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Contribution by Russian Federation

to the CSTD 2019-2020 priority theme on “Exploring space technologies for sustainable development and the benefits of international research collaboration in this context

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Russia's input on Theme 2: Exploring space technologies for sustainable development and the benefits of international research collaboration in this context.

Humanity is on the verge of the fourth industrial revolution, which is expected to switch production to a digital form that would be fully automated and controlled by intelligent systems in real time and in constant interaction with the external environment and with the prospect of combining things and services into a global industrial network, which will become a driver of sustainable development on global level. An active role in the new industrial revolution will be played by space technologies, in particular, technologies of geoinformation processing and Earth remote sensing (ERS).

The remote sensing services market is one of the fastest growing segments in the field of practical use of space. The reason is simple – the data obtained by using remote sensing are in demand in various sectors of the economy, as well as at all levels of the planning and management system.

In this regard, national remote sensing systems are developing more and more actively – more and more countries in the world are becoming satellite operators, and the number of such devices has long gone to hundreds. Only in the period from 2007 to 2016, according to Euroconsult, 181 Earth remote sensing satellites (excluding meteorological) were launched in the world, the cost of developing and assembling them amounted to \$ 17.4 billion.

As a result, in 1998 the volume of revenues of the global remote sensing market barely crossed the line of \$ 200 million, then in 2016 it narrowly missed achieving \$ 2 billion, and by 2026, according to Euroconsult analysts, it will reach 8.5 billion dollars. At the same time, the volume of the market for the production of remote sensing satellites for the period 2016–2026 will amount to \$ 33 billion. Russia's share in this market is also growing.

Today, the total volume of the Russian market – not only services, but the entire production cycle of geoinformation from the creation and launch of satellites

to the end user – is estimated at \$ 250 million. By 2020, it is expected to be about 1 billion, and will grow by 2025 up to 1.5 billion dollars a year. In this case, it is feasible to take into account the trend of a significant shift of the market's center of gravity from the segment of data survey to the field of end products, solutions and services.

Speaking about the role of space technologies in the development of national economies, it should be noted that within the framework of the Russian national project “Digital Economy” one of the targets is creation. of a domestic digital platform for collecting, processing, storing and disseminating remote sensing data of the Earth from space within Digital Earth project by 2022.

The Digital Earth project involves the creation and regular updating of a continuous seamless coverage by remote sensing data of the entire globe. Creating a digital model of the globe is another step within Russian long-term strategy to create a modern system of geoinformation support for the development of the Russian economy. The implementation of the project will provide qualitatively new opportunities and objective information regarding agriculture and forestry, cadastre, cartography, regional management, control and prevention of emergency situations, natural disasters and industrial accidents.

In agriculture and land use, space observation will provide a new level of control on the targeted use of land, allow evaluate the condition of crops on the basis of multispectral survey data and analyze the effectiveness of fertilizer application. In addition, satellite imagery data can provide companies with reliable information on insurance events related to natural events (for example, one can confirm or deny drought, flooding, hail, or simply crop failure on each specific field). Remote sensing data can also solve such pressing environmental problems as illegal logging and unauthorized landfill sites. The use of remote sensing data will also improve the efficiency of the construction industry.

The Decree of the President of the Russian Federation dated May 7, 2018 “On National Goals and Strategic Tasks of the Development of the Russian Federation for the Period until 2024” defines such national goals as accelerating

technological development, ensuring the accelerated introduction of digital technologies in the economy and the social sphere, the creation of high-tech export-oriented sectors in the basic sectors of the economy.

To accelerate the technological development and implementation of digital technologies, it is necessary to solve different problems, including those in the field of space development.

The current state of the public satellite Internet in the Russian Federation is determined by the available capacity of existing communication satellites. During 2015 - 2016 by order of the Federal Communications Agency, high-speed satellite access networks based on high-capacity communication satellites have been created, which provides communications (including access to the Internet) to most of Russia, including those with a low population density.

After the launch and commissioning in 2019 of the Yamal-601 satellite, the Russian Federation actually completed the formation of a satellite segment for the provision of high-speed data services throughout Russia.

Modern high-capacity geostationary communication satellites make it possible to provide residents of small settlements with modern services of broadband access to the Internet using multi-terrestrial satellite access stations with Wi-Fi wireless technology.

Currently, free satellite capacity is enough to include more than 100 thousand satellite stations. At the same time, a significant number of settlements with a population of up to 250 people remain outside the coverage area of these satellites, due to the physical limitations of geostationary satellites that cannot serve the polar territories.

July 18, 2018 the President of the Russian Federation V. Putin approved the creation of a federal target program for the development of the latest satellite system "Sphere" (FTP "Sphere"). The strategic goal of the program is to create an interconnected space information infrastructure, taking into account the development of existing and the creation of new designed satellite communication systems for broadcasting, remote sensing of the Earth and navigation in the

interests of all sectors of the Russian economy, expanding participation in international markets, increasing export potential and fending off existing geopolitical challenges.

The program is aimed at achieving the required level of satellite services (communications, navigation, remote sensing of the Earth); digitalization of economic, industrial, educational, scientific, administrative and cultural processes of the country's development; maximum use of existing and future satellite capabilities in the interests of the national, public and economic security of the country; new competitive innovative technologies and solutions using satellite tools.

It is obvious that space research is one of the engines of economic development. Its results contribute to improving the quality of life on Earth. Continuing space exploration, humanity will make new discoveries, expand its knowledge and will be able to answer a number of fundamental scientific and philosophical questions.

In the 2030 Agenda for Sustainable Development, governments promised to achieve prosperity and well-being for all. Space science, technology and applied space technologies contribute to dynamic sustainable development. So, the development of technologies in this area has led to the fact that mankind has got tools in the field of weather forecasting, environmental protection, strengthening humanitarian assistance, etc. Moreover, most of the achievements in space exploration over the past five decades would not have been possible without international cooperation regarding various areas of space activities.

According to the Outer Space Treaty, when researching and using outer space, its participants must be guided by the principle of cooperation and mutual assistance and carry out space activities with due regard to the relevant interests of all other states. States are encouraged to promote and spur cooperation in this area. The need for cooperation between states in space exploration is caused by the interest of all countries in the results of such activities, as well as the high cost of space projects.

A successful example of international cooperation in space exploration is the work of the International Space Station (ISS). The first component of the ISS was launched into orbit in 1998, and in 2000, people began to work at the station. For example, by June 2017, the number of countries using the ISS reached 90. Earlier, partner countries on the ISS project agreed to operate the station until 2024. A discussion on the possibility of extending the work of the ISS until 2028-2030 is currently underway.

Thus, it is obvious that the solving of the problems related to space exploration requires a comprehensive international approach. It is important to understand that for the sustainable development of mankind, it is necessary that outer space has an exclusively peaceful status, and any activity in outer space develops in an atmosphere of cooperation for the benefit of humanity.