Nordic Innovation

The Nordic Space Technology Ecosystem

Mapping capabilities, gaps and opportunities for stronger Nordic collaboration

Nordic Innovation

Nordic Innovation is an organization under the Nordic Council of Ministers. We aim to make the Nordics a pioneering region for sustainable growth by promoting entrepreneurship, innovation and competitiveness in Nordic businesses. We support the Nordic prime ministers' vision that the Nordic region will become the most sustainable and integrated region in the world in 2030.

The Nordic Space Technology Ecosystem

Mapping capabilities, gaps and opportunities for stronger Nordic collaboration

Report for Nordic Innovation
by Danish Technological University (DTI), RISE and Aalto University (AYO)

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Preface

Space is not just about presence, control and power, but also a matter of building competitiveness, resilience and strategic autonomy. It is about the Nordic region's ability to stand on our own, protect critical infrastructure and create new industries. In 2025, the Nordic ministers for trade and industry signed a joint declaration for closer cooperation on space-related activities, with a focus on innovation, security and competitiveness.

The Nordic countries already have strong space industries. But if we want to compete with nations such as the United States and China, we need to stand together as one single region. Only then can we create an ecosystem that few regions in the world can match.

This report helps us to kick-start that work. By mapping the space capabilities and gaps in Denmark, Norway, Sweden, Finland and Iceland, the report provides us with the knowledge base and recommendations needed to create stronger Nordic space collaboration. The report shows us how the different Nordic strengths can play together and create common value.

Thanks to the partners Danish Technological Institute, Aalto University and Research Institutes of Sweden (RISE) for this important work. The report is highly valuable for Nordic Innovation and can serve as a guide when creating future initiatives. At the same time, the report fits into a broader Nordic context and supports the objectives of the Nordic declaration on closer space collaboration.

Sindre Bornstein,
CEO, Nordic Innovation

Crew-7 training at EAC with Andreas Mogensen. ESA - S. Corvaja.

Contents

Executive Summary

This study maps the space capabilities of Denmark, Finland, Iceland, Norway and Sweden and explores the possibilities for stronger Nordic collaboration within space innovation. Based on interviews with leading Nordic actors, the study finds that cooperation should not duplicate existing EU or ESA programmes but rather connect national strengths to overcome small domestic markets and scale-up barriers.

The analysis applies a broad definition of space technology, spanning upstream (satellites and launchers), midstream (data processing, AI and sensor fusion), and downstream (maritime, climate, transport and defence) applications. The Nordic region's true strength lies in its high complementarity: Swedish industrial depth and engineering, Finnish new space and digital leadership, Norwegian launch and maritime operational infrastructure, Danish specialised testing and nanosatellites, and Icelandic analogue environments.

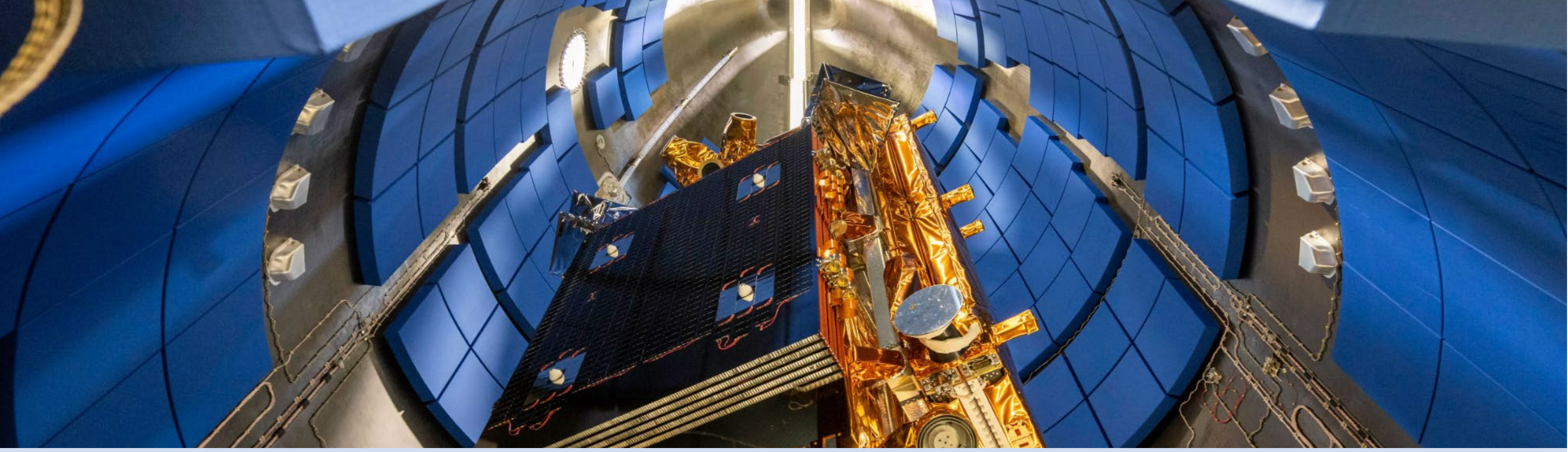
However, the ecosystem remains "under-connected". National silos create a persistent "valley of death" where strong research and early-stage innovations struggle to transition to commercial scale. Key bottlenecks include a lack of public sector anchor customers, limited visibility of regional testing infrastructure, and a shortage of specialised scale-up capital for deep tech hardware.

To bridge these gaps, the report presents a set of recommendations:

Immediate actions (0–12 months)
Create a Nordic space capability and test infrastructure atlas to share facilities; launch challenge dialogues with public sector users to trigger pilot-to-procurement pathways; and organise space application hackathons.

Medium-term initiatives (1–3 years)
Establish cross-border demonstration programmes; implement an SME testbed access voucher scheme; launch a joint space scale-up track to mobilise private co-investment; and build a stronger talent pipeline by connecting student space communities.

Long-term strategic moves (3–7 years)
Develop joint flagship missions (e.g. Arctic monitoring or resilient positioning/ communications) and position the Nordic countries as a premier European test region for space-enabled civil security and dual-use preparedness.



Copernicus Sentinel- 1D Encapsulation. ESA – M. Pédoussaut.

1. Introduction

Space technology is becoming a strategic foundation for modern societies. It supports communications, navigation, transport, emergency preparedness, climate and environmental monitoring, defence, fisheries, energy systems, digital services and critical infrastructure. What was once seen primarily as a specialised sector serving scientific missions and satellite operations is now increasingly an enabling layer for innovation, security and value creation across the wider economy.

The Nordic region has a strong starting point in this development. Across Denmark, Finland, Iceland, Norway and Sweden, the ecosystem combines world-class research environments, advanced technical expertise, unique Arctic geography, strong ground segment infrastructure, high levels of digital maturity and a growing base of specialised companies and startups. At the same time, the Nordic space ecosystem remains fragmented. Activities are largely organised within national systems, shaped by national strategies, funding structures, institutional mandates and participation in European and European Space Agency (ESA) programmes. Domestic markets are small, many companies operate in specialised niches, and there is a persistent gap between research, early-stage innovation and commercial scale-up.

This creates a central strategic challenge. Individually, the Nordic countries are too small to build globally competitive space ecosystems across the full value chain. Collectively, however, they could play a more influential role in the European and global space economy. The question is therefore how Nordic strengths can be better connected, and what role Nordic innovation can play in supporting a more integrated and competitive Nordic space technology ecosystem.

The purpose of this report is to map and analyse the Nordic space technology ecosystem across all five Nordic countries. The report identifies key actors, capabilities, technology areas, application domains, institutional frameworks, bottlenecks and opportunities for collaboration. The report asks where Nordic cooperation can add practical value beyond national initiatives and existing ESA or EU frameworks. Nordic cooperation should not duplicate national initiatives or replace existing European and ESA frameworks. Rather, it should help connect capabilities across borders, strengthen commercial pathways, improve visibility, support scale-up, enable shared use of infrastructure, and identify areas where the Nordic region can act with greater collective weight.

This study applies a broad understanding of space technology, recognising both the core space sector and the wider economic and societal systems that depend on space-based capabilities. The findings are based on a mixed-methods ecosystem mapping combining desk research of national strategy and policy documents, programme descriptions, and previous ecosystem analyses with company and infrastructure mapping, stakeholder interviews across the five Nordic countries, and patent analysis.

Marcus Wandt training at the European Astronaut Centre. ESA - P. Sebirot

Artist's impression of MTG I on board of an Ariane 5 rocket. ESA - P. Carrili.

2. Country perspectives on Nordic cooperation

The following section provides short introductions to the space ecosystems of Denmark, Norway, Sweden, Finland and Iceland. The summaries are based on desk research, available strategy and policy documents, ecosystem and patent mappings and a broad set of interviews with actors from across the Nordic space sector. These include public authorities, research institutions, industry organisations, companies, startup support organisations, downstream users and specialised technology providers.

The purpose of the country summaries is not to provide a complete description of each national ecosystem, but to identify perspectives relevant to stronger Nordic involvement in the space sector. The focus is therefore placed on where each country sees opportunities for Nordic cooperation, where national strengths could complement those of neighbouring countries, and where joint initiatives could create greater critical mass than individual countries can achieve alone.

Each country summary follows the same general logic. It begins with how the country views Nordic cooperation and where it sees the most relevant Nordic opportunities. It then briefly characterises the national ecosystem, including its main strengths, bottlenecks and possible role in a more integrated Nordic space agenda.

2.1 Denmark

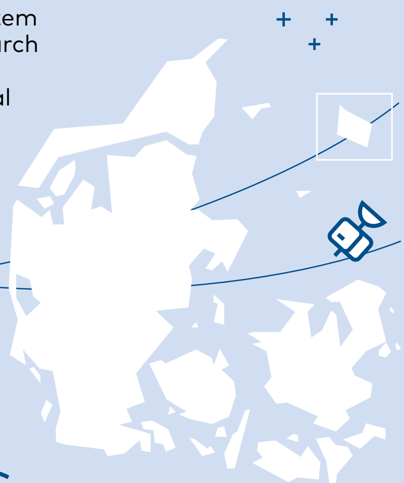
From a Danish perspective, Nordic cooperation is attractive when it helps compensate for Denmark's limited scale. Denmark is positive towards Nordic collaboration when it creates critical mass, concrete missions, stronger ESA positioning, access to

Denmark's space technology ecosystem

Small, specialised and increasingly strategic

Ecosystem profile

Compact ecosystem with strong research environments, selected industrial niches and growing commercialisation support.



Key numbers

~200 space-related companies

2,378 fulll-time equivalents

830 million EUR total turnover

53% export share

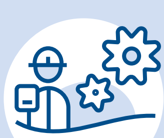
Value chain distribution of companies

Downstream	Upstream	Both
145	62	15

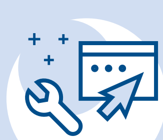
Capability profile

- Nanosatellite platforms and mission systems
- High-precision optical star trackers and instrumentation
- Human spaceflight, astronaut health, and medical systems
- Dual-use integration, climate action, and North Atlantic monitoring

Value in Nordic cooperation



Specialised engineering and testing



Downstream applications and space-enabled services

ESA experience and commercialisation support

Arctic/North Atlantic use cases via Greenland and maritime robotics

Case

Aaveq Robotics
Satellite communication can enable unmanned maritime logistics and waste collection in remote Greenlandic settlements.

complementary capabilities, shared test and qualification infrastructure and clearer routes to market.

The strongest opportunities are joint Nordic missions or constellations in areas such as Arctic weather, maritime monitoring, environmental observation, secure communications, defence preparedness and North Atlantic surveillance. This could create real demand for Nordic suppliers and help small companies mature technologies through practical delivery. A second opportunity is a more coordinated Nordic engagement in the ESA. Denmark has limited weight as a small member state, but a more aligned Nordic position on selected technologies, missions or applications could increase visibility and influence. A third opportunity lies in a Nordic test and validation network, making existing facilities more visible and accessible for small companies that cannot easily afford high TRL qualification. A fourth opportunity concerns dual-use, defence and Arctic applications, since shared geography and security interests create common Nordic needs.

Denmark's own space ecosystem is compact, specialised and increasingly strategic. It does not have the scale, launch infrastructure or large prime contractors found in larger space economies. Its strength lies instead in strong university environments, selected industrial niches, ESA participation, specialised firms and a growing commercialisation infrastructure. The new national strategy has helped frame space not only as research but also as a strategic capability linked to security, defence, preparedness, climate, business development, and resilience.

The Danish knowledge base is strong, with key capabilities in space systems engineering, instrumentation, satellite navigation, small satellites, mission participation and adjacent fields such as robotics and autonomy. However, Denmark's main weakness is the transition from research and early innovation to higher-TRL development, qualification, commercial maturation and scale. Research and technology organisations can help bridge this gap through testing, validation, materials work, certification, production optimisation and demonstration.

The industrial base is diverse but small. Danish strengths include small satellites, satellite-enabled services, composite structures, human spaceflight equipment, testing, systems integration and specialised downstream applications. Denmark's patent profile is not broad but coherent: It points to applied engineering, communication services, small satellite applications, and enabling technologies such as antenna testing and validation.

2.2 Finland

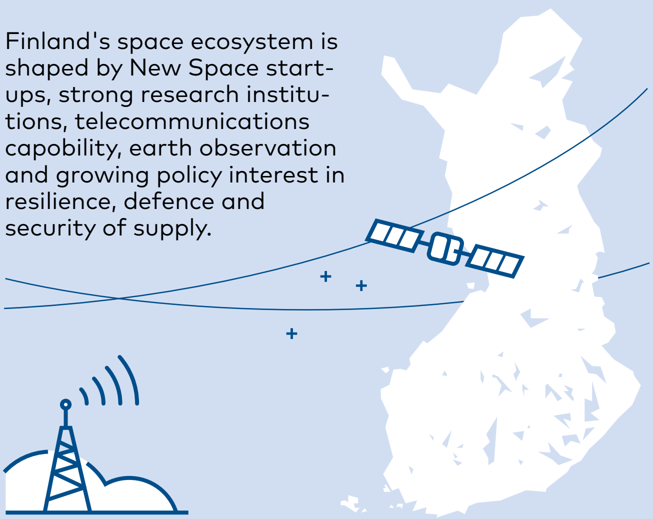
From Finland's viewpoint, Nordic cooperation is mostly relevant when it helps overcome the limits of small national markets and creates stronger pathways from technology development to operational use. Finland has strong capabilities in selected niches, but its domestic customer base, scale-up capital and demonstration opportunities are limited.

Finlands's space technology ecosystem

New Space, digital infrastructure and resilience

Ecosystem profile

Finland's space ecosystem is shaped by New Space start-ups, strong research institutions, telecommunications capobility, earth observation and growing policy interest in resilience, defence and security of supply.



Key numbers

~200 space-related companies

150 million EUR space-related turnover*

808 employees*

100 million EUR export*

*among 30 responding companies.

Survey figures refer to o norrower Business Finland / Space Finland company sample; broader company turnover includes non-space activities.

Capability profile

- Earth observation and SAR
- Satellite communications
- GNSS/PNT and resilient timing
- Space data and resilience AI-enabled services
- Space weather, meteorology and geospatial data
- Small-satellite platforms, propulsion and mission architecture

Value in Nordic cooperation

Digital and operational intelligence for space system

SAR, earth observation and climate services

Resilient PNT and secure communications

Startup commercialisation and data-driven applications

Case

SharpNav is developing resilient LEO-based positioning, navigation and timing. The case shows how Finnish strengths in GNSS, telecommunications, geospatial research, AI and security of supply can support critical infrastructure resilience.

Nordic cooperation could therefore add value by creating larger reference markets, shared pilots, joint test environments, coordinated public demand and stronger international visibility.

The clearest opportunity is resilience-related space infrastructure. Finland has strong interests in secure communications, positioning, navigation and timing (PNT), Earth observation, weather services and the continuity of critical societal functions. These are not only commercial opportunities, but also a question of security of supply, preparedness and strategic autonomy. A Nordic agenda focused on resilient PNT, secure satellite communications, Arctic and northern monitoring, and space-enabled crisis management would align well with Finnish strengths and shared Nordic needs.

A second opportunity lies in Earth observation and climate services for northern conditions. Finland's strengths in synthetic aperture radar (SAR), remote sensing, cold weather and geospatial data could be combined with Norwegian capabilities. Joint Nordic pilots could focus on boreal forests, snow and ice monitoring, environmental change, maritime awareness, infrastructure resilience and climate adaptation.

A third opportunity is shared test, demonstration and validation infrastructure. Finnish startups and growth companies often need pilots, reference customers and operational validation before they can scale internationally. A Nordic test and demonstration network could support PNT, Earth observation, satellite communications, city applications, Arctic use cases and dual-use resilience services. This would be especially valuable if it involved public authorities, cities and critical infrastructure users as early customers, not only research institutions.

Finland's own space ecosystem is a relatively young but increasingly mature new space economy. It is not built around launch infrastructure, a dominant prime contractor or long-established state space operators. Its profile is instead shaped by startups, research institutes, university-based commercialisation, digital capabilities and internationally visible growth companies. Finland's strongest position in the Nordic ecosystem lies in the digital and operational layers of space systems: satellite communications, non-terrestrial networks, Earth observation, SAR, positioning, data services, and space-enabled resilience.

The Finnish ecosystem has strong research and talent foundations. Aalto University has played a central role in satellite development and commercialisation. At the same time, institutions such as VTT, the Finnish Geospatial Research Institute and the Finnish Meteorological Institute contribute capabilities in telecommunications, global navigation satellite systems (GNSS), geodesy, Earth observation, space weather, remote sensing, calibration, validation and operational data services. These environments provide not only research but also trusted infrastructure and services for public authorities and industry.

The industrial profile is led by visible new space and digital actors. ICEYE gives Finland a globally recognised position in SAR Earth observation and satellite operations. Nokia

Europe's all-new weather satellite takes to the skies. ESA - M. Pédoussaut.

points to Finnish strength in telecommunications and the integration of satellites into future mobile and non-terrestrial networks. Kuva Space, ReOrbit, Aurora Propulsion Technologies and emerging PNT firms add capabilities in hyperspectral imaging, satellite platforms, propulsion, mission architecture and specialised subsystems. Patent data reinforces this picture, with Finnish innovation concentrated around digital infrastructure, satellite communications, Earth observation, constellation operations and selected spacecraft technologies.

The main bottleneck is not idea generation, but scale-up. Finland can produce strong technologies, startups, and research-based ventures, but companies often struggle to move from early development to larger commercial and operational scales. The key gaps are patient capital, later-stage funding, anchor customers, public procurement pathways, demonstration opportunities and international market entry. The ecosystem also needs broader competences in regulation, business development, systems integration, procurement, policy and end-user understanding.

The Finnish view of Nordic cooperation is therefore pragmatic. Nordic action should not duplicate ESA, EU or national instruments. It should focus on areas where shared northern conditions, small markets, and complementary capabilities make joint action more effective than national action alone: resilient PNT, Earth observation, secure communications, weather and climate services, Arctic and northern applications, shared demonstration infrastructure, and scale-up finance.

2.3 Iceland

From Iceland's perspective, Nordic cooperation is valuable when it turns Iceland's niche assets into practical shared capability. Iceland should not try to mirror the larger Nordic space ecosystems, which have stronger industrial bases, ESA participation, launch infrastructure, research funding and dedicated company clusters. The opportunity lies instead in complementing them. Iceland can offer demanding field environments, Arctic and North Atlantic use cases, Earth observation validation, mission support and possible data infrastructure roles. In return, the other Nordic countries can contribute to technology, funding, industrial partners, missions, data platforms and routes to market.

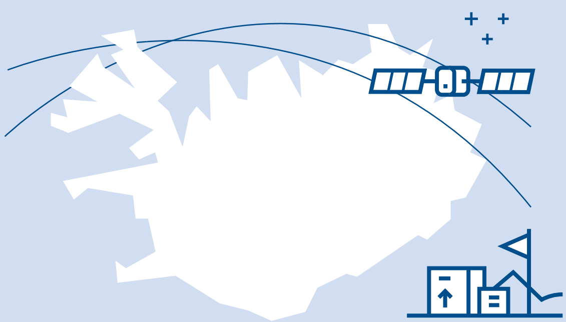
The most promising Nordic opportunities are analogue testing, Arctic and North Atlantic Earth observation, ground segment and data resilience, marine applications, Copernicus-based public sector services, space weather and shared validation infrastructure. Iceland's volcanic landscapes, glaciers, lava fields, remote highlands and coastal environments can provide test conditions that are difficult to reproduce elsewhere. This makes Iceland relevant for lunar and Martian analogue research, astronaut training, rover testing, robotics, communications, energy systems and human-robot operations. Technologies developed in Denmark, Finland, Sweden or Norway could be tested and validated in Icelandic terrain before being used in space, Arctic or remote operational environments.

Iceland's space technology ecosystem

Analogue environments, Earth observation and North Atlantic validation

Ecosystem profile

Iceland is a specialised, location-based space ecosystem. Its strongest assets are geography, fied conditions, Earth observation needs and international mission support potential.



Key numbers

- smallest nordic space ecosystem
- Iceland is not a member of ESA

1 space-related patent family

5 main opportunity areas: Analogue testing, earth observation validation, marine applications, data resilience, mission support

Iceland's space value is better captured through geography, validation, research and downstream use than through patent volume or industrial scale.

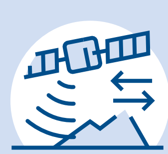
Capability profile

- Moon and Mars analogue environments
- Volcanic, lava-field and glacial terrain
- Earth observation and Copernicus use
- Marine, fisheries and coastal monitoring
- Dust, land-cover and climate validation
- Potential ground-segment and data-resilience roles

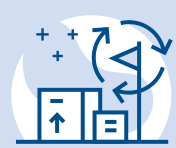
Value in Nordic cooperation

Analogue testing and field validation

Arctic and North Atlantic Earth observation



Copernicus-based public-sector services



Mission support, logistics and operational realism

Case

MÁNI positions Iceland as a platform for lunar and Martian analogue research, testing, training and technology development. it shows how Iceland can contribute to Nordic space capability through terrain, logistics, field expertise, research coordination and mission support.

Iceland's space ecosystem is still small and institutionally emerging. It does not yet have a broad space industry, a mature national strategy framework or a large base of space-focused companies. Its coordination model is hybrid, with Iceland Research Institute of Space Science (IRISS) and the University of Iceland serving as anchors for emerging research and innovation. At the same time, Copernicus-related activities are linked to national scientific and mapping institutions. This means that Iceland's contribution is currently less industrial and more service-based, research-based and location-based.

Earth observation is another clear area of opportunity. Iceland requires observations of volcanoes, glaciers, fisheries, marine monitoring, dust storms, land cover, afforestation, climate impacts and public safety. These needs create a natural demand for satellite data, Copernicus services and in-situ validation. Iceland's public authorities, research institutions and marine sectors can therefore become important users and testers of space-enabled services.

The main bottlenecks are limited funding, small expert capacity, weak commercial scale and still-developing public coordination. Without stronger institutions and continuity, Iceland risks remaining a project-based test location for foreign actors rather than capturing long-term domestic value. With focused Nordic cooperation, however, Iceland can become a small but strategically valuable platform for analogue research, validation, Arctic data use and North Atlantic mission support.

2.4 Norway

Norwegian perspectives on Nordic cooperation are practical and problem-driven. Cooperation is seen as most valuable when it helps address shared operational challenges that are too specialised, too costly, or too dependent on small markets for one country to solve alone.

The strongest Nordic opportunities are found in Arctic and maritime applications, including surveillance, search and rescue, ice and weather services, secure communications, fisheries, offshore infrastructure, environmental monitoring, critical infrastructure protection and defence preparedness. These are areas where Nordic geography creates common surveillance needs, while the countries bring different strengths.

A second opportunity is more coordinated Nordic positioning in the ESA and European space programmes. A more aligned Nordic approach could increase visibility and influence around shared priorities such as secure Arctic communications, dual-use services, test infrastructure and maritime awareness.

A third opportunity is joint use and mapping of Nordic test, demonstration and validation facilities. Norway has a strong infrastructure, but it is not always visible or accessible to

Norway's space technology ecosystem

Strategic infrastructure for the High North

Ecosystem profile

Norway's space ecosystem is shaped by geography, public-purpose infrastructure, arctic operations, maritime surveillance, defence, communications and national resilience

Key numbers

Around
130
space-related companies

Since
1962
Andøya's operational space heritage

Around
1,300
rockets launched from Andøya

4
main activities at Andøya Space

- Suborbital launches
- Defence testing
- Education
- Orbital launch

Capability profile

- Andeya Space / polar launch
- Svalbard ground-segment advantage
- KSAT / global data downlink
- Space Norway / High North communications
- Defence-related test environments

Value in Nordic cooperation

Arctic and maritime operational use cases

Launch, ground segment and test infrastructure

Secure communications and resilience

Public-purpose demand and strategic infrastructure

Case

Andøya Space connects science, defence, education, testing, launch capability, Arctic geography and European strategic autonomy. It illustrates how launch infrastructure can become a resilience capability, not only a commercial asset.

smaller companies outside established networks. A Nordic overview of launch-related, ground segment, environmental, data, validation and operational test facilities could help SMEs mature technologies faster and reduce duplication. Joint Nordic missions in coastline monitoring, secure Arctic communication, environmental observation or border awareness could also create customers and real industrial work packages.

Norway's own space ecosystem is among the most infrastructure-rich and strategically positioned in the Nordic region. It is shaped by Arctic geography, maritime activity, defence needs, public-purpose satellite services and national resilience. Space is not treated only as science or industry, but as part of the country's operational capacity in the High North. This gives the Norwegian ecosystem a more utility-oriented character than ecosystems mainly driven by research, startups or specialised manufacturing.

Norway has several assets that many larger countries would find difficult to replicate: polar launch infrastructure, the Svalbard ground segment advantage, global satellite data downlink capacity, state-backed communications infrastructure, strong maritime demand and major anchor actors in defence, propulsion, ground stations, satellite operations and launch. This gives Norway a relatively complete space value chain for a small country, with specific strengths in maritime surveillance, Arctic monitoring, satellite communications, ground segment and operational services.

The main bottlenecks are scale, funding continuity, access to customers and the difficult transition from demonstration to deployment. Early-stage support exists, and Norway has a strong public infrastructure, but startups and SMEs still face barriers to moving from prototypes to qualified, commercial solutions. Hardware firms are especially exposed because development is expensive, timelines are long, and investors often have limited understanding of space business models. Norway's non-EU status also creates uncertainty as ESA and EU space programmes become more intertwined.

2.5 Sweden

From a Swedish perspective, Nordic cooperation is mostly useful when it helps overcome fragmentation, small markets and weak demand mechanisms. Sweden has strong infrastructure, research, and industrial capabilities, but many space technologies still lack customers, procurement pathways and scale-up finance. Nordic cooperation could therefore add value by creating larger reference markets, shared demonstrations, stronger public sector demand and more visible value chains across the region.

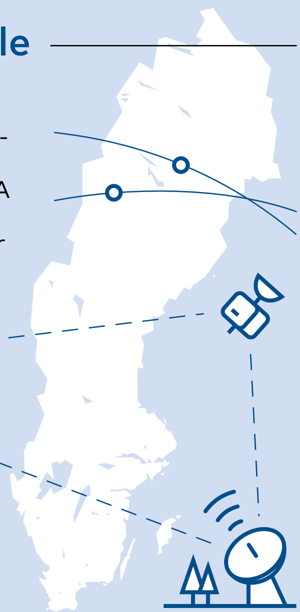
The first opportunity is joint use of test, launch and demonstration infrastructure. Esrange Space Center, Swedish testing capabilities and northern environments could support Nordic missions, suborbital campaigns, validation activities and dual-use demonstrations. This would be most valuable if linked to concrete industrial work packages and public sector users, rather than only research collaboration. A second

Sweden's space technology ecosystem

Broad engineering depth, infrastructure and downstream potential

Ecosystem profile

Sweden combines strong space infrastructure, established industrial actors, research environments, ESA pathways and a growing downstream software layer - but the ecosystem remains fragmented.



*Key numbers refer mainly to 2023 Swedish mapping data. Total turnover includes companies where space is one activity among others.

Key numbers*

124 space-related companies

103 private limited companies

1.6 billion EUR total turnover

1,650 full-time equivalents

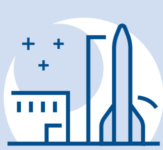
440 million EUR space-related turnover

60 million EUR in reported R&D investment

Capability profile

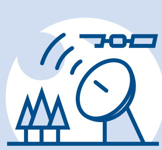
- Space infrastructure and Esrange
- Spacecraft subsystems and launch interfaces
- Satellite communication terminals and RF systems
- Ground networks and mission support
- Data handling, AI and edge computing
- Earth observation and downstream applications
- Defence, aerospace and dual-use integration

Value in Nordic cooperation



Launch, test and demonstration infrastructure

Mission-critical hardware and system integration



Sattelite communications and nonterrestrial networks

Downstream AI, Earth observation and operational alerts

Case

PandionAI shows the downstream opportunity: using AI, Earth observation and multi-sensor data to turn satellite information into operational alerts for energy infrastructure, maritime awareness, wildfire detection and forestry.

opportunity lies in downstream applications in sectors shared across the Nordic region: climate monitoring, forestry, energy infrastructure, maritime domain awareness, Arctic and North Atlantic operations, emergency preparedness and civil security. Here, Swedish AI, software and data-integration capabilities could be combined with Finnish Earth observation, Norwegian maritime and Arctic infrastructure, Danish specialised data and testing niches and Icelandic validation environments.

A third opportunity concerns defence and dual-use cooperation. Sweden has strong capabilities in defence systems, sensors, communications, electronic warfare, edge computing and system integration. Nordic cooperation could strengthen these areas where countries share security concerns but bring different operational and technical assets. A fourth opportunity is coordinated public demand, for example through joint pilot procurement, pre-commercial procurement or shared challenge programmes. This could help startups validate technologies, secure early customers and build exportable references. Finally, a Nordic space accelerator, co-investment facility or scale-up mechanism could help bridge the gap between public grants and commercial growth.

Sweden's own space ecosystem is broad and technically strong, but fragmented. It combines a national space agency, major universities, Esrange, established industrial companies, a defence and aerospace base, ESA-linked support structures and a growing layer of startups and downstream service companies. Compared with Denmark, Sweden has greater industrial breadth and stronger infrastructure. Compared with Finland, it is less cohesive as a new space ecosystem, but stronger in traditional engineering, launch-related infrastructure, subsystems and defence-adjacent capabilities. Compared with Norway, Sweden has a broader industrial and research base, while Norway is more clearly shaped by Arctic operations and national space infrastructure.

The main Swedish bottleneck is not a lack of ideas or competence. The challenge is converting research, public funding and technical capability into commercial and operational scale. Public procurement is often cautious, anchor customers are limited, investors are still getting to know the space sector, and links between startups, large industrial firms and end users are not always strong enough. Sweden therefore needs stronger market pull, more strategic public demand, clearer industrial direction and better pathways from research to business.

Sweden's industrial strengths include spacecraft subsystems, launch interfaces, satellite structures, propulsion heritage, satellite communication terminals, ground networks, data handling, AI, defence-related technologies and Earth observation applications. Patent data reinforces this profile, showing Swedish depth in mission-critical hardware, satellite communications, telecom integration, spacecraft control and navigation-related technologies.

Artist view of The James Webb Space Telescope. ESA – D. Ducros.

3. Cross-Nordic strengths, gaps and bottlenecks

The Nordic space technology ecosystem is stronger than the sum of its individual national markets, but also less integrated than its shared geography, institutional trust and technological complementarity would suggest. Across Denmark, Finland, Iceland, Norway and Sweden, the region has world-class research environments, strong public institutions, advanced digital capabilities, specialised companies, Arctic and North Atlantic geography, and important infrastructure for ground segment, testing, launch, data processing and downstream use. At the same time, the ecosystem remains highly national in its organisation. Funding systems, strategies, procurement practices, institutional mandates and commercial networks are still primarily country-based, while cross-border collaboration remains uneven and often project-specific.

While not always connected, the Nordic countries can potentially complement each other in a broader space value chain. Sweden has the broadest engineering and infrastructure base with strong capabilities in launch-related infrastructure, spacecraft subsystems, satellite communications, ground networks, defence-adjacent technologies and industrial systems. Finland contributes a strong digital profile, especially in Earth observation, SAR, satellite communications, non-terrestrial networks, GNSS/PNT, data services and resilience-oriented applications. Norway is strongest in operational infrastructure, ground segment, Arctic services, satellite operations, launch development, maritime monitoring and state-backed space capacity. Denmark contributes specialised engineering, small satellites, testing, instrumentation, human spaceflight-related technologies and downstream space-enabled applications. Iceland has the smallest industrial base, but offers distinctive analogue environments, North Atlantic and Arctic use cases, Copernicus-related data needs and field validation opportunities.

The strongest Nordic assets are found at the intersection of space technology and regional needs. The Nordic countries have large maritime zones, sparsely populated areas, long coastlines, Arctic and sub-Arctic conditions, high dependence on digital infrastructure and strong public sector demand for climate, environmental, security and preparedness services. These conditions create natural use cases for Earth observation, secure communications, resilient positioning, maritime domain awareness, ice and weather monitoring, forestry, fisheries, emergency preparedness, critical infrastructure monitoring and defence-related services. In these areas, the region is not just a supplier of technologies; it is also a demanding user environment. This gives the Nordic countries an opportunity to become a testbed and reference market for space-enabled solutions.

Research and education are other major strengths. Across the region, universities and research institutes provide deep competence in space science, instrumentation, satellite systems, geodesy, remote sensing, space weather, meteorology, robotics, AI, communications and data analytics. However, there are also recurring weaknesses: Research excellence does not always translate into industrial growth. Many Nordic actors describe a gap between research and early innovation on the one hand, and higher-TRL development, qualification, procurement, production and commercial scale-up on the other. A further bottleneck is the weak cross-border connection among talent, education and entrepreneurship. The Nordic countries have strong student, university and research environments, but these are still largely organised nationally. Student satellite projects, rocketry communities, space data initiatives and applied technical training could become stronger sources of startups and industrial talent if they were connected through Nordic student challenges, joint courses, founder pathways and collaboration with incubators and companies.

This "valley of death" is one of the most consistent bottlenecks across countries. It appears in different forms: Danish actors describe the challenge of moving from research and prototypes to qualified industrial products; Finnish interviewees point to the gap between early-stage support and larger funding rounds; Swedish interviewees emphasise the transition from grant-funded development to commercial revenue; Norwegian actors point to the need for stronger industrial scale-up around infrastructure and operations; and Icelandic actors highlight limited institutional capacity and funding for turning geographic and research assets into sustained activity. The common pattern is clear: Nordic ecosystems are good at generating knowledge and specialised technologies, but less effective at creating repeated customers, large work packages and scale-up pathways.

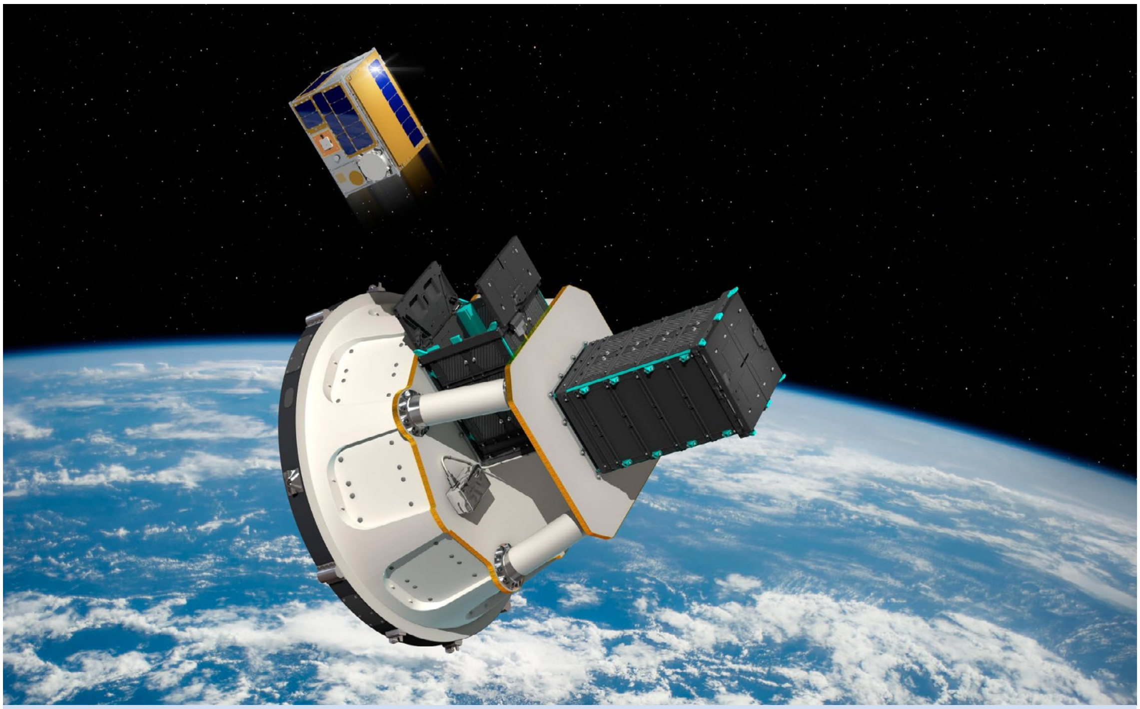
Small domestic markets intensify this problem. Most Nordic space firms must internationalise early, but they often need domestic or regional reference customers before they can compete internationally. This creates a circular problem: Firms need operational validation to win customers, but they need customers to finance operational validation. Public procurement could help break this cycle, but interviewees across countries describe procurement as slow, risk-averse and difficult for startups and SMEs to access. Public authorities recognise the strategic value of space, particularly for climate, defence, preparedness and critical infrastructure, but this recognition is not yet consistently translated into agile procurement, challenge-based missions or first customer mechanisms.

The clearest market failure is the lack of early customers. Many Nordic space companies can access research funding or early-stage innovation support, but they struggle to move from pilots to recurring use. Public procurement and anchor customer models could help break this cycle by turning shared Nordic needs into first markets for Nordic solutions.

Scale-up funding is another common barrier. Early-stage support has improved in several countries through ESA BICs, Phi-Labs, innovation agencies, university incubators and research-to-business instruments. However, the later stages remain difficult, especially for hardware, deep tech, dual-use and infrastructure-oriented companies with long development timelines and high qualification costs. Finnish interviewees identify the lack of large funding rounds as a major bottleneck. Swedish interviewees point to a gap between grants and private venture capital. Danish actors emphasise working-capital constraints and the challenge of scaling specialised hardware and deep tech firms. Across the region, investors often lack space-sector expertise, while space companies lack the short revenue timelines preferred by many investors. The finance gap is not only about more money, but also about more specialised capital. Space and deep tech companies often have long development cycles, high qualification costs and complex public or dual-use markets. A Nordic investment or co-investment mechanism could help build a stronger regional investment story, improve investor understanding of space business models and support companies between early grants and commercial revenue.

The ecosystem is also fragmented across value chains and sectors. Several interviewees note that upstream, midstream and downstream actors do not always understand each other's needs. Technology developers may be too focused on technical performance, while public sector or industrial users may lack the capacity to specify demand or integrate space-based solutions into operations. This is especially visible in Earth observation and downstream services. The region has strong satellite data, AI, geospatial and public sector capabilities, but many potential users still find space data complex, difficult to procure or insufficiently adapted to operational workflows. The challenge is therefore not only technological; it is also organisational, commercial and user-oriented.

A related gap concerns infrastructure visibility. The Nordic region has significant infrastructure: Esrange, Andøya, Svalbard ground segment, Sodankylä, university laboratories, RTO facilities, test environments, calibration and validation sites, analogue environments in Iceland, ESA BICs, Phi-Labs and national data platforms. Yet actors often lack a clear overview of what exists across borders, who can access it, under which conditions, and how it could support TRL maturation or commercial validation. This limits the practical value of Nordic complementarity. A company in Denmark may not know which Swedish, Norwegian or Finnish facilities could support testing. A Finnish startup



Artist's view of the release of Celeste IOD-1 & 2 satellites. ESA – D. Ducros.

may not readily identify Nordic public sector pilot environments. Icelandic analogue assets may be internationally attractive but not fully integrated into Nordic technology development pathways.

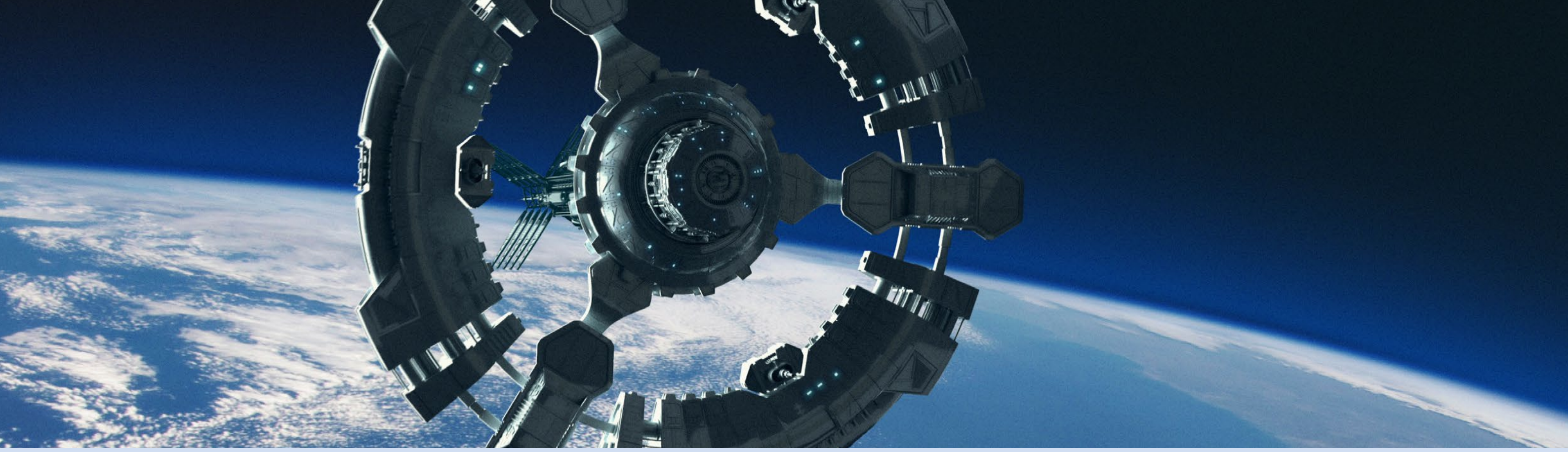
Cross-border commercial collaboration remains less developed than research and policy dialogue. Nordic actors often express goodwill towards collaboration, but cooperation is rarely the default route to market. Firms are focused on ESA, EU programmes, national customers or global markets. In many cases, Nordic cooperation is seen as valuable only if it leads to concrete missions, customers, investment, testing opportunities or industrial work packages. This is an important finding: The appetite for Nordic cooperation is pragmatic, not symbolic. Actors are positive when cooperation creates scale, reduces risk or opens markets; they are sceptical if it only leads to networks, conferences or strategies.

The region's visibility in European space value chains is also uneven. ESA is system-shaping for Denmark, Finland, Norway and Sweden, providing funding, legitimacy, technical learning and access to missions. EU programmes such as Copernicus, Galileo, EUSPA, Horizon Europe, CASSINI and EUMETSAT are also central. However, Nordic actors are often visible as specialised suppliers, research participants or niche innovators rather than as integrated regional value chains. This matters because European space is becoming more strategic, security-oriented and industrially competitive.

At the same time, the dual-use and resilience agenda creates a window of opportunity. Across countries, interviewees increasingly connect space to defence, security of supply, maritime surveillance, Arctic awareness, secure communications, PNT resilience and critical infrastructure. These are areas where Nordic needs overlap strongly and where regional cooperation could create demand that is larger than any single national market. The same applies to climate and environmental monitoring, where Nordic geography creates strong use cases for Earth observation, weather services, ice and snow monitoring, forestry, fisheries and coastal resilience.

The cross-Nordic synthesis therefore points to a clear strategic message. The Nordic space ecosystem is not weak; it is "under-connected". The region has strong research, capable firms, critical infrastructure, demanding use cases and trusted institutions. The main bottlenecks are scale, fragmentation, weak commercial pathways, limited procurement mechanisms, insufficient shared infrastructure overview, and uneven integration into European value chains. The next step is not to create a parallel Nordic space system, but to connect existing national strengths through practical instruments: shared missions, joint demonstrations, cross-border testbeds, coordinated ESA/EU positioning, public sector pilot procurement, scale-up finance and better ecosystem intelligence.

Nordic cooperation will add value only where it solves real problems for actors. The most promising agenda is therefore selective and mission-oriented. It should focus on areas where Nordic countries share strategic needs and have complementary capabilities: Arctic and North Atlantic monitoring, resilient PNT, secure communications, Earth observation and climate services, maritime domain awareness, dual-use preparedness, shared testing and validation, and downstream public sector applications. If these areas are turned into concrete projects with funding, users and industrial work packages, the Nordic region can move from a collection of strong but fragmented national ecosystems towards a more visible and competitive space technology region.



Artist rendition of fictitious space station orbiting earth. iStockphoto.

4. Recommendations for a stronger Nordic space ecosystem

In the following, we present ten recommendations to strengthen the Nordic space ecosystem, based on analyses of interviews, literature, and patent data. The recommendations follow a simple principle: Use what already exists, then identify the gaps. Nordic cooperation should not duplicate national, ESA- or EU instruments. It should connect existing assets more effectively and intervene where national markets are too small, infrastructure is under-used, public demand is fragmented, or companies lack customers, capital and routes to scale.

Recommendation	Rationale, key actors and first step
Timeframe: Immediate action 0-12 months	
Create a Nordic space capability and infrastructure map	Actors lack a clear overview of test facilities, laboratories, ground infrastructure, data platforms, analogue environments and specialist suppliers. Nordic Innovation, national space agencies, ESA BICs, Phi-Labs, universities, RTOs, and industry associations should build a shared database that includes access conditions, technical capabilities, and contact points.
Launch Nordic challenge dialogues with public sector users	Launch Nordic challenge dialogues and anchor customer pilots with public sector users. Public authorities, cities, defence, maritime, environmental, energy, forestry, fisheries and infrastructure actors should define shared Nordic problems and commit to testing, co-developing or procuring promising solutions. First step: Select 3–4 shared challenges and invite public buyers, startups, SMEs and larger firms to develop pilot concepts with a route to procurement.

Recommendation	Rationale, key actors and first step
Timeframe: Immediate action 0-12 months	
Organise a Nordic space applications hackathon	A hackathon can translate available space data and technologies into concrete use cases and prototypes. Nordic Innovation, ESA BICs, Phi-Labs, Copernicus/EUSPA actors, universities, startups and public users should focus on 3–4 shared themes, such as Arctic monitoring, climate adaptation, maritime awareness and emergency response.
Coordinate Nordic positions before selected ESA/EU programme windows	ESA and EU programmes are the main operational frameworks, but Nordic visibility is uneven. National space agencies, ministries, ESA delegations, and industry associations should identify selected programme opportunities in which a common Nordic position could strengthen their influence.
Timeframe: Medium-term 1-3 years	
Establish a Nordic demonstration programme	Cross-border demonstrations can close the gap between pilots and customers. Nordic Innovation, national innovation agencies, public buyers, ESA BICs, SMEs and large firms should fund 3–5 demonstrations in Arctic services, EO/climate, maritime awareness, resilient PNT or secure communications.
Build a Nordic testbed access scheme for SMEs	Testing and validation are costly and fragmented. Esrange, Andøya, Sodankylä, RTOs, universities, Icelandic analogue environments and national innovation agencies should create small vouchers for cross-border testing, calibration, validation and demonstration.
Create a Nordic space scale-up and co-investment track	Early-stage support exists, but later-stage finance, customer access and investor understanding remain weak. ESA BICs, Phi-Labs, Nordic Innovation, national innovation agencies, The Export and Investment Fund of Denmark (EIFO), Business Finland, Innovation Norway, Vinnova, private investors and industrial customers should develop a joint scale-up track with investor days, customer introductions, mentoring and possible co-investment mechanisms.
Connect Nordic space talent, education and entrepreneurship	Nordic universities, applied research institutions, vocational institutions, student space communities, incubators, ESA BICs and companies should build student-to-startup pathways, Nordic student space challenges, joint study modules and interdisciplinary training in technology, business, law, policy, regulation and procurement. First step: Map existing student satellites, rocketry, EO, robotics and space innovation communities and launch one Nordic student challenge linked to ESA BICs and industry mentors.
Timeframe: Long-term 3-7 years	
Develop one or two Nordic flagship missions	Shared missions would create critical mass, industrial work packages and international visibility. Nordic governments, ESA, national agencies, defence and civil authorities, industry and research actors should assess missions in Arctic monitoring and resilient PNT/SATCOM.
Position the Nordic countries as a European test region for space-enabled resilience	The region's geography, digital maturity and public sector needs create a strong European value proposition. The Nordic Council of Ministers, Nordic Innovation, ESA, EU institutions and national governments should develop a joint offering for Arctic, climate, maritime, security and preparedness applications.

Recommendations to strenghten the Nordic space ecosystem

IMMEDIATE ACTION: 0-12 MONTHS

Create a Nordic space capability and infrastructure map

Build a shared overview of test facilities, laboratories, ground intrastructure, data platforms, analogue environments and specialist suppliers.

Organise a Nordic space applications hackathon

Translate space data and technologies into concrete use cases and prototypes.

Launch Nordic challenge dialogues with public-sector users

Turn shared public-sector needs into anchor-customer pilots and routes to procurement.

Coordinate Nordic positions before selected ESA /EU programme windows

Identify programme opportunities where a common Nordic position can strengthen visibility and influence.

MEDIUM TERM: 1-3 YEARS

Establish a Nordic demonstration programme

Fund cross-border demonstrations that move solutions from pilots to customers.

Create a Nordic space scale-up and co-investment track

Bridge the gap between early-stage support and later-stage growth.

Build a Nordic testbed access scheme for SMEs

Create small vouchers for cross-border testing, calibration, validation and demonstration.

Connect Nordic space talent, education and entrepreneurship

Build student-to-startup pathways, Nordic student challenges and joint training.

LONG TERM: 3-7 YEARS

Develop one or two Nordic flagship missions

Create critical mass, industrial work packages and international visibility.

Position the Nordics as a test region for space-enabled resilience

Use Nordic geography, digital maturity and public-sector demand as a European value proposition.

The Horsehead Nebula in Orion. iStockphoto.

Appendix A: List of interviews

Name	Position	Organisation/programme	Category	Country
Thomas A. E. Andersen	CEO	Danish Aerospace Company	Company	Denmark
Damir Ljubicic	CEO	Space Composite Structures DENMARK ApS	Company	Denmark
Thomas Hofman-Bang	CEO	The Danish Industry Foundation	Foundation	Denmark
Peter Mandix Sehestedt	Senior Adviser in the Division for Space	Ministry of Higher Education and Science	Policy	Denmark
Sune Nordentoft Lauritsen	Head of Space ventures (DTU)	Space Ventures DK	Hubs	Denmark
Tero Vihavainen	Secretary General	Finnish Space Committee	Policy	Finland
Jyri Heilimo	Head of Group	Finnish Meteorological Institute	Research	Finland
Jarkko Koskinen	Deputy Director General	Finnish Geospatial Research Institute	Research	Finland
Tapio Tourula	Chief Preparedness Specialist	National Emergency Supply Agency	Policy	Finland
Timo Latvala	Director, Space Business Area	Gofore	Company	Finland

Name	Position	Organisation/programme	Category	Country
Kaisa Ahonen	Project manager	ESA BIC Finland	Hubs	Finland
Renske Martijnse-Hartikka	Senior Project Manager	Forum Virium Helsinki	NGO/city innovation company	Finland
Mikko Punnala	Founder and Chairman of the board	SharpNav Oy	Startup	Finland
Heidi Kuusiniemi	Professor, Wireless Systems	Tampere University	Research	Finland
Tapio Tourula	Chief Preparedness Specialist	National Emergency Supply Agency	Public Authority	Finland
Tiina Nurmi	Chief Adviser	Business Finland	Hubs	Finland
James Francis	Research Fellow	European Space Policy Institute	Research	Nordics (based in Switzerland)
Marco Pizzolato	Natural Science specialist	Copernicus in Iceland	Research	Iceland
Daniel Robert Leeb	CEO	Iceland Space Agency	Policy	Iceland
Ketil Olsen	CEO and President of Andøya Space	Andøya Space AS	Company	Norway
Jo Bjørnstad	Managing Director ESA BIC NO	ESA BIC Norway	Hubs	Norway
Gunnar Helsøe	CEO	Norwegian Industrial Forum for Space Activites (NIFRO)	Cluster	Norway
Torgeir Solberg	Business Developer	ESA Phi-lab Norway	Funding	Norway
Pernille Sofie Hauge	Senior Adviser, innovation	Space Agency Norway	Policy	Norway
Charlotte Lahnborg Alme	Associate	Norwegian Space Cluster	Cluster	Norway
Ernesto Gutierrez	Head of Innovation and Societal Benefit	Swedish Space Agency	Policy	Sweden
Ulf Palmnäs	CEO	Rymdkapital	Venture capital	Sweden

Name	Position	Organisation/programme	Category	Country
Karin Holmqvist	Head of Space Strategy & Development	SAAB	Company	Sweden
Marcus Skogsmo	CEO	PandionAI	Company	Sweden

Appendix B: List of abbreviations

Abbreviation	Expansion	Explanation
AI	Artificial Intelligence	Used in satellite data processing, onboard analytics, sensor fusion and space-enabled services.
AIS	Automatic Identification System	Maritime vessel identification and tracking system, relevant for satellite-supported maritime monitoring.
AIT	Assembly, Integration and Testing	Key phase in satellite and spacecraft development before launch.
CASSINI	EU CASSINI Space Entrepreneurship Initiative	EU initiative supporting space startups, investment and commercialisation.
COPUOS	Committee on the Peaceful Uses of Outer Space	UN committee concerned with international cooperation and governance in outer space.
EO	Earth Observation	Satellite-based observation of Earth, including land, sea, ice, atmosphere, forests, climate and infrastructure.
ESA	European Space Agency	Central European space organisation for missions, technology development, funding and international cooperation.
ESA BIC	European Space Agency Business Incubation Centre	ESA-linked incubator supporting space-related startups with funding, business support and technical networks.
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites	European organisation operating meteorological satellite systems and related data services.
EUSPA	European Union Agency for the Space Programme	EU agency supporting the EU space programme, including market uptake and services related to Galileo and EGNOS.

Abbreviation	Expansion	Explanation
GEO	Geostationary Earth Orbit	Orbit where a satellite appears fixed relative to Earth; relevant for communications and weather satellites.
GNSS	Global Navigation Satellite System	Satellite navigation systems used for positioning, navigation and timing, such as GPS and Galileo.
GOVSATCOM	Governmental Satellite Communications	Secure satellite communication services for government, defence, emergency and public sector users.
HAPS/HALE	High-Altitude Platform Stations/ High-Altitude Long-Endurance platforms	Near-space platforms used for observation, communication or surveillance.
HYPSO	HYPerspectral Smallsat for Ocean Observation	Norwegian small-satellite mission line using hyperspectral imaging for ocean observation.
IOD	In-Orbit Demonstration	Demonstration and validation of technology after launch into space.
IRISS	Iceland Research Institute of Space Science	Icelandic research and innovation platform for space science and space-related collaboration.
ISA	Iceland Space Agency	Icelandic space-related connector and facilitator mentioned in the Iceland chapter.
ISRU	In-Situ Resource Utilisation	Use of local resources in space exploration, for example on the Moon or Mars.
JAXA	Japan Aerospace Exploration Agency	Japanese space agency and international research collaborator.
KSAT	Kongsberg Satellite Services	Norwegian ground-station and satellite-services company, central to Norway's space infrastructure.
LEO	Low Earth Orbit	Orbit close to Earth, widely used for Earth observation, communications constellations and new space systems.
LEO-PNT	Low Earth Orbit-based Positioning, Navigation and Timing	Emerging approach to resilient navigation and timing services using LEO satellites.
NASA	National Aeronautics and Space Administration	US space agency and international space actor.
NOSA	Norwegian Space Agency	Norwegian public space agency responsible for national space policy, ESA coordination and industry support.
PNT	Positioning, Navigation and Timing	Satellite-enabled services providing location, navigation and precise timing for infrastructure, transport and defence.

Abbreviation	Expansion	Explanation
SAR	Synthetic Aperture Radar	Radar-based Earth observation technology that can monitor Earth regardless of cloud cover or daylight.
SATCOM	Satellite Communications	Communication services delivered via satellites, including maritime, Arctic, government and emergency communications.
SDA	Space Domain Awareness	Defence-oriented awareness of space activities, assets, risks and threats.
SSA	Space Situational Awareness	Monitoring of satellites, debris, orbital risks, space weather and the wider space environment.
SST	Space Surveillance and Tracking	Tracking of satellites, space debris and other objects in orbit.
TRL	Technology Readiness Level	Scale used to assess technology maturity from early research to operational deployment.

Nordic
Innovation