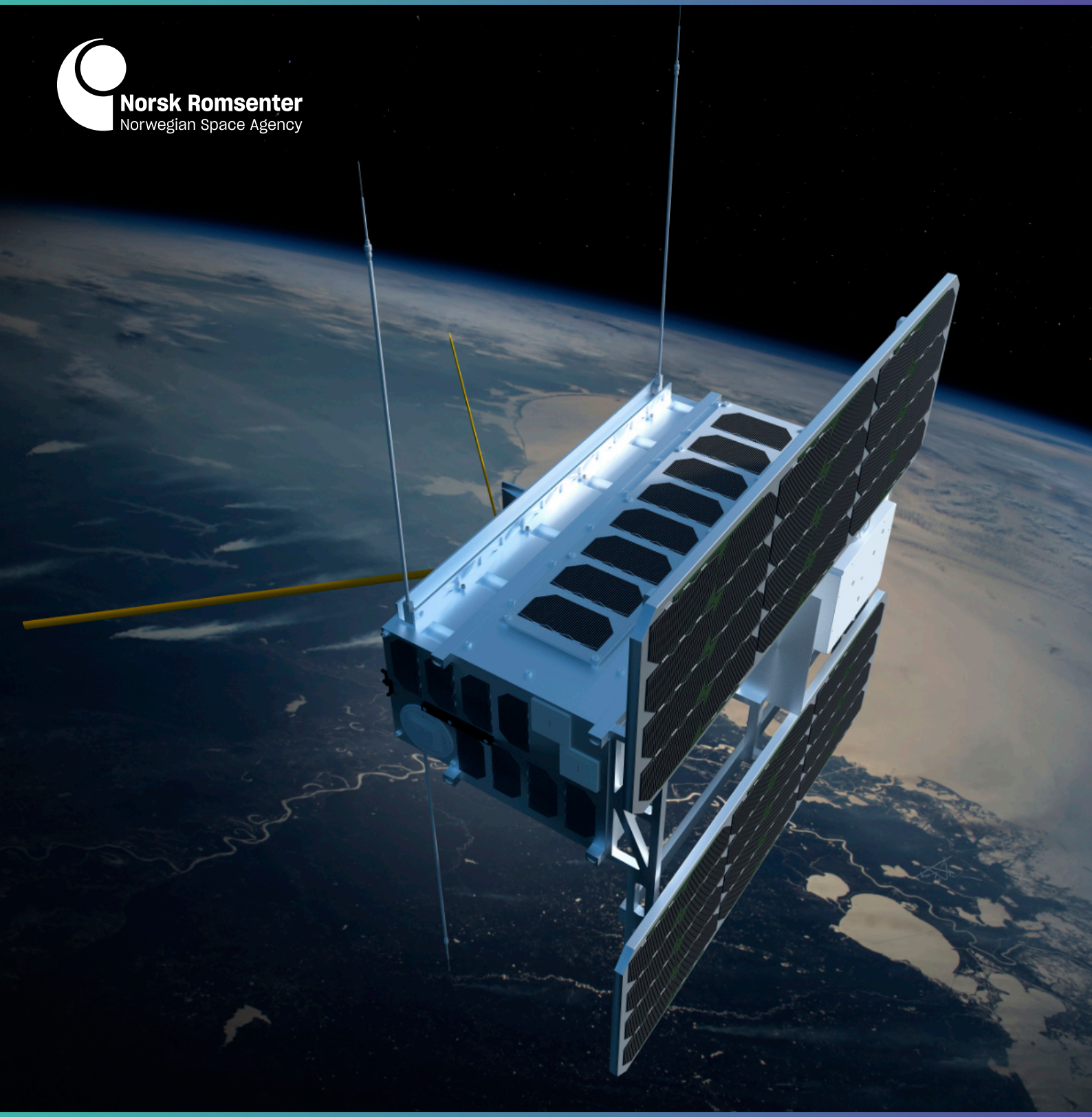
Norsk Romsenter
Norwegian Space Agency



The Government's strategy for Norwegian space activities

Summary of White Paper no. 10 (2019-2020) to the Parliament

Translation from the Norwegian. For information only.

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The principal objective of Norway's public funding of space activity is that it should be a means to advance Norwegian interests. The Government will endeavour to maximise the benefits Norway receives from its participation in space activities.

The Government has defined the following four goals for Norwegian space activities:

1. Promoting profitable companies, growth and employment
2. Meeting important needs of society and user groups
3. Ensuring satisfactory protection of important space infrastructure
4. Securing Norwegian foreign, security and defence policy interests in space activities and in outer space

In Norway as in other countries, government initiatives and funding have been driving forces in the development of space activities. The reasons for this are many and complex, including that it is an industry associated with costly investments and high risk, and that the development of many space applications is driven by public needs, including military needs. In recent years, private initiative and private funding have increasingly come into play.

Norwegian government funding of space activities has been oriented towards practical benefits, with the emphasis on business development and specific national user needs in just about every sector of society. There has been a pragmatic approach to organisation of the activities, with the emphasis on possible utilisation of available opportunities to meet national needs in a cost-effective manner.

International collaboration is often the most expedient way of meeting national needs. In other instances, it has been necessary to develop our own cross-sectoral solutions, such as in the case of the Norwegian satellites for monitoring maritime traffic. The strong focus on user needs has led Norway to invest most heavily in cross-sectoral applications, entailing a subsequent need for coordination between the relevant ministries and agencies.

The Government will:

- Continue its active involvement in ESA space programmes to support Norwegian business development and Norwegian user needs
- Consider continued participation in EU space programmes
- Participate actively in the UN Committee on the Peaceful Uses of Outer Space (COPUOS) with a view to developing international rules of law and promoting regulated use of space in accordance with Norwegian interests
- Consider continued participation in other international cooperation on bilateral and multilateral space programmes
- Facilitate more cross-sectoral cooperation consistent with national space interests
- Further develop the Norwegian Space Agency's role as the Government's expert adviser on strategic issues and as the coordinating executive body for managing Norwegian space activities
- Facilitate cross-sectoral needs assessments and feasibility studies relating to national space infrastructure solutions
- Strengthen the Space Committee's role as a cross-sectoral arena for coordinating Norwegian space activities through regular political representation on the Committee
- Strengthen the Space Security Committee's role as a cross-sectoral arena for coordination of security issues relating to space activities

1.1 Promoting profitable companies, growth and employment

Space activities make an important contribution to value creation in the Norwegian economy, both per se and by lending support to other industries. The Government's space policy is thus also a policy for profitable jobs, value creation and sustainable growth. The Norwegian space industry is the result of years of targeted public and private investments. Public funding of research, development and infrastructure has supported long-term investments in Norwegian business and industry. Industrial developments have for a large part taken place in sectors where the needs of Norwegian user groups have been particularly strong, such as the maritime sector. In some cases, Norway's geographical advantages have given us a competitive edge internationally. Norway has multiple satellite ground stations, including in Svalbard, on Jan Mayen Island and in Dronning Maud Land.

The combination of public policy instruments, industry's willingness to make long-term investments and discerning national customers has made Norwegian suppliers world leaders in certain niches and good contenders in others.

The Norwegian satellite communication industry generates approximately two-thirds of all space-related revenues in Norway. Telenor has been heavily involved in Norwegian space activities for a long time. The Kongsberg Group and Nammo are the other two biggest contributors to the upstream space sector.

Norway also has many competitive undertakings in the downstream space sector. This is not least true in the field of maritime space technology applications, including maritime communication, ocean monitoring and advanced navigation services.

In addition to the direct value creation that takes place in the space industry, space activities facilitate value creation in other industries.[1] This is value creation not normally ascribed to the space industry, but for which space-based services are nonetheless of decisive importance. These industries include the maritime sector, fisheries, offshore industry, aviation and overland transport.

Space activities contribute indirectly to value creation through transfer of technology to other high-technology industries, thereby producing what are sometimes mutually beneficial synergies. This is particularly the case in the defence sector and offshore industry, where, as in the space industry, there is a demand for sophisticated and basically vulnerable technical components that can be used under extreme conditions.

The Government wants to prepare the ground so that Norwegian industry can maintain its position and further develop its competitive edge. It is of the utmost importance for the space industry, as for other industries, that the general framework conditions are good, including access to qualified labour, a well-functioning infrastruc-

1 Menon (2017): *Samfunnsøkonomisk analyse av norsk offentlig satsing på romvirksomhet og OECD* (2019): The Space Economy in Figures

ture, uncomplicated regulation of business operations, good access to international markets and user-friendly policy and funding instruments.

In addition to the general business funding schemes, almost NOK 1.34 billion has been allocated to space activities in the Ministry of Trade, Industry and Fisheries' budget proposition for 2020. Much of this contributes directly or indirectly to promoting value creation in industry. In Norway, government funds for the development of space-related industry are mostly channeled through the ESA and EU space programmes Galileo/EGNOS and Copernicus. Technology support through the national sector-specific funding comes in addition to this.

Industrial growth and development are largely supported using three mechanisms that can be referred to as technology development, market access and insight into space-technology systems. The Government will pursue a space activities policy whereby Norwegian industry can compete in new market segments as they emerge. At the same time, we will follow up on policies that have yielded good results, such as our long-term involvement in European cooperation through ESA, maintain high environmental and security standards and ensure that our policies are consistent with Norwegian foreign, defence and security policy interests.

The Government will:

- Seek to ensure predictable and favourable framework conditions for Norwegian space-related industry
- Seek to facilitate that Norwegian industry can compete for contracts under international space programmes in which Norway participates
- Facilitate good coordination between relevant policy instrument and funding agencies so that national development support funding and schemes administered by the Research Council of Norway and Innovation Norway have the combined effect of supporting opportunities for the development of Norwegian space activities
- Facilitate utilisation by Norwegian industry of space technology as enabling technology for keeping abreast of competition and restructuring
- Facilitate technology transfer between the space domain and other sectors and technologies
- Facilitate sustainable utilisation of Norway's geographical space-technology advantages in mainland Norway, Svalbard, Jan Mayen Island and Dronning Maud Land within the framework of Norwegian foreign, defence and security policy interests
- Prioritise the work on clarifying whether public funding should be contributed to the establishment of a launch base for small satellites on Andøya
- Establish a set of regulations for small satellites that takes account of industry as well as other Norwegian interests associated with satellite activities
- Facilitate Norwegian industry's participation in and access to classified procurements in national and international space projects

1.2 Meeting important needs of society and user groups

Satellites constitute essential infrastructure for a series of fundamental tasks in society. Largely thanks to Norway's geography, topography and economic structure, space activities have been driven by the need to address specific challenges relating to maritime communication, safety at sea, environmental monitoring and assertion of sovereignty, among other things. With its large ocean areas, rough terrain and an economy dependent on the utilisation of natural resources and on maritime transport, Norway, more than many other countries, has benefited from satellites for communication, navigation and monitoring. This is particularly so in the High North.

Several indicators suggest that these benefits will increase in upcoming years. Development trends such as increased activities in the High North, industrial ocean-space developments and more frequent extreme weather give rise to new challenges for which satellite-based solutions will play an important role. The Norwegian Armed Forces increasingly depend on satellites. Furthermore, satellites support Norway's prioritised foreign policy objectives, such as mitigating climate change and achieving the UN Sustainable Development Goals.

International cooperation is the cornerstone of the Government's investments in space activities, including the effort to facilitate satisfactory coverage of the needs of Norwegian society and user groups. Through our membership of COPUOS, we are able to contribute to the further development of international regulations in the field. Our membership of the European Space Agency (ESA) contributes to the development of technology that can meet the needs of Norwegian user groups. Through participation in Galileo, EGNOS and Copernicus, we are able to influence and gain insight into operational infrastructure of great importance for addressing the needs of Norwegian society and user groups. Participation in such cooperation will in all probability continue to be one of the most important ways in which Norway can ensure that the needs of Norwegian users can be safely and efficiently met. At the same time, small satellite technology opens up new opportunities for developing our own national solutions.

Climate and the environment

Satellites play a decisive role in providing data for an informed climate and environmental policy. Many of the essential climate variables referred to in the reports from the UN Intergovernmental Panel on Climate Change (IPCC) are already largely based on satellite measurements. Facilitating access to reliable and relevant data sources for climate and environmental policies is therefore a priority task for the

Government's investments in space activities. Through the establishment of the EU Copernicus programme, researchers and decision-makers all over the world have been provided with a durable source of comparable data of relevance to a wide range of factors that impact the environment and climate. In accordance with the Environmental Information Act, the Government will seek to provide the public, researchers and decision-makers with expedient access to environmental data. This will be done within the framework of Copernicus and other relevant programmes, and by clarifying the Norwegian Space Agency's responsibilities. Through participation in the Copernicus programme, Norway can exert influence so that more observations are made in areas of particular interest to Norway. Environmental crime and Norway's International Climate and Forest Initiative are examples of Norway leading the way internationally in areas where satellite data are used as an important tool.

Civil protection and emergency planning

Satellites enable cost-effective monitoring of large areas and communication with areas that cannot be reached using other technologies. Satellites thus play an important role in preventing accidents at sea. It is important for ships to be able to receive reliable safety notices and to transmit and receive distress messages. Satellites also play an important part in handling accidents once they occur. For a long time, Norway has participated in international satellite cooperation that helps to prevent accidents and coordinate search and rescue operations. The Global Navigation Satellite System (GNSS) makes search and rescue operations more effective because it gives all participating resources access to accurate position data and common time references and enables more rapid and accurate handling of distress messages. In addition, the highly elliptical orbit (HEO) satellite communication system being developed by Space Norway will enable real-time video transmission in connection with accidents and search and rescue operations in the High North. Satellite data are also increasingly used as an important tool in the prevention of accidents and harmful effects of avalanches, land and rock slides, floods and glaciers.

Utilisation of space by the Armed Forces

Satellite technology has played an important role in military activities ever since the first Soviet and US satellites were launched in the 1960s. In the past, there has been a sharp distinction between civil and military use of satellite technology. Today, however, the distinction between civil and military space activities is fading. Defence technology has less of a head start and, in many cases, it is the civil space sector that leads the way, partly as a result of technology transfer from consumer electronics. In order to utilise the rapid development of technology in the civil sector, the Armed Forces have also become a major consumer of commercial services, which has given rise to solutions for multiple uses in many satellite-based systems.

In addition to commercial services, the Armed Forces rely on services that are primarily provided under bilateral agreements with other nations. Until recently, space activities were hardly mentioned in the Armed Forces' own strategy documents. This situation has changed rapidly in recent years, particularly after the presentation of the Long-term Plan for the Armed Forces (2017–2020).[2] The purpose of the defence sector's involvement in space activities shall be to procure the space-based capacities needed in the performance of its social mission. Norway, with its ambition of being 'NATO in the High North', has a special responsibility for developing good space-based service coverage in the High North and Arctic regions. These regions are of particular strategic importance to Norway, at the same time as both the ground and space infrastructure is often poorly developed compared with many other regions in which NATO operates.

Research and education

While new results of Earth observations can be relatively quickly put to use for the benefit of society, it usually takes significantly longer before new knowledge in the fields of astronomy, space physics, cosmology and fundamental particle physics can be put to practical use. Norway has strong expert communities in some areas of space research, and these have successfully tendered for major projects under the auspices of the Research Council of Norway and the European Research Council. There are also strong Earth observation environments at a number of universities and applied research institutes. Norway has a long-standing tradition of northern light research, a field of interplay between ground-based and space-based measuring instruments. It is also a venue for specialists in areas such as solar research, plasma physics and atmospheric physics. Based on such research, services are now being developed with a view to forecasting solar storms and space weather. It often takes some time before basic research is put to use in business or public administration.

The High North

The High North is the most important region for which Norway has strategic responsibility. Monitoring maritime traffic, pollution and fisheries is important for Norway's exercise of authority and effective emergency response. Norway needs satellites for monitoring and communication, to enable secure and efficient information sharing between agencies with responsibility for operations at sea. This applies to search and rescue operations, detection of illegal fishing, environmental crime and transport of hazardous cargo.

Transport and communications

The transport and communications sector makes extensive use of satellite services – on land, at sea and in the air. All modes of transport have gradually become more or less dependent on satellite navigation and communication. Reliability and access to

the systems are therefore critical. AIS base stations are used by the Norwegian Coastal Administration to collect important information about maritime traffic, and satellites provide detailed images of the traffic situation, even far out at sea. In aviation, increased use of satellite navigation to supplement ground-based radio navigation systems has been a trend for several years. Airspace monitoring is also increasingly based on systems that include satellite solutions. The use of satellite communication in aviation is also on the rise. Furthermore, satellite services play an increasingly greater role in overland transport. Both the road and rail sector make use of a wide range of satellite-based services for everything from building infrastructure to fleet management.

BOX 1.1 Automated Identification System (AIS)

AIS is a collision avoidance system introduced by the International Maritime Organisation (IMO), a specialised UN agency, for the purpose of increasing the safety of crews, ships and the environment. The AIS systems exchange information about vessel identity, position, course and speed using VHF radio signals.

Together with the Armed Forces, the Norwegian Coastal Administration operates a chain of AIS receivers along the coast. Today, the chain consists of about 60 receivers that receive AIS signals from vessels passing along the coast. The AIS data provide a detailed real-time overview of maritime traffic, and form an important basis for the vessel traffic services' traffic organisation and intervention in potentially hazardous situations. Such data can also be used to locate vessels in distress and nearby vessels in connection with rescue operations.

Overall, use of AIS data facilitates more rapid and efficient response to incidents as they develop. Real-time images based on AIS data are useful in the effort to control fisheries, fight environmental crime and prevent terrorism, in keeping borders under surveillance and in planning and facilitating maritime transport. The Norwegian Coastal Administration is the national agency responsible for capturing AIS data from ground-based receivers and satellites, and for the national distribution and international cooperation on exchange of such data. Some agencies receive AIS data directly into their systems. This makes a big difference for the joint rescue coordination centres, the Armed Forces, the Coast Guard, the coastal radio stations, the Ministry of Fisheries and the District Governor of Svalbard.

Development policy and multilateral cooperation

Earth observation satellites play an important role in today's efforts to reach the UN Sustainable Development Goals for 2030, including through collecting all kinds of data on precipitation and temperature variations, changes in land use in urban and rural areas etc. Development organisations as well as public authorities make good use of satellite-based information to inform knowledge-based decisions. Satellite-based technology can also dramatically improve communication and data sharing capacity in critical situations when telephone networks and internet connections are

down, and provide health and educational systems with access to telecommunications and data services in places without telecommunications infrastructure etc. Broadband access and digital tools are key elements in Norway's global education, health and humanitarian work. One example of this was the Ministry of Climate and Environment's announcement in June 2019 that Norway would provide the world with free access to high-resolution satellite images of the tropics. The optical satellite images procured by Norway's International Climate and Forest Initiative over the foreign aid budget will also capture information about everything from small infrastructural changes in urban areas to changes in habitats that are hotspots for the spread of infectious diseases such as malaria. Facilitating research and establishing a knowledge base for international negotiations, including negotiations on climate and environmental agreements, are already important parts of the Norwegian diplomatic toolbox.

Agriculture

Space technology is being used in agriculture in a number of ways. The most advanced development is the use of positioning services for precision farming machinery. There is also an increasing number of applications based on Earth observations, and more services are expected in the years ahead. Space technology enables better definition of borders, documentation of drainage systems and mapping of land resources. Use of positioning services in connection with grazing husbandry in outlying fields enables better monitoring and herding of animals and makes it easier to follow up sick or injured animals. Under the Copernicus programme, snow maps have been developed for reindeer herding. In forestry, satellite navigation is used for valuation, registration and operational planning.

Fisheries

The fishing fleet is largely dependent on satellite navigation. Until recently, this dependency was covered by the US-owned Global Positioning System (GPS). Going forward, GPS, the Galileo system and systems from the Russian Federation (Glonass) and China (Beidou) will be used in combination. More use can also be made of satellites and other space technology to collect information about activities at sea. This can be relevant as a basis for research and control of activities in Norwegian territorial waters, among other things. Access to satellite-borne AIS sensors has proved very useful in mapping fisheries in waters outside our territory and vessels sailing under foreign flags. Today, Norway owns several satellites that receive and register AIS signals transmitted from vessels. 'Radar satellites', including synthetic aperture radars (SAR), enable registration of object, surface and terrain attributes based on how the radar signals are reflected, regardless of light and weather conditions. This has proved to be a very useful tool for registering pollution in the form of oil spills. Like fishing vessels, vessels used in aquaculture also need reliable navi-

gation systems. This applies to wellboats as well as other service vessels. They operate in the close vicinity of aquaculture facilities and in some cases use dynamic positioning in connection with work operations. From a supervisory perspective, satellite technology is useful in connection with escaped fish, emissions, toxic algal blooms, oil spills etc.

BOX 1.2 Independent national capabilities - examples

Roughly speaking, Norway can secure independent capabilities in three ways. Firstly, full self-reliance can be achieved through Norwegian control of space systems. This will give a high degree of control and insight, and thus entail security and industrial advantages. Secondly, Norway can enter into binding bilateral or multilateral cooperation agreements as co-owner of or a partner for space-based infrastructure. This entails less control and insight and some degree of dependency on others. Thirdly, space-based services can be utilised without any ownership of the infrastructure. This could potentially entail very little control and insight, and access will be fully dependent on others. National space needs tend to be covered through a combination of the above. Building independent national capabilities is costly, and a cost-benefit analysis must be carried out in each individual case.

Independent national capabilities are desirable in many contexts, and in line with Norwegian space policy as set out in white paper (Report No 32 to the Parliament (2012-2013)) Between heaven and earth: Norwegian space policy for business and public benefit. The report states that '[a] certain degree of national control and independent capability is required to secure our interests, even in the case of commercially obtainable services'. Compliance with this policy can be seen in the Norwegian solution for Arctic satellite communication under the auspices of the government-owned company Space Norway. High elliptical orbit (HEO) satellites are to provide aviation and shipping with broadband capacity, so that aircraft and ships have reliable internet access in all parts of the Arctic region, and so that broadband can be offered on intercontinental flights passing through this region. From a military point of view, the project will provide nationally controlled broadband coverage in the High North. Another example of compliance with this policy is the Norwegian Coastal Administration's AIS satellites for maritime surveillance and safety at sea, described in white paper (Report No 33 to the Parliament (2017-2018)) National Transport Plan. The satellites were developed through collaboration between the Norwegian Space Agency, the Norwegian Defence Research Establishment (FFI) and industry. The Norwegian Coastal Administration currently has four satellites in operation. There are plans for launching new maritime surveillance satellites with a view to getting a better overall picture of maritime traffic. The defence sector is and will continue to be a major consumer of data from these surveillance satellites.

The Government will:

- Facilitate utilisation of space activities as a cost-effective solution to meet important needs of society and user groups
- Help to ensure that Norwegian technology communities are able to procure space-based solutions to meet the needs of Norwegian users
- Consider the need to facilitate national and cross-sectoral use of small satellites, including for the purpose of meeting the needs of users in the High North and at sea
- Improve coordination between civil and military space activities
- Seek to ensure that Norwegian users of Earth observation data have necessary access to data from Norwegian and international satellites and that Norwegian R&D communities contribute to innovative and cost-effective cross-sectoral solutions
- Provide easy public access to information about the environment in line with the principles behind the Environmental Information Act
- Work to ensure that Norwegian space research and expertise maintain a high international level
- Continue work relating to the 'Space2030' agenda under the auspices of COPUOS
- Help to combat environmental and fisheries crime through utilisation of satellite data
- Contribute to increased use of satellite data in the international effort to achieve the Sustainable Development Goals, in cooperation with the European Commission, relevant UN organisations and the Group on Earth Observations (GEO)
- Strengthen developing countries' access to Norwegian analytical and tracking tools through the Blue Justice initiative against transnational fisheries crime

1.3 Ensure proper protection of space-related infrastructure

Security is an important and complex issue for Norwegian and international space activities. On the one hand, satellite services are important tools for improving security and reducing vulnerability, in the form of cost-effective and operationally reliable solutions, among other things for ocean monitoring, landslide monitoring, maritime search and rescue capabilities and intelligence gathering. On the other hand, society's growing dependency on satellite services gives rise to new vulnerabilities in the form of natural and human-made threats against satellite data and signals and pertaining infrastructure. Signal loss or interference can cause serious damage to important societal functions, such as weather forecasting, power supply, payment transfers, communication and navigation. More use of satellite services thus contributes to simultaneously reducing and increasing vulnerabilities in society.

The Government wants Norway to utilise the many possibilities for greater value creation, civil protection and efficient public administration offered by satellite technology. At the same time, an overall space policy must take account of the new vulnerabilities that arise when society becomes increasingly dependent on satellite services.

Loss of satellite services can have major consequences and in many cases be a threat to life and health and entail great financial losses. If worse comes to worst, it can threaten our ability to protect national security interests, since both surveillance and military operations are largely dependent on the use of satellites. At the same time, the space-related infrastructure needs to be protected against both undesirable incidents and activities that pose a threat to security.

Other than technical failure and human error, undesirable incidents affecting satellites, ground-based infrastructure and satellite signals are primarily space weather, space debris and interference. *Space weather* (solar storms) can interfere with navigation and communication signals and damage satellites and receivers. It is often possible to forecast such phenomena, however, whereby technical measures can be put in place to protect the infrastructure. Norway has access to the space weather forecasting services delivered by the US National Oceanic and Atmospheric Administration (NOAA). *Space debris* consists mainly of fragments of discarded or broken satellites and launchers, and at very high speeds, even coin-sized objects can inflict serious damage on satellites in orbit. Several attempts at establishing international guidelines to limit the spread of space debris have failed. *Interference* occurs when radio signals are disrupted by other signals transmitted on the same or a similar frequency. During the period of disruption, satellite-based functions can be significantly reduced. The most important ways of limiting interference are to control the

allocation of frequencies and satellite orbits and to have adequate means of detecting and eliminating disruptions affecting satellites, ground stations or users.

Security threats to satellite infrastructure include a wide range of possible actions from all kinds of sources. Some attacks may be intended to disrupt or prevent the use of a particular satellite service, while the purpose of other attacks is to spread misinformation or to gather intelligence. Attacks intended to disable a satellite service include physical destruction, cyber-attacks and/or jamming. Rather than disabling a satellite-based system, the attacker may want to infiltrate it, either to gather information or by manipulating the data being transmitted.

It is in the common interest of all states to limit undesirable incidents. In the case of activities that threaten security, all states are primarily interested in protecting systems owned by themselves and their allies. Measures to combat security threats must therefore largely be handled both nationally and in cooperation with allied states and international organisations. One of the most important policy instruments for safeguarding the security of Norwegian space infrastructure is the Security Act. Norway is also a party to several international agreements that concern the protection of space infrastructure.

The Government will pursue a comprehensive space security policy, viewing the various measures in conjunction with each other and applying a cross-sectoral perspective. A fundamental precondition for being able to pursue such a policy is that Norway maintains and further develops enough national expertise on possible ways of dealing with threats to space infrastructure. Such expertise will enable us to identify vulnerabilities, implement national security measures and make good use of international cooperation. The Space Security Committee, led by the Ministry of Trade, Industry and Fisheries, will be a key arena for public authorities' handling of security challenges associated with space activities.

The Government has presented a strategy for positioning, navigation and timing (PNT). It addresses vulnerabilities associated with, among other things, the use of global satellite navigation systems. The strategy forms part of the Government's work to strengthen civil protection, and its chief goals are to enable continued use of the PNT systems, to raise awareness of how such systems are used in society and to make society less vulnerable to PTN system failures.

Norway is completely dependent on international cooperation for building and operating large satellite systems. In upcoming years, the EU space programmes Galileo, EGNOS and Copernicus will play a key role in meeting the needs of Norwegian users. Active participation in these programmes increases our expertise on utilisation of these services. Participation in international organisations like ESA and COPUOS helps to strengthen Norwegian expertise on space security. The Government will endeavour to ensure that Norway makes the most of these opportunities.

The Government will:

- Facilitate exchange of information and coordination between relevant administrative and supervisory bodies relating to risks associated with space infrastructure
- Put into place timely and forward-looking Norwegian legislation in the area, providing sufficient legal authority for protecting important space infrastructure
- Make active use of satellite technology to reduce vulnerabilities in society
- Strengthen Norwegian public authorities' situational awareness of space through cross-sectoral cooperation
- Take steps to ensure that Norway has the expertise needed to protect important infrastructure from unintentional and intentional disruptive or harmful acts
- Follow-up the space-related measures set out in the national PNT strategy
- Ensure that Norwegian public authorities have sufficient control of important space infrastructure, primarily through legislation and contractual commitments
- The Government will, though its ownership of Space Norway, offer cost-effective and properly managed space-related infrastructure to meet Norway's most important societal needs, and, through its ownership of Andøya Space Center, facilitate access by Norwegian industry, research communities and administrative agencies to infrastructure for technology testing and natural science research
- Strengthen Norwegian expertise relating to space security through international cooperation, and facilitate contact between competent public agencies in order to utilise expertise and gather know-how relating to space security
- Through international forums, particularly COPUOS, seek to limit the amount of space debris
- Participate in the work of COPUOS and others to develop international 'rules of the road' for space traffic
- Participate in COPUOS's Space Weather Expert Group, and help to further develop European space weather monitoring
- Clarify the roles and responsibilities of different administrative agencies relating to space security matters

1.4 Securing Norwegian foreign, security and defence policy interests in space activities and in outer space

The new space age comes in a time when the global economy's centre of gravity is moving East and the Western economies' technological head start is decreasing. At the same time, there is strategic rivalry between the US and China and less multilateral cooperation. This creates the basis for a fourth development trend, whereby security and defence policies become important driving forces behind developments in space. Security policy has always been a dimension of space activities, but, with new technology, lower costs and digitalisation, more public and private players are entering the field, substantially raising the level of activities. The speed and scope of technological change makes it difficult to predict exactly what possibilities, vulnerabilities and seeds of conflict these developments will bring with the passage of time.

Access to data and space-based services increasingly impact the balance of power between states. As a result of developments in missile technology, missile defence systems, anti-satellite (ASAT) weapons, cyber-weapons and electronic warfare, outer space has become an increasingly important dimension of security and defence. The risk of conflict increases in step with the strategic importance of space.

Implications for Norway include that our territories in the Arctic and Dronning Maud Land gain greater strategic importance. These areas offer favourable locations for ground-based space infrastructure that delivers services for which there is an ever greater demand. At the same time, a more complex and unpredictable situation in space will be challenging as we become more and more dependent on space-based services for civil protection and very vulnerable when these services fail.

A general challenge associated with space-based services is that capabilities and technology increasingly cater for multiple uses. The fact that one and the same satellite can serve both civil and military purposes has implications for international law. Exports of certain space-related goods, technology and services are also subject to licensing and must be handled in accordance with applicable export control regulations.

Norway is reliant on a rules-based world order and binding multilateral cooperation. The absence of international agreements on how to best regulate space activities and outer space in a time of increasing rivalry and unpredictability requires more knowledge and focus on space activities and the importance of outer space for our foreign policy, security policy and defence policy. At the same time, greater awareness of the security-policy aspect of developments in outer space will help to ensure that our efforts on the international arena strengthen Norwegian security.

In order to contribute to the development of space law and promote regulated use of space in accordance with Norwegian interests, Norway became a member of COPUOS in 2017. Norway has also initiated work on a new Space Act to replace the act currently in force from 1969.

Multilateral and bilateral processes are under way relating to the above issues, and the challenges are being discussed with our allies in security policy forums. The Government's policy must help to secure Norwegian foreign, security and defence policy interests relating to space activities and in outer space through international cooperation and multilateral institutions, at the same time as we protect the interests of our allies.

The Government will:

- Secure Norway's freedom of action and utilisation of outer space and space activities within the framework of international law
- Ensure that we fulfil our commitments to our allies and promote our foreign and security policy interests in outer space and in space activities
- Ensure Norway's active participation and support for a UN-led legal regime in outer space that promotes predictable framework conditions and peaceful coexistence

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