the response time until the public is alerted and potential attacks can be countered.
- ➔ Communication satellites such as the COM-SATBw series and Heinrich Hertz as well as satellite constellations such as the planned Infrastructure for Resilience, Interconnectivity

positioning, navigation and timing (PNT) is critical to military operations in the land, air, sea and cyber and information domains.

Interministerial Space Situational Awareness Centre in Uedem, Lower Rhine region, Germany.



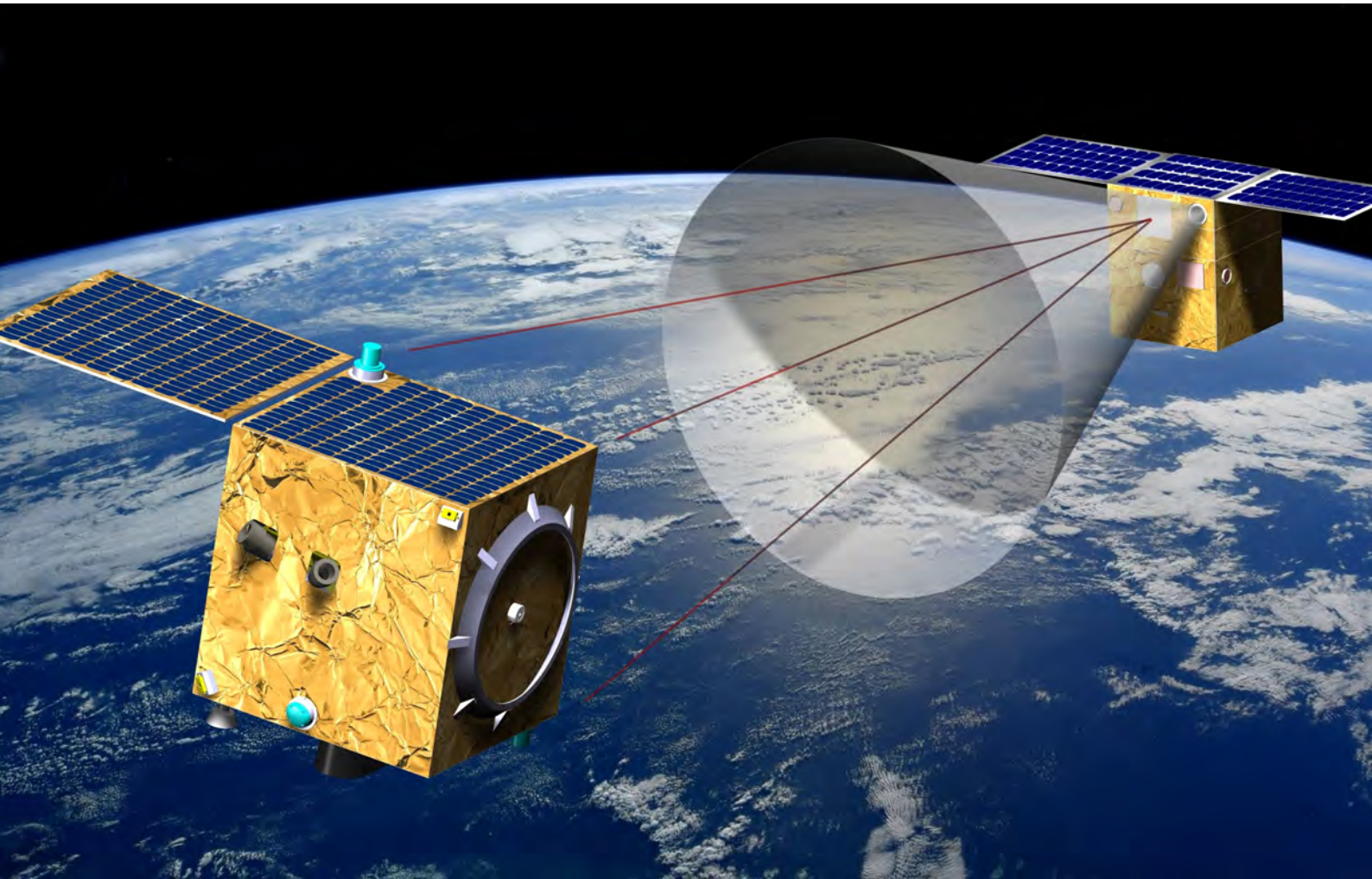
and Security by Satellite (IRIS²) and the European Union Governmental Satellite Communications Programme (GOVSATCOM) provide robust and secure communication channels, which are critical to the exchange of information between different civilian users, military units and command structures.

- ➔ Civilian and military satellites will supply the necessary communications and data transmission infrastructure for multi-domain operations. Space-based sensors also provide critical real-time information that contributes to situational awareness and assessment, which is essential for decision-making in complex operational scenarios.
- ➔ Earth observation and reconnaissance satellites for surveillance and reconnaissance of enemy forces are another key element of military operations and the state's capacity to act.
- ➔ For civil security, a single point of access to remote sensing data and processing resources is crucial, for example for use by the authorities. Establishing such a point of access must go hand in hand with increased research and development for cloud-based AI-supported services in Europe.
- ➔ Protection and defence of space systems require new capabilities to conduct space operations, such as reusable spaceplanes,⁶ inspection and surveillance satellites, and on-board sensors for satellites to identify any attempts to approach and interfere.

- ➔ The concept of responsive space will create options for quickly replacing malfunctioning capacities or setting new priorities by quickly deploying capabilities into orbit.
- ➔ Future civilian and military satellites will have to be designed to be even more resilient, which requires relevant key technologies and increased national and European independence.
- ➔ Satellite communications can play an important logistic role in operations of authorities and organisations with security tasks, such as police, fire and rescue services, in crisis situations and natural disasters. Their data and communication links are indispensable in situations where terrestrial infrastructure is not available. Such emergency personnel, however, must also be able to operate effectively when space-based services are not available.
- ➔ Strategic space research and development is particularly important but also costly. The dual-use character can be put to profitable use through civil-military dual-sourcing, as practised at the German Aerospace Centre and the Fraunhofer Institutes, but requires monitoring of a potentially unintended technology drain.

In the above-mentioned areas of the use of space, Germany already has some of its own civil, state and military capabilities but also draws on European systems (such as Galileo) and private-sector

⁶ Reusable spaceplanes are launched into space via rockets and able to land independently.



Artist's rendering of an inspection satellite.

2.2 *Promote International Cooperation and Sustainable Order in Space*

Germany is committed to the peaceful and rules-based use of space. We advocate a rules-based world order within NATO, the EU and the United Nations. We are strengthening the application of international law in space based on the Outer Space Treaty and expanding our partnerships with like-minded nations.

NATO is the cornerstone of our security. In 2019, Germany and its Allies recognised outer space as a distinct military domain alongside land, air, sea and the cyber and information domain. Attacks in and from space may justify the decision to invoke Article 5 of the North Atlantic Treaty. Establishing a space safety and security architecture thus not only serves national interest and national defence but also constitutes a German contribution to supporting NATO in a collective defence scenario.

Artist's rendering of Ariane 6 during booster separation.



As the largest economy in the EU, Germany will play a leading role in the development of a European space safety and security architecture while safeguarding national interests and competencies. The objective is to establish a European space safety and security architecture that effectively integrates the space capabilities of the member states and avoids redundancies. In doing so, we will use relevant EU programmes and tools, such as Permanent Structured Cooperation (PESCO), the European Defence Fund (EDF), the future European Defence Industry Programme (EDIP) and any potential follow-up programmes. At the same time, we must preserve key German industrial competencies and develop them strategically along the entire value chain. Germany remains committed to the European IRIS² satellite communications constellation and will complement this system with national capabilities. The use of IRIS² by German security authorities could be an important contribution to strengthening national security and safeguarding our digital sovereignty. Standardisation approaches (protocol stack for space) should allow for a flexible expansion of this use.

In the EU context, Germany is making a significant contribution to the implementation of the EU Space Strategy for Security and Defence

(EUSSSD) and the EU White Paper for European Defence – Readiness 2030. At European level, we are also advocating the further development of satellite-based military early warning systems. Germany is assuming more responsibility for the protection and defence of EU space systems and is working towards incorporating security and defence aspects in civilian programmes. This includes the development and implementation of technologies to protect Earth from collision with near-Earth objects. We support improved exchange of national and commercial satellite imagery data within the European framework and promote the work of the European Union Satellite Centre (SatCen).

In future, Europe must ensure independent and resilient access to space with sufficient launch capacity and frequency through a number of competitive launch vehicle and spaceplane programmes, which will also apply to possible future crewed spaceflight.

With its launch programme, the European Space Agency (ESA) makes a significant contribution to ensuring independent European access to space. ESA can play a crucial role in ensuring that Europe develops and maintains launch capabilities for all payload classes, for example through the

German astronaut Matthias Maurer during extra-vehicular activity.



European Launcher Challenge. ESA also has relevant expertise in research and technology development as well as in conducting missions. We always consider if and how technologies, systems and infrastructure developed in ESA programmes may be used in national security-related applications. In the medium term, ESA should strive to develop European launch systems capable of high rates in all payload classes to provide all users with flexible access to space for highly agile mission profiles. In the long term, Europe, with the help of ESA, should be able to reach all relevant target orbits, including those around the Moon. To this end, we are advocating the further development of the European Launcher Challenge so that, in the medium and long term, several competitive European heavy-lift launchers will ensure Europe's independent access even to cis-lunar space.

The United Nations (UN) is another important reference point for German space policy. In the UN context, Germany and its partners are committed to the Prevention of an Arms Race in Outer Space (PAROS). A simple ban on "space weapons" would fall short of this objective as there is

no universally binding definition, partly because of the dual-use nature of most space systems. The Federal Government is therefore pursuing a behaviour-based approach aimed at prohibiting irresponsible or threatening behaviour. Several resolutions on responsible state behaviour, co-drafted and submitted by Germany to the UN General Assembly, have already garnered support from the vast majority of states. Against the backdrop of a potential development of a Russian nuclear-armed anti-satellite weapon, Germany has recently supported a resolution initiative in the UN Security Council and – following a Russian veto there – subsequently advocated it in the General Assembly. The resolution, which was adopted by a wide majority of states, calls on the nations not to develop nuclear and other weapons of mass destruction that could be placed in orbit around the Earth.

Multilaterally agreed standards and norms help to distinguish between responsible and irresponsible or threatening behaviour and to react accordingly. Our political commitment, made together with numerous partners, to refrain from destructive testing of ground-, air- and sea-based anti-satellite missiles is a clear example of such agreements. Other cooperation instruments also have a positive effect on safety and security in space. For example, the German Space Agency at the German Aerospace Centre joined the US-initiated Artemis Accords for civil exploration and use of outer space in September 2023. Germany is also part of the Inter-Agency Space Debris Coordination Committee (IADC), a body dedicated to the prevention of space debris, and committed to the framework of the International Charter Space and Major Disasters, an important tool for space-based disaster response efforts.

Additionally, we need more multilateral arrangements on the specifics of the use of very low Earth orbits – in terms of a functional approach



Artist's rendering of a microlauncher including payload in a low orbit.

of the applicable legal regime – in an altitude range between 80 km and 100 km above sea level. This range is becoming increasingly relevant in terms of security and aviation law, especially owing to the use of high-altitude pseudo-satellites (HAPS), hypersonic missiles and aircraft/ spacecraft.

Germany is reviewing ways to promote a sustainable legal order for space at national or European level.

In terms of partnerships, Germany has been participating in the Combined Space Operations (CSpO) Initiative since 2019. With our CSpO partners Australia, France, the United Kingdom, Italy, Japan, Canada, New Zealand, Norway and the United States, we are developing common ideas for strengthening space safety and security.

„Germany commits not to conduct any destructive anti-satellite direct-ascent missile tests.“

(Germany at the UN Open-Ended Working Group on Reducing Space Threats through Norms, Rules and Principles of Responsible Behaviour, Geneva, September 2022)

A key component of our military space policy is our participation in the Multinational Force Operation Olympic Defender (MNF-OOD). Close cooperation with capable, like-minded and responsible partners (Australia, France, the United Kingdom, Canada, New Zealand and the United States) will deter hostile actions against our space systems. Within the framework of MNF-OOD, we will also enhance the protection and defence of



Major General Traut (right) welcomes United States General Stephen N. Whiting during his visit to the Bundeswehr Space Command on the occasion of Germany's joining OPERATION OLYMPIC DEFENDER on 11 October 2024.

our space systems and increase our resilience to hazards and threats from space.

As a leading spacefaring nation, the United States is an important bilateral cooperation partner in the field of space safety and security. The United States operates the world's largest space situational awareness sensor network and supplies important data to our Space Situational Awareness Centre.

Our bilateral cooperation with France is based on documents such as the Aachen Treaty. Priorities include collaboration on establishing space situational awareness, doctrines, data exchange and complementary structuring of national sensor networks. We also have a long-standing cooperation on space-based imagery reconnaissance.

Another example of practical cooperation with partner countries is our collaboration with Finland and Sweden on positioning a space surveillance radar system in higher geographical lati-

tudes and on data exchange, which supports the implementation of a network of sensors with global coverage. Together with the United Kingdom and Norway, we are establishing responsive space launch opportunities, for example at the spaceports in SaxaVord, Scotland, and Andøya, Norway, which will facilitate the rapid transport of payloads into space via microlaunchers.

International collaborations on civil spaceflight in the context of bilateral and multilateral cooperation with, for example, Japan, Canada, New Zealand, the United States, South Korea and other strategically important partner countries must be intensified. Global space projects are an important tool to strengthen international partnerships for the peaceful and sustainable use of space. There are already joint declarations of intent on civil and military space cooperation between the governments of Germany, Japan and New Zealand. In future, Germany will actively seek out more collaborations and, where possible, serve as a framework nation for countries with smaller civil and military space programmes.

We can only strengthen the rules-based international order in space in cooperation with our partners. Our continued commitment to multilateral forums such as the UN is essential for this. The Federal Government is also cooperating with players from business, science and civil society and will enter into new partnerships with emerging space nations.



A microlauncher on the launch pad.



Dialogue between the German Space Agency and the African Space Agency in September 2025.

2.3 Build Deterrence, Strengthen Defence Capabilities and Resilience

The need for the Bundeswehr to be ready to deploy and fight at any time, as stipulated in the National Security Strategy and the 2023 Defence Policy Guidelines, also applies to the space domain. This requires defence capabilities aimed at deterrence. In the space domain, deterrence means keeping potential enemies from acting aggressively against our own and allied space infrastructure by using a combination of international diplomacy and partnerships, resilience measures, defence readiness and military capabilities. This includes:

This includes:

- ➔ **Credible defence capability:**
Germany must have the necessary capabilities to effectively protect its space systems, counter attacks and limit an adversary's capabilities to act in space.
- ➔ **Transparency and communication:**
Even in the space domain, potential enemies can only be deterred if we have the necessary capabilities, are willing to use them and communicate this willingness. At the same time, the Federal Government is committed to acting as a responsible and transparent player in

space.

- ➔ **International cooperation and standards:**
In cooperation formats with other like-minded space nations, Germany is strengthening its own capabilities and resilience in space. International agreements and standards for behaviour in space also contribute to stability, security and deterrence.
- ➔ **Technological superiority:**
Germany is securing access to strategically important space technologies using its civil-military capacity for innovation.
- ➔ **Resilience:**
The ability to rapidly reconstitute our own space capabilities and a resilient cyber security architecture are essential components of this capability. The Bundeswehr, authorities and organisations with security tasks and government agencies must be able to perform their tasks even if space services are not available. This requires, in particular, alternative communication and navigation capabilities and personnel trained to use them.

On the basis of an interministerial assessment of the situation, we will ensure Germany's ability to take action in the space domain along the entire spectrum from peace to crisis to national and collective defence. In this way, the space domain will also contribute to our country's defence capability.

3. Building a National Space Safety and Security Architecture



Launch of a European launch vehicle on 4 November 2025.

SPACE SAFETY AND SECURITY ARCHITECTURE

DEFENSIVE

- ✓ Capability for Space Operations
- ✓ Space Situational Awareness
- ✓ Satellite Communications
- ✓ Global Imagery Reconnaissance
- ✓ Signals Intelligence
- ✓ Contribution to Ballistic Missile Defence
- ✓ Positioning, Navigation and Timing
- ✓ Earth and Weather Observation



RESILIENT

- ✓ Fully Meshed Multi-Orbit Constellations
- ✓ Resilience through technology mix and rolling acquisition
- ✓ Active and Passive Protective Measures
- ✓ Capability for Responsive Space



- ✓ Inspection
- ✓ Maintenance
- ✓ Logistics
- ✓ Refit
- ✓ Repair
- ✓ Refueling

COLLABORATIVE

- ✓ Whole-of-Government
- ✓ Joint
- ✓ Combined
- ✓ Civil-Military
- ✓ Inclusion of Commercial Actors
- ✓ Framework Nation



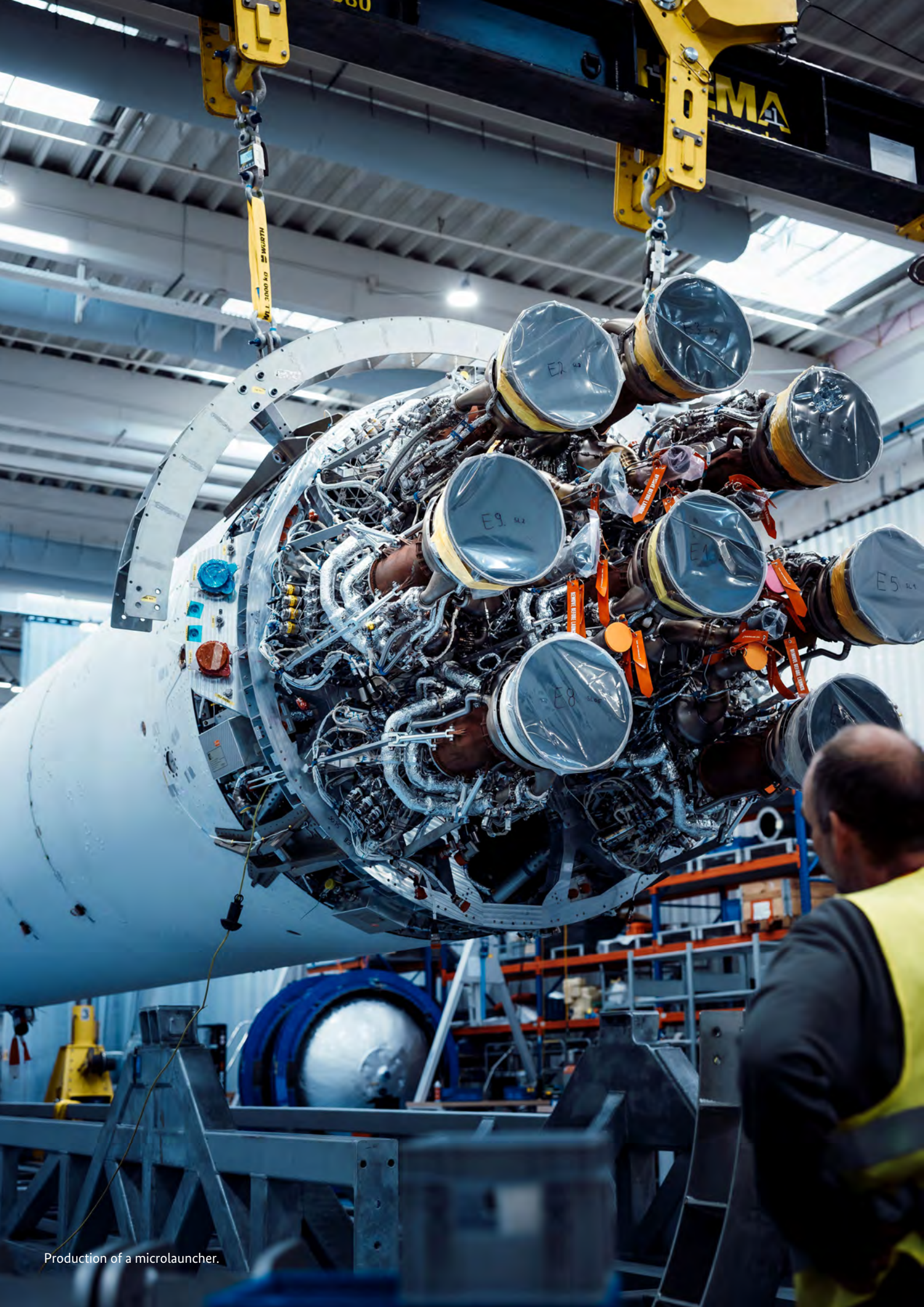
Characteristics of the future German Space Safety and Security Architecture.

The ability to assess the situation, an increase in resilience of deployed space systems and the protection and defence of these systems are essential components of a sustainable space safety and security architecture and the prerequisite for independent action in space.

Germany is among the largest contributors to NATO, the EU and ESA. We also operate the national space programme for innovation and international cooperation and other space-related activities. The synergies offered by these programmes benefit our security and we want to use them even more systematically.

3.1 Whole-of-Government Ability to take Action in Space

In order to ensure Germany's ability to take action in the event of incidents relevant to space safety and security, we need a governance structure tailored to the space domain. To establish a consistent national space safety and security architecture, Germany is strengthening strategic control of space-related activities that are relevant to security.



Production of a microlauncher.



A Special Operations Forces Command soldier wearing satellite communications equipment.

The Coordinating Committee on Space Safety and Security is activated in the event that incidents relevant to space safety and security occur or will foreseeably occur. It collects information on these incidents, evaluates this information in an interministerial process and develops options for action. Federal ministries with space- and security-related tasks discuss strategic issues of spaceflight and space as well as any need for interministerial action in the Interministerial Steering Group on the use of Space and Space Safety and Security. An opportunity to strengthen cooperation between the Federal Ministry of Defence and the Federal Ministry of Research, Technology and Space through liaison officers is also created.

The close integration of these bodies ensures that issues of space safety and security can be discussed and decided at all levels of the Federal Government and that the necessary space expertise is available at all times. In future, space safety and security issues should be appropriately reflected in the work of the National Security Council, the National Command Centre and the National Crisis Staff. In order to more directly connect and upgrade the existing Interministerial Steering Group on Space Safety and Security, we will transform it into an interministerial committee of the National Security Council.

3.2 Increasing Resilience

A resilient, stable and responsive space safety and security architecture will deter potential adversaries. It is therefore important to integrate new capabilities for the operation, protection and defence of national space systems. We want to support civilian and commercial space infrastructure in times of peace, crises and a state of defence, appropriately train and qualify young personnel and strengthen German companies in their capacity building. Where necessary, military space infrastructure and those elements of civilian and commercial space infrastructure that are relevant to security are to be identified as relevant to defence matters and taken into account. Based on the proposed umbrella law on critical infrastructure, elements of such infrastructure will also be registered as critical infrastructures in the new critical infrastructure sector “Space”.

In order to create a resilient space safety and security architecture, we need to take stock of space dependencies and space and of vulnerabilities. Based on these findings, we will develop and implement options for action to increase resilience, paying particular attention to the interfaces between space safety and security on the one hand and other areas of security on the other, such as internal and external security, civil defence, security of supply, transport security and network and IT security. Germany is actively involved in shaping European systems and infrastructures in order to integrate them into national space use by providing targeted support to the German space industry through the regular awarding of government contracts and by using readily available existing capacities through pooling and sharing.

The resilience of space systems is also based on the ability to quickly replace failed systems or have alternatives and redundancies available. Dependence on space will also be reduced at critical points and the armed forces must be able to survive in combat even without support from the space domain, if necessary.

Space-related civil-military cooperation must also function in a state of defence. To this end, the Federal Government will establish the necessary legal framework and forms of contract that will ensure the provision of services by industry even in a state of conflict or defence. We support the space sector as part of an industrial policy that seeks to increase resilience so as to avoid dependence on imports and individual manufacturers for strategically important areas of technology. This policy includes avoiding single-source situations or monopolies. We are also involving the private sector in order to create further civil-military options for increasing resilience.

Institutional research funding by the Federal Government and sponsored research projects



Engineers and technicians in front of a completed satellite.

provide another foundation for a resilient space safety and security architecture. In particular, the institutional research done by the German Aerospace Centre, with its state-funded research infrastructure, is a necessary basis for future developments and is to be expanded. A framework set by the state and public funding, in combination with private-sector investment, are key to successful research.

The basis for the whole-of-government ability to take action in space is provided by the industrial capabilities required for this purpose. In its National Security and Defence Industry Strategy of In

December 2024, the Federal Government defined space technologies as key security and defence industry technologies, the national availability of which is in the interest of national security, partly in order to maintain security of supply. The German space industry will therefore play a crucial role in the development of the space safety and security architecture.

In order to strengthen the German space industry, which includes small and medium-sized enterprises and start-ups, the certifications, security checks, IT-requirements and access restrictions required in the security and defence sector



Exhibition booth for space technology.



Conference attendees in conversation next to the DLR Startup Factory booth on 29 September 2025 in Munich, Germany.

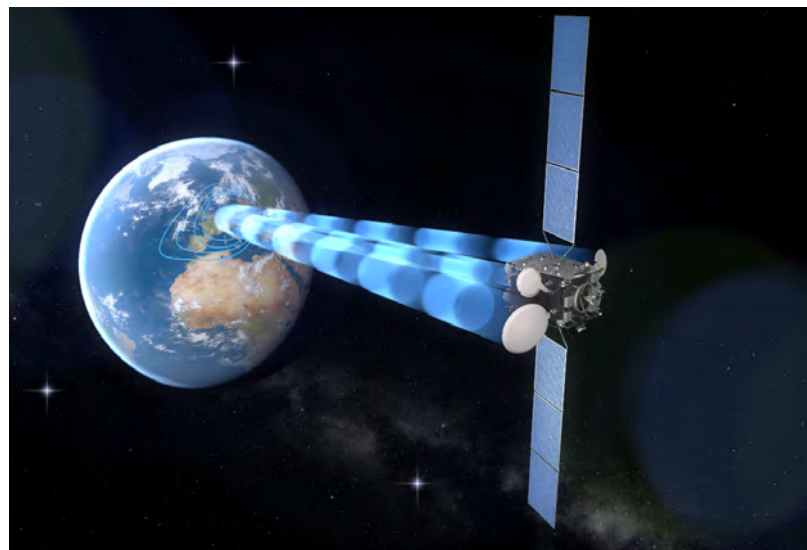
must be made transparent and their procedures accelerated.

The Federal Government aims to increase national development and implementation of essential security and defence industry technologies. An example of this policy is Heinrich Hertz, the geostationary communications satellite launched in 2023, which is equipped with elements for a scientific and technical mission funded by the national space programme for innovation and international cooperation but also includes a military payload. In addition, demonstration and pilot missions will increasingly be used for faster and less bureaucratic technology and capability development. The Federal Government will more clearly define its understanding of key security and defence industry technologies for the space sector, thereby contributing to the protection and preservation of the national space industry.

In cooperation with partners, Germany promotes the standardisation and interoperability of satellite platforms, communication interfaces, ground segments and antennas, satellite fuel supply, the regular transfer of payloads with

European systems and the installation of large constellations. At the same time, we are pushing for uniform requirements and standards for the construction and safe operation of space systems (e.g. protocol stack for space).

In addition to industrial manufacturing, Europe must have the capability for independent processing of protected data and (AI-based) data evaluation. This includes not only the necessary



Artist's rendering of the Heinrich Hertz satellite launched in 2023.

software but also data centre locations in Europe, including their data connection and security certification. The Federal Government is working towards increased cooperation in this area within the EU and promotes technical implementation.

In addition, we are integrating technical and organisational cyber security measures in the development of the space safety and security architecture. To this end, we are enhancing the space-related cyber defence capabilities of the Bundeswehr and the Federal Office for Information Security.

Resilient space situational awareness capabilities are necessary to identify risks and threats to national space systems. We are therefore pursuing the strategic goal of a sensor network with global coverage by installing more national sensors than

previously planned. We are cooperating with international partners to set up sensors at particularly attractive geographical locations. Germany also continues to pursue a strong role in the European Union Space Surveillance and Tracking (EU SST) partnership, which will serve as the basis for a future civilian approach to European space traffic management.

We are working towards military use of heavy launchers and microlaunchers, reusable spaceplanes, new propulsion technologies, on-orbit logistics, cislunar space and multifunctional large satellite constellations. These technologies offer increased flexibility, agility, sustainability and strategic depth for resilient military operations in space. By developing and integrating these technologies, we want to enhance our surveillance, communication and defence capabilities.



Artist's rendering of a launch vehicle above the clouds.



Artist's rendering of a satellite being placed in its target orbit.

3.3 *Research and Development*

As part of the research activities of the Federal Ministry of Defence, defence research and technology prepare the best possible equipment for the

Bundeswehr in good time and tailored to mission requirements. In cooperation with the German Aerospace Centre and the Fraunhofer Society, various risks and threats as well as methods and technologies for countering them are identified, evaluated and investigated in the field of space research.



A LOX-methane technology demonstrator is being tested on a test bench.

To maintain and strengthen resilience, we increasingly rely on research results and dual-use technologies. One example is the use of research results and technologies from aviation, transport, civil security and energy at the German Aerospace Centre to improve solutions for space. We will identify national and European cutting-edge technologies and evaluate them as a factor for the national space safety and security architecture. We will continue to develop civil-military cooperation in the space domain. We are investigating how

- ➔ active co-orbital protection,
- ➔ on-orbit servicing,
- ➔ high-altitude pseudo-satellites (HAPS),
- ➔ space-based contributions to territorial ballistic missile defence,
- ➔ the development of powerful rocket propulsion systems,
- ➔ space-based space surveillance and tracking,
- ➔ orbital networking with inter-satellite links,
- ➔ high-atmosphere hypersonic technology,
- ➔ technologies for enhanced manoeuvrability and agility in orbit,
- ➔ the development of ramjet engines,
- ➔ the development of powerful non-chemical space propulsion systems,
- ➔ funding and testing of re-entry and landing technologies,

- ➔ large constellations,
- ➔ small and micro satellites,
- ➔ reusable spaceplanes,
- ➔ microlaunchers,
- ➔ quantum technologies,
- ➔ AI applications, and
- ➔ initiatives for a possible Earth observation service at European level

can be integrated into the national space safety and security architecture as soon as possible to strengthen space safety and security and ensure resilient whole-of-government defence capabilities in the space domain.

The aim of the Space Innovation Hub of the German Space Agency at the German Aerospace Centre is to make German space service providers more competitive and to enable public customers to access innovative space technologies and services more quickly. The Federal Government will strengthen the Space Innovation Hub in order to boost the development of space technologies in Germany – which is necessary for security – from research to market maturity. Necessary investments will be implemented and smaller and medium-sized enterprises will be better supported through approaches that are less bureaucratic, less conventional and less risk-averse and through increased exchange with public customers such as the Bundeswehr. This exchange is intended to benefit users from the civilian and military spheres as well as the intelligence branch and will mostly concern security-relevant space technologies and applications.

Hypersonic spaceplanes, which in future will harness the potential of numerous technological innovation leaps, are an example of such innovations. They can take off from and land on conventional airfields, are reusable, produce virtually no space debris, enable faster operations than classical vehicles and cause less environmental pollution during the launch phase. In order to further promote such or similar military innovation leaps, the Federal Government will not only use the German Space Agency at the German Aerospace Centre and the Innovation Hub located there but also the Federal Agency for Breakthrough Innovation, the Agency for Innovation in Cybersecurity and other institutions. The goal is to provide these institutions with the necessary freedoms and sound funding to enable them to significantly accelerate future projects in the field of space safety and security through innovative procurement processes.



Meeting of the *Space Innovation Hub* in Bonn on 10 October 2025.

The SPACE Research Centre of the Bundeswehr University Munich will contribute to further developments in the space domain with scientists from various disciplines. The centre conducts



Artist's rendering of the "Aurora" spacecraft being developed by a German startup.

research on space technology, satellite communications, cyber security and AI. This research must be promoted and harnessed to a greater extent.

We will increase the involvement of the Bundeswehr in the Responsive Space Cluster Competence Centre (RSC³) founded by the German Aerospace Centre in 2020. This collaboration explores the potential capabilities of small satellites and their possible applications to ensure resilience, responsiveness and mitigation of unpredictable bottlenecks.

3.4 Protection and Defence

We want to endow Germany with credible deterrence and defence capabilities in the space domain.

The Bundeswehr relies on the use of space to fulfil its core mission of national and collective defence. The military use of space is therefore a standing operational task of the Bundeswehr and includes tasks such as establishing situational awareness



The Bundeswehr Space Command welcomes international guests in Uedem, Germany.

for the space domain, planning and conduct of space operations as well as protection and military control of the operation of all space systems in the Bundeswehr Space Command, under the domain responsibility of the German Air & Space Force & Space Force. This mission will be accomplished in times of peace, crises and a state of defence in a way that is appropriate to the situation and threat at the time. Space operations serve two purposes:

- ➔ protecting and defending own use of space,
- ➔ restricting adversaries' use of space.

The protection and defence of Germany's national use of space against unlawful or aggressive behaviour is not limited to German military satellites. These measures may also extend to German civilian and commercial satellites as well as satellites of Allies, strategic partners and the EU. Germany adheres to the following guidelines in this approach:

- ➔ Germany reserves the right to respond to unfriendly behaviour with retortions;⁷

- ➔ Germany reserves the right to undertake reprisals in response to breaches of international law;⁸
- ➔ Germany reserves the right to exercise its right of individual or collective self-defence in the event of an armed attack, including in space.

The first step towards protecting against space threats is the ability to recognise them as such. Security-relevant incidents and threats in space are analysed and ideally attributed to their originators. Establishing space situational awareness is therefore a civilian-military task of paramount importance for the Federal Government. Current planning for the space surveillance system of the Bundeswehr will enable us to achieve initial operating capability in this respect, which we will expand with further operational military and civilian sensors and through cooperation with international Allies and partners.

Space weather can also damage satellite systems and cause disruption or failure of ground-based infrastructure such as power grids or radio



Artist's rendering of the future Bundeswehr telescope system in Meßstetten, Germany.

⁷ Under international law, retorsion is an unfriendly but lawful measure that is permissible at any time if in response to another state's unfriendly or unlawful act.

⁸ Under international law, reprisals refer to non-violent acts that would otherwise be unlawful but that in exceptional cases are considered lawful under customary international law.



Artist's rendering of a microlauncher being launched in the North Sea.

networks. We will therefore set up a European space weather information service at the interministerial Space Situational Awareness Centre.

Space systems for command and control, reconnaissance and effects are critical to successful military operations. We will continue to develop the architecture of our national and European space infrastructures, in particular our satellite communications and reconnaissance, in light of rapid technological developments and international programmes. For this purpose, we will establish a fully meshed multi-orbit architecture that relies on a larger number of satellites at different orbit heights and increases the resilience of the overall system.

In addition to its supporting function, we also consider outer space an independent and dynamic area of military operations. We are strengthening the Bundeswehr's ability to act in space and enabling it to limit the use of space by adversaries. The operation of space systems, conducting space

operations and the ability to generate effects in space are essential military capabilities. We will fully integrate these aspects into the Bundeswehr's planning and command and control process as well as its capability development and will significantly accelerate the relevant procurement process. We will adapt the relevant legal bases where necessary.

In order to enhance our defence capability in a multilateral framework, Germany will equip the Bundeswehr Space Command with a multinational command element offering multinational participation. This agency will coordinate and support command and control tasks in the space domain for the EU, NATO and multilateral operations.

Specialist personnel with space expertise are required to safely operate defence-relevant space infrastructures. We will therefore invest in the basic, advanced and follow-on training of our space personnel.

4. *Implementation*



Assembly of satellite components.

There are three strategic action areas:

- I. Identify risks and threats, develop options for action;
- II. Promote international cooperation and sustainable order in space;
- III. Build deterrence, strengthen defence capabilities and resilience.

From these, specific lines of action and tasks for the establishment of a whole-of-government space security architecture can be derived. The federal ministries will implement the strategic lines of action on their own responsibility – setting their own priorities within their areas of responsibility and using the available resources of their departmental budgets and the current financial plan – as well as by means of interministerial exchange and action.

STRATEGIC ACTION AREAS



Strategic Action Areas in Space Safety and Security.

#	STRATEGIC LINES OF ACTION
	I. Identify Risks and Threats, Develop Options for Action
1.	Ensuring operational readiness of the whole-of-government space safety and security architecture
2.	Building the resilient space command and control as well as systems architecture of the Bundeswehr according to the principle of unity in command
3.	Implementing a sensor network with global coverage to establish space situational awareness, with a particular focus on increasing the observation rate
4.	Developing and procuring capabilities for space-based early warning, reconnaissance, surveillance and tracking across all speed and altitude bands, including rockets, satellites, HAPS and hypersonic flight systems
5.	Developing the capability for space-based signals intelligence
6.	Establishing control over the operation of military space systems by a satellite operations and control centre at the Bundeswehr Space Command
7.	Developing and installing fully meshed and integrated multi-orbit satellite constellations for space-based communication and a data backbone as well as imagery and electronic reconnaissance, taking into account national and European infrastructures (e.g. IRIS ²)
8.	Developing and installing fully meshed and integrated multi-orbit satellite constellations of space-based imagery and electronic reconnaissance, prioritised implementation in cooperation with partners
9.	Conducting an interministerial evaluation of areas of application relevant for military and/or security/regulatory reasons, such as weather and Earth observation, early warning and ballistic missile defence, communications, positioning, navigation and timing, responsive space as well as space weather, space situational awareness and satellite control systems and infrastructures
10.	Developing concepts for operation, use, participation and provision to ensure military control and prioritised provision of services and products for the Bundeswehr, civil protection agencies and other state actors in the event of a crisis
11.	Taking stock of dependencies on space and of vulnerabilities and creating a list of security-relevant space infrastructures that are essential to whole-of-government security provision, to be implemented on the responsibility of the relevant ministries
12.	Addressing strategic issues relevant to space safety and security, as needed, at state secretary and National Security Council level
13.	Achieving close integration of national space safety and security bodies
14.	Training and practicing emergency procedures for the failure of space-dependent systems, including as part of training and exercises
15.	Establishing structural and doctrinal foundations for situation assessments and the development of state options for a coordinated use of civilian and military instruments
16.	Defining key security and defence industry technologies in space
17.	Protecting raw material and supply chains of the space industry
18.	Participating in the application of export control procedures for dual-use space safety and security products, capabilities and defence materiel and in investment screenings
19.	Establishing a national space weather information service at the interministerial Space Situational Awareness Centre
20.	Strengthening the EU's ability to assess the situation and take action in the event of incidents related to space safety and security by providing information and contributions
21.	Developing a technology roadmap to identify shared future needs for civilian, military and intelligence applications to ensure that synergies are used efficiently

#	STRATEGIC LINES OF ACTION
	II. Promote International Cooperation and Sustainable Order in Space
1.	Collaborating in bilateral and multinational settings, in particular with CSpO, MNF-OOD, EU, ESA and NATO partners, with the aim of enhancing the operational readiness of the whole-of-government space safety and security architecture
2.	Expanding participation in the US-led space operation OLYMPIC DEFENDER (OOD) in order to ensure the deterrence and defence capability of the space safety and security architecture and to achieve the capability for joint and multinational space operations
3.	Developing national legal positions regarding the implementation and application of international space law and participating in the development of a political framework and rules of engagement for a military use of space, from crisis and conflict situations to national and collective defence
4.	Using international training and exercises to protect, defend, plan and conduct space operations in cooperation with the United States, France and other CSpO, MNF-OOD, EU and NATO allies and partners
5.	Expanding bilateral and multilateral security-relevant space collaborations and developing standards of conduct with international organisations and key partners
6.	Promoting partnerships aimed at a peaceful and sustainable use of space by all actors
7.	Providing space-related data, services and products to the EU and NATO, enhancing NATO information sharing
8.	Positioning Germany with an appropriate role to play in the future EU space safety and security architecture, including the establishment of appropriate facilities and infrastructures in Germany and EU staff representation
9.	Developing and coordinating policy positions, operational requirements and decisive contributions to security- and defence-relevant aspects of European space activities and programmes
10.	Promoting the standardisation and interoperability of satellite platforms, communications interfaces, ground segments and antennas as well as satellite fuel supply
11.	Establishing a European Space Component Command (ESCC) as a national command and control element of the Bundeswehr Space Command, which will, at the tactical level, coordinate and perform command and control tasks for the EU and NATO or in multilateral contexts in the space domain, receiving multinational reinforcements in the form of military personnel from EU and partner countries
12.	Integrating security- and defence-relevant aspects into EU programmes for the use of space
13.	Systematically reviewing and assessing whether technologies developed in ESA programmes with a civilian focus can also be used for applications related to national security
14.	Promoting politically binding agreements on norms, rules and principles for the responsible, peaceful and sustainable use of space and arms control to prevent an escalation in space within the framework of the United Nations
15.	Applying export control procedures to dual-use space safety and security products and capabilities as well as defence materiel
16.	Engaging in active diplomacy on space safety and security to promote a rules-based use of space and to avoid misunderstandings
17.	Developing international export control regimes for space technologies and updating the relevant commodity lists on a regular basis
18.	Expanding participation in the multinational Responsive Space Capabilities Memorandum of Understanding (MoU)
19.	Continuing Germany's central role in the EU Space Surveillance and Tracking (EU SST) partnership

#	STRATEGIC LINES OF ACTION III. Build Deterrence, Strengthen Defence Capabilities and Resilience
1.	Establishing the capability for planning and conducting space operations and generating effects in order to ensure credible deterrence and defence capability in the space domain
2.	Determining the military command and control organisation for accomplishing the joint standing operational task of military use of space is under the authority of the Chief of the Air & Space Force.
3.	Systematically integrating the space domain into training and exercises of the Bundeswehr, the EU and NATO
4.	Establishing a Bundeswehr Space Defence Academy in the area of responsibility of the Bundeswehr Space Command
5.	Establishing a classifiable wargaming centre as well as a simulations and space testbed
6.	Strengthening the responsibility of the Bundeswehr Space Command in exercising military responsibility over the space domain and improving the necessary command and control processes in accordance with the principle of unity in command
7.	Developing technical and operational capabilities to restrict/prevent military use of space by an adversary at national level and/or in cooperation with partners, including deep precision strike and hypersonic capabilities
8.	Developing and using highly agile standardised inspection, maintenance and refuelling/logistics satellites as well as reusable spaceplanes to resolve technical problems
9.	Developing active and passive protective measures for all space segments, including hardening against electromagnetic pulses and against the impact of nuclear explosions in space
10.	Developing and using highly agile low-signal surveillance and bodyguard satellites and reusable spaceplanes to inspect and effect an adversary's systems
11.	Installing and operating multifunctional, fully meshed and resilient satellite constellations at the Bundeswehr military branch responsible for the space domain, prioritising implementation in cooperation with partners, unless already available at EU level
12.	Implementing and using the concept of responsive space at national level and/or in cooperation with partners
13.	Ensuring access to space in the range of heavy equipment as well as sufficient responsive launch transport capacity to ensure national and European strategic independence in all payload classes and transport scenarios
14.	Increasing resilience to availability disruptions and failure of security-relevant space services
15.	Establishing terrestrial resilience measures to complement space systems
16.	Optimising time-critical decision in space operations within the context of multi-domain operations (MDO) of the Bundeswehr's command and control organisation
17.	Expanding the value chain in the small satellite sector, developing rolling satellite fleets in the context of technology developments and for regular cost-effective partial regeneration of satellite constellations (at national, bilateral and multinational level)
18.	Establishing the capability for comprehensive cyber operations and electromagnetic spectrum operations in the space domain
19.	Developing and implementing technologies to protect Earth from collision with near-Earth objects
20.	Developing powerful non-chemical space propulsion systems
21.	Promoting and testing re-entry and landing technologies
22.	Ensuring the continuous availability of key civilian personnel in times of peace, crisis and war
23.	Conducting whole-of-government exercises to increase resilience, e.g. in the context of the Interstate and Interministerial Crisis Management Exercise
24.	Developing public-private concepts for requirements, procurement, operation, provision and marketing in order to meet the requirements of security authorities
25.	Strengthening the Space Innovation Hub, e.g. by creating suitable instruments to support innovative ideas relating to security up to the point of market readiness, defining the requirements in cooperation with the Bundeswehr

Publishing information

Publisher

Federal Ministry of Defence
Federal Foreign Office

Editorial staff

BMVg, Referat Pol II 1

Graphics / layout / typesetting / print

Federal Office of Bundeswehr Infrastructure,
Environmental Protection and Services
DL, Hürth Printing Office
Horbeller Str. 52
50354 Hürth

Last updated:

November 2025

Note

This document is published by the Federal Government
as part of its public relations activities.

It is issued free of charge and not intended for sale.

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