



# Finland 2025

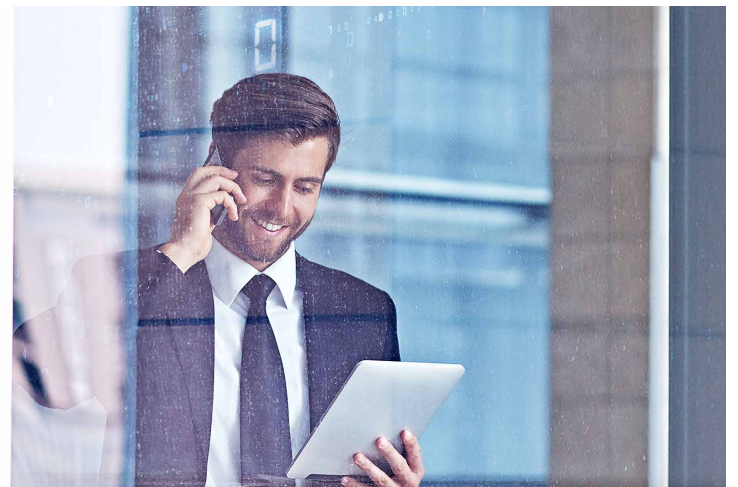
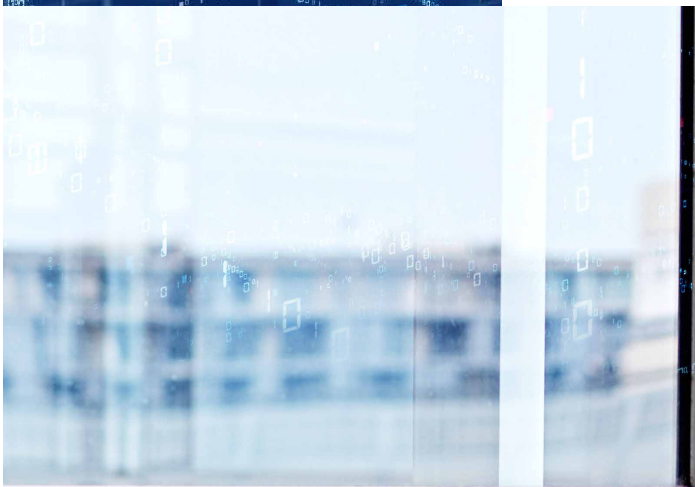
The world's most attractive and agile space business environment which benefits all companies operating here



Ministry of Economic Affairs  
and Employment of Finland



MINISTRY OF TRANSPORT  
AND COMMUNICATIONS



**The space strategy working group for updating measures  
which promote the growth and employment of the space sector**

Riikka Heikinheimo, chair, Confederation of Finnish Industries; Ilona Lundström, Ministry of Economic Affairs and Employment; Laura Vilkkonen, Ministry of Transport and Communications; Raimo Jyväsjärvi, Ministry of Defence; Nina Brander, Prime Minister's Office; Pekka Soini, Business Finland; Juhani Damski, Finnish Meteorological Institute; Tua Huomo, VTT Technical Research Centre of Finland; Juha-Matti Liukkonen, Reaktor Oy; Sauli Eloranta, Rolls Royce Oy; Petri Niemi, G2Invest Oy; Jukka Harju, Tuija Pulkkinen, Aalto University, until 31 Aug 2018 and Minna Palmroth, University of Helsinki, since 1 Sept 2018. Secretariat Maija Lönnqvist, Ministry of Economic Affairs and Employment; Olli Lehtilä, Ministry of Transport and Communications; Markus Ranne, Business Finland.



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Intelligent transport is undergoing an intense revolution and accurate position determination is a key factor in the development of automatic transport.

# Space business is an opportunity for Finland

The New Space Economy will change space business globally. It refers to space business which is carried out by new operators on a commercial basis independent of the government.

The development of small satellites and private launch services enables cheaper and simpler access to space. Space applications and data, such as everyday navigation, telecommunications and weather services, are used in almost all industries. Space activities are also of ever-increasing strategic importance to the functioning of society.

The change in the operating environment also benefits companies operating in other industries which are able, in their own business, to exploit data generated by small satellites, for example. The New Space Economy is an opportunity for Finland. Finnish digital expertise serves as a basis for the utilisation of space applications and data in new ways. It is important for Finland to ensure that the business benefits return to Finland in the long term and that the space business ecosystem evolves in Finland. There are already Finnish space companies which are gathering capital globally. Space applications also play an important role in the development of the operations of the European Space Agency. Similarly, the data and services produced by the European Union space programme serve as a basis for the new globally scalable business.

Along with the revolution of the space sector, Finland joined the family of space nations when the first Finnish satellite, Aalto University's Aalto-1, was launched into space in summer 2017. The first commercial satellite, X-1, developed by Iceye Oy, was launched into space in January 2018, on the same day as the President of Finland ratified the Act on Space Activities. Several other small-satellite projects are in hand.

The sector is undergoing a rapid revolution, which is why it has also become necessary to update the national space strategy drafted in 2013 with measures which promote a favourable operating environment and sustainable growth of the space sector. Many of these measures have already been realised, examples being the New Space Economy programme launched by Business Finland in spring 2018, the Act on Space Activities [63/2018] which entered into force in January 2018 and the Business Incubation Centre established by the European Space Agency in Finland. Updating the strategy continues the work started with these measures.

Through a joint effort of enterprises, research and administration, and with the help of our international network, we can make Finland an agile, bold and renewing actor in the utilisation of space.

**Mika Lintilä**  
Minister of Economic Affairs



# Services based on space activities are part of our everyday lives

Along with the development of digitalisation, the data, services and applications based on space activities have become an increasingly important part of our everyday lives. Satellite navigation offers location information to billions of smartphones and navigators at the precision of a couple of metres. People find their way to their destination with ease, even in unfamiliar environments, and they receive real-time local weather data on their smart phones.

Europe is going through an important stage in the evolution of satellite navigation as the first services have only recently been introduced in the European global satellite navigation system, Galileo, scheduled to be in full use in the 2020s. For Finland it is of utmost importance that, in the commissioning of European satellite systems, equal coverage is ensured here in the Nordic countries as well, where our geographic location poses some challenges for the full exploitation of accurate navigation. The significance of accurate navigation is emphasised in particular in the transport sector along with new transport services and automated transport solutions. The new transport solutions and more efficient utilisation of condition data also have a vitally important role in the fight against climate change.

Comprehensive satellite navigation solutions, efficient data communication links and high-quality expertise in condition data together enable the development of new innovations and business in Finland. The space sector is changing, as a

result of which opportunities have also opened up for smaller operators to gain a foothold in the market alongside large industrial companies. Even though we already have the first Finnish small satellites in orbit, we have no reason to be content with our position as a small space nation. In addition to the actual satellites, we should focus our attention especially on the increasing amount of space data and its exploitation.

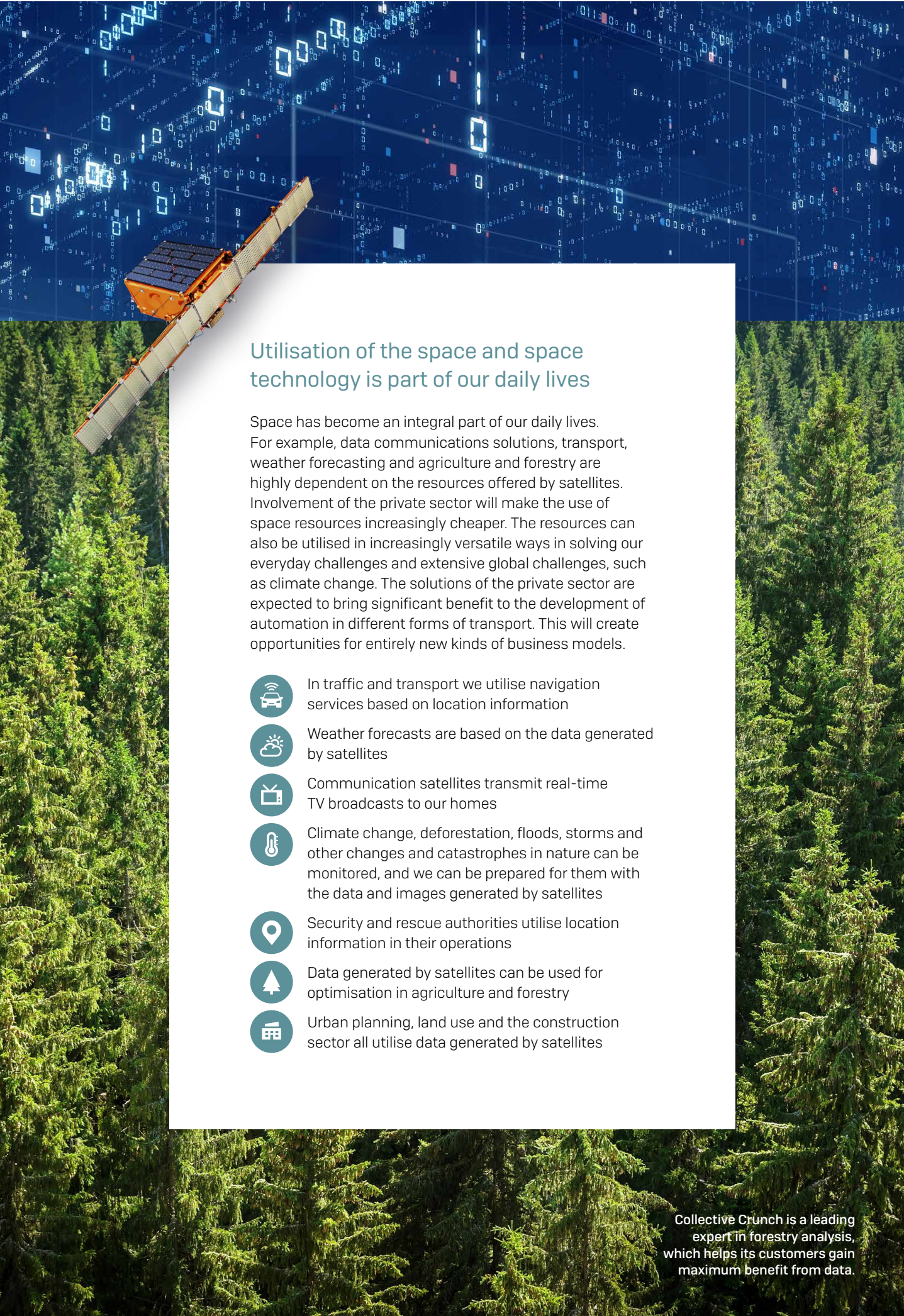
As in many other technical fields, the space sector is no longer driven mainly by the authorities, which has been characteristic of it until now. The sector is evolving based on the needs of an ever-increasing number of users of space data, and the role of the economy is emphasised in the generation of solutions serving these needs. Public administration must provide enterprises with the prerequisites to openly produce high-quality space data for various purposes. Solutions based on space are present in all sectors of our society, and our national space strategy must be updated to correspond to the changes in the operating environment.

Finland and Finnish companies have, on the strength of what they choose to do and emphasise, every chance of rising to be among the best and most sustainable actors in exploiting the opportunities that space has to offer.

**Anne Berner**

Minister of Transport and Communications





## Utilisation of the space and space technology is part of our daily lives

Space has become an integral part of our daily lives. For example, data communications solutions, transport, weather forecasting and agriculture and forestry are highly dependent on the resources offered by satellites. Involvement of the private sector will make the use of space resources increasingly cheaper. The resources can also be utilised in increasingly versatile ways in solving our everyday challenges and extensive global challenges, such as climate change. The solutions of the private sector are expected to bring significant benefit to the development of automation in different forms of transport. This will create opportunities for entirely new kinds of business models.



In traffic and transport we utilise navigation services based on location information



Weather forecasts are based on the data generated by satellites



Communication satellites transmit real-time TV broadcasts to our homes



Climate change, deforestation, floods, storms and other changes and catastrophes in nature can be monitored, and we can be prepared for them with the data and images generated by satellites



Security and rescue authorities utilise location information in their operations



Data generated by satellites can be used for optimisation in agriculture and forestry



Urban planning, land use and the construction sector all utilise data generated by satellites

Collective Crunch is a leading expert in forestry analysis, which helps its customers gain maximum benefit from data.

# The New Space Economy – revolution of the space sector

The Finnish national space strategy for 2013–2020 was approved in 2013. The Finnish Space Committee guides and monitors the implementation of the space strategy. The goal is that the space activities in Finland are world-class in selected fields by 2020.

## The main aims of the strategy are:

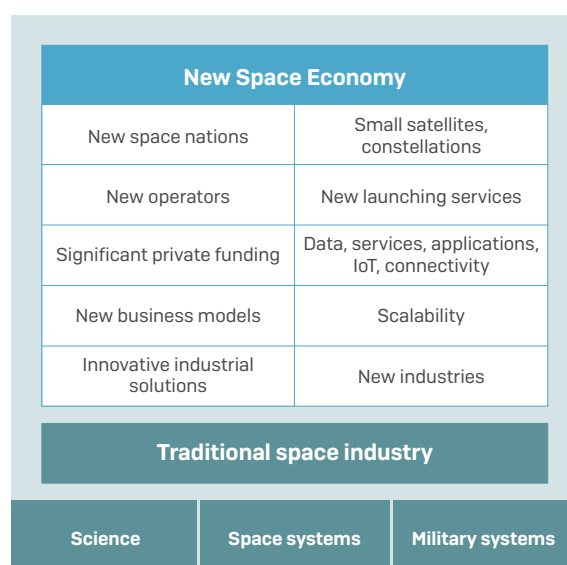
1. Space applications are developed to meet the increasing requirements of the Arctic area.
2. The competitiveness of services is strengthened by open geographic data.
3. The level of scientific research is raised by utilising the programmes of ESA and the EU.
4. The space industry will respond to the increasing international competition with applications and specialisation.

After the preparation of the national strategy, the emphasis in space activities has shifted to the utilisation of new business opportunities. Publicly funded space research and investments in complex systems have promoted change and growth in the space sector from the traditional space industry to a sector which produces services through space data and applications. Space is one of the central enablers of digitalisation and platform economy.

The traditional space industry develops, designs and manufactures components and instruments for satellites as well as the systems required in them for the needs of the private and public sector. Important financing channels for the traditional space industry include, for example, orders placed by ESA, the European Organisation for the Exploitation of Meteorological Satellites EUMETSAT and the EU.

In recent years, a new operating model, the New Space Economy, has emerged next to the traditional

space industry. The New Space Economy refers to business using small satellites to deploy systems which offer commercial services and utilising space data and applications. The New Space Economy enables easier and cheaper access to space than ever before. The traditional space industry and the New Space Economy complement one another. The New Space Economy is a market-oriented continuum for work in the space sector which was formerly publicly funded at a national level.





## Space strategy renewal

The revolution in the space sector challenges Finland to renew its space strategy. Mika Lintilä, Minister of Economic Affairs, and Anne Berner, Minister of Transport and Communications, set up a working group in March 2018 with the task of preparing a proposal for the new measures in the Finnish space strategy to promote growth and employment.

The aim of the working group was to create a firm common understanding between representatives of the economy, research and administration on what kind of choices, emphases and structures will enable Finland to be among the top nations in utilising the opportunities that space has to offer. The proposal drafted by the working group was to meet the following opportunities and challenges, among others: securing the business prerequisites of the New Space Economy; promoting the introduction of new innovations in different application areas; securing access to the data generated by satellites; improving the international visibility of Finnish space sector; efficient utilisation of the frameworks offered by the European Space Agency and the European Union; public measures to support forerunner markets; the role of research and education; and efficient space administration.

The mandate of the working group extended from 1 March 2018 to 31 October 2018. The working group gathered to meet seven times and it organised two complementary workshops and a discussion for companies. The meetings of the working group were divided across four themes: prerequisites for

entering the market; space data and applications; research and education; and international impact. Under each theme, the working group heard enterprises and research organisations: Iceye Oy, Space Systems Finland Oy, Here Oy, Collective Crunch Oy, the National Land Survey of Finland/ Spatial Data Centre, the Finnish Meteorological Institute and the European Space Agency.

The working group was chaired by Riikka Heikinheimo from the Confederation of Finnish Industries. The members of the working group were Ilona Lundström, Ministry of Economic Affairs and Employment; Laura Vilkkonen, Ministry of Transport and Communications; Raimo Jyväsjärvi, Ministry of Defence; Nina Brander, Prime Minister's Office; Pekka Soini, Business Finland; Juhani Damski, Finnish Meteorological Institute; Tua Huomo, VTT Technical Research Centre of Finland; Juha-Matti Liukkonen, Reaktor Oy; Sauli Eloranta, Rolls Royce Oy; Petri Niemi, G2Invest Oy; Jukka Harju, Tuija Pulkkinen, Aalto University, until 31 Aug 2018 and Minna Palmroth, University of Helsinki, since 1 Sept 2018.





## The recommendation from the working group for the development of space administration

The task of the working group was to assess how Finnish space administration should be organised to best promote the creation of an attractive operating environment in Finland.

At the moment, Finnish space administration is decentralised. The Finnish Space Committee operating in conjunction with the Ministry of Economic Affairs and Employment gathers the views of different administrative branches. The ministries are, however, themselves responsible for the development and utilisation of space activities in their own administrative branch. In a survey ordered by the Ministry of Transport and Communications, the shortcomings identified concerning decentralised space administration were difficulties in coordination, lack of clarity of responsibilities as well as scattered resources and lack of full-time commitment.

The working group concludes that development of space administration is needed. The working group did not, however, want to take a stand concerning the structure of the administration, but rather concluded that further work by the ministries is required for that.

According to the working group, the tasks of space administration are to coordinate Finland's international representation and impact, to promote the opportunities of the sector in its global revolution, to implement, monitor and update the space strategy measures as well as to implement and develop legislation and permit procedures related to space activities. The working group found that, for the completion of these tasks, at least partial centralisation of the administration would be necessary.

Additionally, adequate personnel and potentially also economic resources should be secured for the administration. The working group found it important not to create a space administration with a stiff, permanent structure but rather an administration that is flexible and capable of reacting to changes in the sector.

The Finnish Meteorological Institute provides weather services and consultation for various users.





# VISION

Finland is an attractive operating environment for the developers and adapters of the space sector. We have supportive legislation and a comprehensive field of easily approachable operators. Our companies base their operations on versatile expertise and are global leaders in producing and applying space solutions.

ICEYE offers timely and reliable radar satellite imaging for a variety of industries.

Space Systems Finland supports its customers in designing and developing complex industrial applications such as data processing applications, control systems and test automation solutions.



# Prerequisites for entering the market

## Measures

**PILOT PROJECTS** Business Finland increases the attractiveness of the sector by enabling and encouraging experimental pilot projects.

**ENABLING** The Ministry of Economic Affairs and Employment, the Ministry of Transport and Communications and Business Finland open opportunities provided by space to a larger group of enterprises.

Business Finland identifies and facilitates the international opportunities to utilise Finnish space solutions and space data and facilitates investments in Finland.

**FINANCING** The Ministry of Economic Affairs and Employment, Business Finland, Finnvera and Tesi facilitate patient financing for space infrastructure projects by attracting foreign financing and by developing public funding opportunities.

**REFERENCES** The authorities make acquisitions through which the enterprises in the space sector will receive their first reference. Business Finland will continue the financing of preparations for innovative public procurements.

**LEGISLATION** The authorities ensure that the national legislation supports business and does not unnecessarily limit it and that the permit processes related to space activities work smoothly (authorisation for space activities, export licences, radio licences).

The authorities involved, together with the security authorities, form a common opinion on ground station investments and implement the necessary amendments in legislation in consideration of national security.

## Goals by 2025



The turnover of enterprises producing satellite technology (upstream) has grown 25-fold (current estimate EUR 20 million). The turnover of enterprises applying space technology and space data (downstream) has grown 10-fold (current estimate EUR 300 million).\*



Utilisation of information and signals based on space activities is an everyday part of the business of Finnish companies irrespective of the sector. Fifty new space sector companies have been established here.



Finnish companies and research organisations are involved in designing, implementing and utilising the space infrastructure jointly determined by the public and commercial sector, as well as its validation and ground segment.



Finnish operators are leading and attractive partners in the best international projects of the sector.



Finnish companies in the space sector have gathered a total of MEUR 300 of capital from abroad. The Finnish operating environment of the space sector attracts the best experts to the country. Ten notable foreign space companies have established an operative unit in Finland.



The authorities make 1% worth of reference procurements out of their annual procurements. The procurement plan is published in advance annually. The authorities have adequate satellite capability in their use.



The needs for amendments to national legislation have been analysed from the viewpoint of national security by 2021.





# VISION

The enterprises and research organisations operating in Finland resolve the challenges of sustainable growth by means of top-class space activities in close cooperation with the operators of the target market and the scientific community around the world.

The space business employs more than 230,000 people in the EU area. One third of the world's satellites are manufactured in Europe.



# International impact

## Measures

**SPACE ADMINISTRATION** The Ministry of Economic Affairs and Employment updates the tasks and composition of the Finnish Space Committee and enhances its activities. In addition, the ministries foster the establishment of a centralised space administration.

**INTERNATIONAL REPRESENTATION** The Finnish Space Committee maps out the Finnish representatives in international bodies, expert groups and standardisation organisations and coordinates the nomination and activities of the representatives in the future.

**MARKETING** Ministries, agencies, enterprises and research organisations market Finnish space knowhow together and ascertain its visibility internationally, and actively and systematically promote the access of Finns to influential positions in international organisations.

**INTERNATIONAL REGULATIONS** The ministries involved participate in determining the international regulations in the EU, COPUOS and through other international cooperation, promoting especially the sustainable use of space, new business opportunities and security aspects.

**ESA PROGRAMMES** The Finnish ESA delegation, enterprises and research organisations are active in the creation and planning of ESA's new programmes and missions, utilising especially the small satellite/IOD type or other agile solutions that are quick and inexpensive to develop. The Ministry of Economic Affairs and Employment and Business Finland analyse the possibilities for additional funding for ESA's optional programmes.

**EU SPACE PROGRAMME** The Ministry of Economic Affairs and Employment and the Ministry of Transport and Communications will impact the development of the EU space programme in the direction of promoting sustainable use of space, new innovations and new business opportunities. The goal is also taken into account during the forthcoming EU Presidency of Finland.

**IMPROVED COVERAGE** The Ministry of Transport and Communications promotes the resolution of coverage problems concerning Finland and Arctic areas and better availability of remote sensing materials and data communications links.

## Goals by 2025



The central operations of the space administration have been put together by 2020. The effectiveness and impacts of centralisation is assessed in 2023.



Finland is represented by the right parties in the most important international bodies and expert groups and especially in the space activities of the EU (space programme + research programme). A centralised space administration coordinates the opinions of Finland.



Finnish companies and research organisations participate actively in selected working groups of standardisation and industrial organisations (e.g. ISO, 3GPP, Eurospace, EAK, ECSS).



The accuracy of satellite navigation has been improved by 2022 to match the level of Central Europe, and more remote sensing data than today is available from the Arctic areas. The availability of data communications in Arctic areas based on satellites has been promoted through international cooperation.



Finnish companies and research organisations participate to a significant extent in the optional ESA programmes and new Finnish companies are involved. Finland's overall return from ESA's programmes meets the targets.



# VISION

Companies and research organisations operating in Finland renew the utilisation of space in a sustainable way and participate in the best space projects.

Centre of excellence for research in sustainable space conducts research on central scientific matters from the viewpoint of sustainable utilisation and develop sustainable technologies with the aim of improving the international competitiveness of Finnish space expertise.



# Research

## Measures

**JOINT PROJECTS** Business Finland, research organisations and companies promote business-oriented joint projects between companies operating in the upstream and downstream sectors and research organisations in the fields of communication, navigation and remote sensing.

**FUNDING** Business Finland's offering includes funding for cooperation which promotes growth and improves expertise in space sector companies and research organisations. The Academy of Finland promotes high-quality, influential and responsible research in the space sector which is based on competition and supports the creation of cooperation networks in the high-quality projects it is financing.

**SUSTAINABLE DEVELOPMENT** Research organisations and funding agencies take the UN's goals for sustainable development into account in allocating research and funding.

**COMPETENCE** The Ministry of Economic Affairs and Employment, the Ministry of Transport and Communications and the Ministry of Education and Culture ensure that the ministries continue to cooperate to improve expertise base in Finland.

**TRAINING** To ensure an adequate expertise base, institutions of higher education will strongly focus on versatile education which serves the needs of the space sector.

## Goals by 2025



There are a larger number of high-quality joint projects ongoing between Finnish and foreign research organisations and enterprises.



Finnish companies and research organisations have a leading role in ESA and EU projects.



Finland is the home of leading applied research in the space sector, including in the areas of satellite navigation, remote sensing and data communications satellites, as well as the environment and climate change.



The operators of the space sector have no lack of expertise which would hamper their operation.



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