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Views of Europaforum Northern Sweden on EU Space policy

Europaforum Northern Sweden is a network for politicians at the local and regional levels from Norrbotten, Västerbotten, Jämtland Härjedalen and Västernorrland. EFNS is a meeting place and knowledge arena where EU policies are analyzed and discussed as regards how they affect northern Sweden. EFNS monitors European issues to influence EU legislation, the EU's strategies and action programs and the EU's budget. The objective of EFNS is to safeguard the interests of northern Sweden both in the European arena and in relation to the national level in matters with a clear European perspective.

Northern Sweden welcomes the EU's increased investment in space activities

EFNS wishes to make a statement concerning the EU's commitment to development of Europe's space industry and space research as manifested in;

1. EU space strategy com (2016)705 and
2. The proposal for the establishment of the EU space program com (2018)447 and
3. Investments in the space sector in the proposal for a framework program for research and innovation Horizon Europa com (2018)436 as well as
4. The attempt to identify investment needs in the space sector which were presented in the report The Future of the European space sector.¹

Space activities are seeing major changes at the global level and are assessed to be of growing importance for society. Space technology is used by researchers, authorities, and private individuals in an increasing number of contexts such as, for example, transport, logistics, environment, climate and communication. The knock-on effects of the investments made in space research create economic growth, social benefit and welfare gains far beyond the primary areas of use. At the same time, the EU space sector is encountering a rapidly changing and competitive landscape in which new actors challenge established business models and technologies. The high degree of internationalization in the space sector is making these changes, and also the EU's policy to respond to them, much felt by actors in northern Sweden who are engaged in close academic and industrial cooperation with both European and global actors and networks in the space sector.

Today, northern Sweden's actors contribute strongly to the EU's multi-sectoral objectives for space activities. The proposals presented offer increased chances of continuing to contribute space research of world class and to EU policies in several prioritized areas such as autonomous access to space, "New Space"/Space 4.0 and also research, innovation and market uptake of space data.

Autonomous access to space

Northern Sweden's space center Espace in Kiruna is an important and unique resource for implementation of the EU's objective of autonomous access to space. It is the only European rocket base with the capacity to launch sounding rockets with landing locations on land enabling the recovery of vehicles and instruments. This can reduce costs for each launch and make possible

¹ http://www.eib.org/attachments/thematic/future_of_european_space_sector_en.pdf



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research that requires rapid recovery of material. The space center thereby complements Europe's other launching capacity. Furthermore, the center could be used for launching small satellites which would give European space activities and exploration access to launching capacity from European land mass and limit dependence on overseas capacity. Esrange's existing infrastructure and more than 50 years' experience of launching sounding rockets and balloons means that only a small extension is needed for launching small satellites. The geographic location in the Arctic is particularly suitable both for launching satellites and collection of data from satellites in polar orbit, which can be followed during a large part of their passage over the Arctic and Europe.

New Space/Space 4.0

There is described in the EU's strategy for space activities an ambition to meet the global trend with cost-effective space technology that makes space activities desirable and accessible to more actors under more commercial forms, this is described in the concepts New Space/Space 4.0. In northern Sweden there is an ecosystem with globally leading actors in space research and space technology and also extensive support activities and commitment to start-up companies and SMEs in the space sector. This takes place *inter alia* in the cooperation project Space for innovation and growth (RIT) where the region's and Sweden's leading actors work to strengthen the Swedish space industry.

Luleå University of Technology runs a NanoSat Lab for design, test and development of space systems on board various space vehicles and is planning an extension which will make the resource a complete European activity in space technology testing. A test bed for the new miniaturized space technology provides all of the necessary chain, from training, research and development to launching and communication for small satellites. In the lab, small satellites, known as Cubesats, are designed, developed, manufactured and tested. This venture is made possible thanks to the capacity at the Institute of Space Physics in Kiruna, SSC Esrange for launching and Luleå University of Technology where groups of researchers in space physics and optic physics are developing measuring instruments for a future expedition to the moon.

Research, innovation and market capture of space data

Northern Sweden's space activities also include efforts that make space technology and data accessible and turn them into applications for commercialization and increased social benefit, a so-called downstream chain. The new digital space economy is based both on existing open and commercial data from space. By combining this data with other data sources, new companies can be established and new products and services created. A center for the digital space economy is being established at Umeå University and Vasa University. At the Swedish University of Agricultural Sciences in Umeå research is carried on into how the increasing flow of satellite data can be used for environmental monitoring of forests and vegetation. Furthermore, national maps of the condition of forests are produced by combining satellite data with remote sensing data from airborne sensors and field data from, *inter alia*, the National Forest Inventory which is located at the Swedish University of Agricultural Sciences. The Institute for Space Physics also carries on activities in Umeå and is there developing systems for analysis of space data. The Mid-Sweden University is involved in the Medipix group which, together with CERN, is developing a hybrid pixel detector for energy dissolved photon and particle measurement with application in space technology through NASA. In addition to research activities, which, of course, are carried on in a global context, the region's actors are also involved at the international level through collaborations with the European Space Agency (ESA), the European Incoherent Scatter Scientific Association (Eiscat) and the European Organization for Nuclear Research (CERN).



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At the region's centers of learning, programs for the region's and the global space industry's needs of long-term skills are carried on. Luleå Technical University has Sweden's only program for a Master of Science in space technology and several popular master's programs in the space sector, as well as the majority of PhDs. Umeå University has master's programs in technical physics with the focus on space technology and Mid-Sweden University offers programs in design and connection of built-in sensor systems, *inter alia* for applications in the space industry. Industrial research and development also take place in additive manufacture and after-treatment for applications in space technology.

Efforts are also underway to create synergies between space activities and the region's infrastructure for "Big data" through plans for data centers that store and make available the considerable amounts of data generated from satellites monitored from the region's space center.

EFNS viewpoints

- EFNS welcomes the EU's commitment and sees the importance of space activities for the development of the whole EFNS area. This also applies to branches of industry that are traditionally not connected with space technology. EFNS looks forward to the EU's continued work to follow up the strategic position with concrete proposals and investments that enable continued space research and space activities.
- EFNS wishes to draw the attention of the decision-making institutions to northern Sweden's possibilities of contributing to the implementation of the EU's objectives in the space sector and the mutual relationship between the EU and the region's space activities. The region's space technology activities, infrastructure and experience of launching sounding rockets and balloons together with the geographic location constitute unique assets for the development of the EU's space activities.

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