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Russia's Earth Observation Activities: Overview and Prospects for Expanded Cooperation with Europe

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Since the 1990s, cooperation between Europe and Russia in space has steadily expanded and became institutionalised. While successful projects were undertaken in areas like human spaceflight, launchers, space science or exploration, cooperation in the field of Earth observation (EO) has remained rather limited. Russia, however, has set forth an ambitious plan to develop further its EO capabilities in the coming years. This effort is emblematic of Moscow's broader desire to revitalise its role as a leading space power. It could likewise offer an opportunity to inspire expanded cooperation between Europe and Russia. This ESPI Perspective seeks to provide a summary of Russia's space policies, institutions and industry as a lead-in to exploring candidate areas for expanded cooperation between Europe and Russia in the civilian EO field.

1. Russia's Ambitions in Space

Russia's strategic plans for space, as in other areas, will largely depend on its economic capabilities. Moscow is still recovering from the global financial crisis of 2008 – 2009, despite having maintained fairly steady growth in recent years. Its GDP decreased by 9% in 2009 and is projected to rise to some 3.6% growth in 2010.[1] Moscow's hard currency reserves have likewise recovered from a low of $384 billion in April 2009 to an estimated $435 billion today.[2] Exports of oil and gas still constitute some 65% of Russia's merchandise export earnings. Accordingly, Moscow remains inordinately dependent on world oil prices. Among the challenges confronting Russian leadership today are: a slump in the world's natural gas market (global natural gas production declined by 2.1% in 2009[3]) including reduced demand for Russian gas in Europe, more visible and troubling social unrest, a decreasing population and governance issues in Russia's distant regions.

Internationally, Moscow appears to be pursuing a two-track strategy of displaying its willingness to cooperate economically with other countries, while pursuing its narrower, national commercial interests. This strategy helps explain some of the complexities involved in securing Earth Observation (EO) and other forms of durable, space-related cooperation. Politically, there are occasional tensions (including energy-related disputes, corruption concerns and certain Russian security initiatives and alliances) that impede the potential for developing a true and trusting partnership in space. That said, there are a wide array of concrete, practical space undertakings on offer in the EO and other fields which are in the national interests of all the parties involved. Russia is keen to reassert its position in the world following a perilous slide during the recent global financial crisis. Expanded cooperation with the EU and other organisations and countries − leveraging its more advanced space-related capabilities (at least in some areas) -- would advance this "recovery" goal. In line with these renewed ambitions, space is of central political and increasingly economic importance.

While space was one of the most prestigious policy tools of the former Soviet Union, the Russian space sector entered a period of

1 IMF. "World Economic Outlook." 26 Jan. 2010.
2 Central Bank of the Russian Federation website. 11 Feb. 2010 http://www.cbr.ru/eng/
3 BP Statistical Review of World Energy, June 2010. http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2008/STAGING/local_assets/2010_downloads/statistical_review_of_world_energy_full_report_2010.pdf

decline in the beginning of the 1990's. Due to lack of funds, qualified personnel and political support, space programmes were delayed or even cancelled. Russia's resurgent political posture on the international scene is reflected in the space sector as well. High-level political support for space has again been secured as it is considered a strategic sector. As a concrete expression of this trend, Russia launched three major space programmes in the recent years: the Federal Space Programme (FSP) for 2006-2015, the Special Federal Programme on Global Navigation Systems (GLONASS) for 2002 – 2011, and the Federal Special Programme for the Development of Russia's Cosmodromes (DRC) for 2006 – 2015. Another indicator of the strategic importance of space in Russia is the steady increase of its space budget in recent years, which culminated in a sizeable increase between 2009 and 2010, from 1.5 billion U.S. dollars to 2.8 billion U.S. dollars, respectively.[4]

Civilian EO missions are not given the same priority as areas such as launchers, GLONASS or manned flights to the International Space Station (ISS). EO priorities are described in the first programmatic section of the FSP, under the section "Scientific Research and Development Activities", in a subsection on Earth remote sensing, hydrometeorology, emergency and environment monitoring.[5]

Russia has laid out an ambitious plan to develop its civilian EO activities in the coming years.

This is the result of an ever greater recognition of the strategic importance of EO for the country. Agriculture monitoring, resource management, emergency scenarios, oil and gas resource surveillance and other capabilities are vital requirements for Russia, given its huge territory.

2. Stakeholders in the Russian Earth Observation Field

In providing an overview of the Russian EO sector, it is useful to review the main national actors involved in EO activities. Various institutional and industrial stakeholders in the Russian EO field span a wide spectrum of interests. With regard to the general institutional framework, EO satellite missions are operated by two government agencies, the Russian Federal Space Agency (Roscosmos) and the Russian Federal Services for Hydrometeorology and Environmental Monitoring (Roshydromet). The Research Centre for Earth Operative Monitoring (NTS OMZ) is Roscosmos' EO unit. It operates the ground segment owned by Roscosmos and its tasks include data planning, acquisition, processing, archiving and dissemination. Data is gathered from Russian as well as foreign spacecraft.[6]

The Scientific Research Center of Space Hydrometeorology (SRC) "Planeta", founded in 1974 within Roshydromet, manages and operates the Russian national ground segment that receives all EO data. Its main activities consist of receiving data from the space segment and processing it according to user requirements. It supplies data to approximately 400 users at the Federal and local/regional level of the Russian Federation, including Roshydromet, the Ministries of Defence, Emergency Situations, Environmental Resources and others.

Another key institution is the Space Research Institute (IKI) of the Russian Academy of Sciences (RAS). The EO-related "Earth Research" programme, one of IKI's ten programmes, is divided into two scientific departments: Satellite Monitoring Technologies and Earth Remote Sensing.[7] The main task of IKI is to produce software to analyse and employ EO data, as well as to provide operational services in the three following areas: agricultural monitoring, forest fire monitoring and fisheries. Its main customers are the Ministry of Agriculture, the Federal Forestry Agency and regional Ministries of Forestry and Fishery. Besides these three major institutional actors, a number of universities are also involved in Earth observation scientific research.

With regard to manufacturers, virtually all of the companies involved in EO are state-owned and subordinate to Roscosmos. The manufacturers of remote sensing spacecraft include the Khrunichev State Research and Production Space Center (Khrunichev), the Progress State Research and Production Space Center (TsSKB Progress), Lavochkin Research and Production Association (NPO Lavochkin), the Government Unitary Research and Production Enterprise – All–Russia Research Institute of Electromechanics with Plant named After A.G. Yosifian (NPO VNIIEM). The latter two are also

[4] Pagkratis, Spyros. Space Policies, Issues and Trends in 2009/2010. ESPI Report 26. June 2010: 18.

[5] Government of the Russian Federation. "Federal Space Program of the Russian Federation for 2006-2015." Resolution 635 of 22 Oct. 2005.

[6] NTS OMZ website. 25 Oct. 2010 http://eng.ntsomz.ru/

[7] Space Research Institute website. 25 Oct. 2010 http://www.iki.rssi.ru/eng/monitor.html

manufacturers of the Russian meteorological satellites.

Commercial EO-related activities involve launch services and data utilisation. Concerning launch activities, ESA has also been employing the services of Russian companies for its EO missions, including Eurockot (owned by EADS Astrium and Khrunichev) and ISC Kosmotras, a Russian-Ukrainian joint venture. Eurockot, for example, successfully launched The Gravity field and Steady-State Ocean Circulation Explorer (GOCE) satellite in March 2009[8] and ISC Kosmotras launched the Cryo-Sat-2 mission in April 2010.[9]

Since the 1990's, several private companies became active in the field of data utilisation (i.e. acquisition, processing, and dissemination). A number of organisations have been founded in recent years that include Russian companies involved in the EO data-related business, such as the GIS Association or the "Earth From Space" Forum.[10] The former initiative was launched in 2009 by several Russian companies. Its goal is to create suitable conditions for the development of Russian space technologies in the field of EO, to establish a clear regulatory framework, and to strengthen Russia's position in the global EO market.[11]

These companies also plan to prepare a proposal for a Federal law on the regulation of EO activities. At the same time, a number of challenges remain for the commercial sector. EO activities are heavily dominated by state structures, a feature found in the entire Russian space sector. Although commercial applications for EO products are slowly emerging, the lack of an adequate legal framework constitutes a serious obstacle to its further development.

3. Russia's Earth Observation Programme

Russia plans to bolster its civilian EO capabilities in the coming years to include meteorological, environmental, emergency situation monitoring, and Earth surveillance satellites.

Russia currently has two civilian EO satellites in orbit, one meteorological (Meteor M-N1) and one environmental (Resurs-DK).

With regard to meteorological satellites, the Meteor M satellite series is to serve as a replacement for the Meteor 3M satellite which ceased functioning in 2006. From 2006 until 2009, Russia did not possess a functioning weather satellite in orbit and relied on data purchased from abroad. In 2009, out of 15 satellite launches under the FSP only one was for EO (the above-mentioned Meteor M-1 launched in September 2009). Meteor M-N1, developed by VNIEEM, is a polar-orbiting meteorological satellite that provides support for Russian hydrometeorological and environmental monitoring services; weather analysis and regional as well as global forecasting; sea water conditions analysis and forecasting (including ice cover monitoring); atmospheric conditions analysis and forecasting for aviation; and global climate, emergency and environmental situation monitoring.[12] Meteorological satellites scheduled for launch in the near term include: Meteor-M N2 scheduled for launch on 1 July 2011 and Meteor-M N3 scheduled for lift-off on 31 December 2012.[13] The Electro-L N1 weather spacecraft has been approved for launch on 1 December 2011.[14] Electro-L N1 is a geostationary, hydrometeorological satellite and its main task will be to provide multispectral images of the Earth surface and to collect heliophysical and meteorological information data. Elektro-L N2 and N3 are envisioned to be launched by 2014.[15]

Concerning environmental satellites, the Resurs-DK, developed by the TsSKB Progress, was launched in June 2006 to provide panchromatic and multispectral (medium and high resolution) optical images. The spacecraft also carries the Italian scientific instrument, PAMELA (Payload for Antimatter Matter Exploration and Light-nuclei Astrophysics).[16] Data from the Resurs-DK

8 Eurockot website. 25 Oct. 2010 http://www.eurockot.com/alist.asp?cnt=20040751&main=3&subm=31

9 "Successful launch for ESA's CryoSat-2 ice satellite." 8 Apr. 2010. ESA. 25 Oct. 2010 http://www.esa.int/esaCP/SEMH5ZZNK7G_index_0.html

10 The GIS-Association was founded in 1995 to promote geospatial technologies, topography, navigation and remote sensing data utilisation in regional and corporate GIS projects.

11 Novosti Kosmonavtiki 2.325 (2010): 53.

12 "Roscosmos Holds a Meeting With Federal Authorities to Discuss Remote Sensing Data Acquisition in 2010." 10 Dec. 2009. Russian Federal Space Agency. 29 Mar. 2010. http://www.federalspace.ru/main.php?id=2&nid=8485&hl=valery+zaichko

13 CEOS. EO Handbook 2010. http://www.eohandbook.com/eohb2010//PDFs/EOHB%202010%20key%20tables.pdf

14 CEOS. EO Handbook 2010. http://www.eohandbook.com/eohb2010//PDFs/EOHB%202010%20key%20tables.pdf

15 CEOS. EO Handbook 2010. <http://www.eohandbook.com/eohb2010//PDFs/EOHB%202010%20key%20tables.pdf>.

16 PAMELA measures charged particles cosmic-ray spectra across a wide energy range up to a few hundred GeV. It

are used for economic development purposes in Russia, including the monitoring of natural resources, topography and geodesic map updating, environmental monitoring (of water and atmospheric pollution), and man-made or natural emergencies.[17] Other environmental satellites, notably Resurs-P N1 and Resurs P-N2, are a follow-on to Resurs-DK and are envisioned for launch on 31 December 2011 and 31 December 2013, respectively[18]. They were also designed by TsSKB Progress and will cover the same applications as the Resurs-DK1, but with enhanced capacities and resolution (<1m). Their main purpose is to provide information on oil and gas fields and monitor crops.

Russia's NPO VNIEEM is developing the Kanopus-V N1, an emergency situation monitoring satellite primarily designed for monitoring man-made and natural emergencies, mapping, forest fire detection and pollution emissions, earthquake prediction (detection of abnormal geophysical phenomena), monitoring of agricultural, water and coastal resources, as well as land use.[19]

An Earth surveillance satellite, Kosmos SKh, developed by ISS Reshetnev, is scheduled to be launched in 2013. The mission is under the supervision of the Russian Ministry of Agriculture and its objective is to forecast droughts, floods and other natural disasters affecting agriculture.[20] In July 2010, the first series of Kosmos-SKh EQM (engineering qualified model) tests were concluded at ISS Reshetnev.[21] Also in 2013, the Arkon-2M next-generation Earth remote sensing satellites are to be launched.[22] They are being developed by NPO Lavochkin and are designed to perform high resolution, continuous global Earth surveillance in the X, P and L frequency bands in all weather conditions. Also planned are the Kondor-E satellites, the baseline design of which was provided by NPO Mashinostroyeniya in 2003. Two satellites, one to be equipped with an electro-optical sensor, and the other with a radar (SAR) are designed to provide high-resolution imagery and terrain mapping in real-time.

Russia is devoting substantial attention to the Arctic and Far North regions of the country and plans for the deployment of the Arktika EO constellation for monitoring the Earth's Polar Regions.

Russia plans for the deployment of the Arktika EO constellation for monitoring the Earth's Polar Regions. This constellation's objective would be to achieve more accurate weather forecasting, searching for oil and gas shelves and identifying new deposits of natural resources in Russia's North. These issues were discussed, for example, in September 2010 at the International Arctic Forum. This Forum is a Russian initiative to establish a high-level international platform to discuss issues regarding the Arctic Region. The Arktika constellation of five satellites is to be developed by Lavochkin (two Arktika M satellites with optical monitoring systems, one Arktika R radar satellite for the polar nights and two Arktika MS telecommunications satellites). The project was approved in 2008 by President Putin with an estimated cost of 30 billion rubles ($1.23 billion) and is scheduled to begin this year.[23]

With regard to the ground segment, Russia has over thirty receiving centres and over eighty small-sized remote data receiving stations. Networks are owned by Roscosmos, Roshydromet, the Ministry of Natural Resources (forestry and geology), the Ministry of Emergency Situations, the State Fishery Committee, and the Russian Academy of Sciences.[24] The ground segment of the Russian constellations is operated by Roscosmos and Roshydromet. SRC "Planeta" operates and manages the ground system owned by Roshydromet.[25]

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consists of a time-of-flight system, a magnetic spectrometer, a silicon-tungsten calorimeter, a shower detector, a neutron detector and a set of scincillator anticoincidence detectors. Information is downloaded to a ground station in Moscow with the daily data volume of roughly 14 GB. (Vladimir M. Mikhailov, "PAMELA Experiment: Flight Data Receiving and Quicklook", 30th International Cosmic Ray Conference, Merida, Mexico, 2007.)

17 "Scientific Research Center of Space Hydrometeorology "Planeta" (SRC Planeta)". SRC Planeta website. 29 Mar. 2010 http://planet.iitp.ru/english/index_eng.htm

18 CEOS. EO Handbook 2010. <http://www.eohandbook.com/eohb2010//PDFs/EOHB%202010%20key%20tables.pdf>.

19 Gunter's space page. 29 Mar. 2010 http://space.skyrocket.de/

20 Roscosmos. Rechetnev ISS Develops Cosmos-Skh Spacecraft. 16 July 2010. http://www.federalspace.ru/main.php?id=2&nid=9898&lang=en

21 Ibid.

22 CEOS. CEOS EO Handbook – Mission Summary Arkon-2M. 13 Oct. 2010. http://eohandbook-db-com.iis1003.shared-servers.com/database/missionsummary.aspx?missionID=691

23 "Russia To Launch Space Project To Monitor The Arctic in 2010". 30 Jan. 2008. Space Mart. 29 Mar. 2010 http://www.spacemart.com/reports/Russia_To_Launch_Space_Project_To_Monitor_The_arctic_In_2010_999.html

24 "Remote sensing data market, processing software and application services for Russia." Presentation by Evgeniy Kapralov, GIS-Association.

25 Asmus, V. V., Dyaduchenko, V. N., Milekhin, O. E. and A. B. Uspensky. "Remote Sensing Products and Applications: Roshydromet Program." Presentation. EUMETSAT Meteorological Satellite Conference. Dubrovnik, Croatia. 19-23 Sept.2005.

In addition to Russia's official space programmes, it is likewise useful to take note of Moscow's political efforts to promote its International Global Aerospace Monitoring System (IGMASS).[26] The concept was originally proposed by the scientists of Space System Research Institute, a branch of the Khrunichev Space Centre (Moscow). IGMASS seeks to unify the efforts of the international community to link economic, scientific, technical, intellectual, and administrative resources in order to utilise the space sector in addressing urgent global issues. The concept was discussed for the first time in 2007, during the 1st International Conference, "Advanced Space Technologies for Humankind Prosperity" convened in Dnetropetrovsk, Ukraine, as well as at subsequent conferences.

The proposed IGMASS constellation envisions combining assets from all over the world. Currently, IGMASS is in the phase of project initialisation. The IGMASS project was officially submitted to the Scientific and Technical Subcommittee (STSC) of the UN Committee on Peaceful Uses of Outer Space (UNCOPUOS) in June 2010.[27] The development of IGMASS will be next discussed at the International IAA Conference on Small Satellite Programmes for Socio Economic Benefits and the Role of IGMASS in December 2010.

4. Europe's Past and Present Cooperation with Russia in Earth Observation

Europe has been cooperating with the former Soviet Union since the 1970's. Following the 1990's, interaction between Russia and Europe was gradually expanded and became institutionalised. Ongoing cooperation already exists among Russia and the European Space Agency (ESA), the European Union (EU), as well as individual European countries. Russia is one of the EU's top trading partners and the EU ranks first as Russia's most important investor. ESA established a Permanent Mission to Russia in 1995 and is actively engaged in facilitating information exchanges and cooperation in various space-related endeavours. Earth observation, however, has not received priority attention despite the fact that Russia is actively participating in various international institutions and initiatives in the EO field.

The most relevant European entities for EO-related cooperation with Russia are ESA, the European Organisation for the Exploitation of Meteorological Satellites (EUMESTAT), and the EU.

ESA signed a Framework Agreement with Russia in 1991 and initiated most of the pilot projects in the area of Russo-European space cooperation. In 1991, the first of these projects explored the possibility of combining the capabilities of ESA's European Remote Sensing Satellite (ERS-1) and Russia's Almaz-1 satellite (both equipped with SAR instruments) for sea-ice monitoring along the Northern Sea Route in support of navigation and oil spill detection.

The IceWatch project of 1995 – 1997 was a natural follow-on to these early sea-ice projects. It stemmed from an agreement between ESA, the Russian Space Agency and the participating institutes (i.e. the Norwegian Research Council and the Murmansk Shipping Company) and involved the joint use of the ERS SAR and the OKEAN SLR (side-looking radar).[28]

Several other coordinated demonstration projects were likewise initiated. IKI participated in the GLOBCOVER project, spawned by ESA and designed to utilise the MERIS sensor of the ENVISAT satellite to produce a global land-cover map for the period of 2005 – 2006.[29] Similarly, SRC "Planeta" was a partner in the BEAR projects, which were underway between 2003 and 2006 and intended to serve as a preparatory base for a potential cooperation in the framework of GMES and GEOSS.

Among more recent projects, DEMOSS (Development of Marine Oil spills/slicks Satellite Monitoring System elements targeting the Black/Caspian/Kara/Barents seas) focuses on developing and demonstrating an oil spill detection and prediction system based on satellite SAR and other space data, in combination with models for oil slick/spill monitoring and prediction. The Russian partners included the Nansen International Environmental and Remote Sensing Centre (NIERSC) in St. Petersburg, the Institute of Applied Physics of the Russian Academy of Sciences, the Arctic

[26] Existing and envisioned international space systems for monitoring natural disasters include the Charter "Space and Major Disasters", GEOSS, GMES, and DMC (Disaster Monitoring Constellation).

[27] Cherkas, Sergey V. International Global Monitoring Aerospace System IGMASS – New Approach to Disaster Management Issue. Presentation to the STSC of UNCOPUOS on 17 June 2010. Vienna: UNCOPUOS. http://www.oosa.unvienna.org/pdf/pres/copuos2010/tech-32E.pdf

[28] "IceWatch. Real-time Sea Ice Monitoring of the Northern Sea Route Using Satellite Radar Technology." ESA. 25 Oct. 2010 http://earth.esa.int/workshops/ers97/papers/sandven2/

[29] "GLOBCOVER." ESA website. 29 Mar. 2010 http://envisat.esa.int/workshops/meris_aatsr2005/participants/359/

and Antarctic Research Institute (AARI) in St. Petersburg, and the Research Centre for Earth Operative Monitoring (NTS OMZ).[30]

EUMETSAT began formalised cooperation with Russia in 1997 and signed an agreement with Roshydromet in June 2003. The agreement, approved at the 53rd Council, includes "a mechanism of periodical consultations, as well as the identification of potential areas for future collaboration, and a reciprocal exchange of data and images from the respective geostationary and low Earth orbit satellites".[31]

A proposal to enhance this cooperation agreement with Roshydromet was unanimously approved at the 64th Council in July 2008.[32] As for the concrete aspects of this cooperation, Operational High Resolution Picture Transmission (HRPT) stations were installed by Roshydromet in Russia in 2005. Similarly, SRC "Planeta" contributes to EUMETSAT's EARS (EUMETSAT Advanced Retransmission Service). Through this framework, SRC "Planeta" acquires local data from its Moscow ground receiving station and transmits it to EUMETSAT in Darmstadt, where the data is processed and redistributed to end users, including SRC "Planeta".

EU-Russia cooperation is more recent and is embedded in a number of institutional arrangements, including The Partnership and Cooperation Agreement (PCA) of 1997, the legal basis for governing EU-Russian cooperation in three major areas of relations: political, trade and economic, and cultural. The programme covers over 30 policy areas, including space. In addition, the EU and Russia introduced the concept of "Four Common Spaces" for cooperation in the framework of the PCA at the St. Petersburg Summit in May 2003. In this regard, cooperation in space was identified as one of priority sectors within the Common Economic Space.[33]

Specific space-related initiatives were also jointly undertaken. In 2001, a Joint Memorandum entitled "New Opportunities for a Euro-Russian Space Partnership" was signed by the EU, ESA and Rosaviakosmos. This Memorandum served as a political backdrop for future work to include Galileo-GLONASS cooperation, GMES, prospects for launchers, as well as industrial cooperation and research in space transport systems.[34]

Similarly, the Tripartite ESA-EU-Russia Space Dialogue was established in Brussels in March 2006 and included space applications (e.g. satellite navigation, Earth observation and satellite communications), access to space (e.g. launchers and future space transportation systems), space science and space technology development.[35] Most cooperative endeavours, however, take the form of Russian participation in the FP (Framework Programme) projects launched by the European Commission (EC). For example, Russia was the most successful "third country" to participate in FP 6 (2002 - 2006), and FP 7, concerning both the total number of participants and the amount of funding received.

With regard to EO, Russia participated in four projects under the aeronautics and space theme of FP 6 (MONRUK, GEOLAND, GNU, and INTEGRAL). There were other EO-related projects under different action items (e.g. ASCABOS, DAMOCLES, ECOOP, GEOMON, and GRAND). As for FP 7, Russian participants were involved in eight proposals for each of the first two calls under the theme of "space".

Despite this existing institutionalised space cooperation between Europe and Russia, as well as a number of other initiatives, the level of EO-related cooperation in space remains relatively modest.

EU-Russian cooperation mainly involves pilot or other smaller operational projects. Unlike the substantial cooperative efforts in the areas of launchers, manned space flight, or space science, EO is still waiting for its first large project. This reality exists despite Russia's

[30] Novikova, N.N., Pakhomov, L.A., Feoktisov, A.I., Zakharov, A.I., Denisov, P.V. "Mezhdunarodnie proiekti DEMOSS i MUNRUK. Razvitie rabot, natchatikh v ramkakh mezhdunarodnikh proiektov OSCAR i ERUNET." 29 Mar. 2010 http://d33.infospace.ru/d33_conf/2008_pdf/1/19.pdf

[31] "International Agreements." EUMETSAT website. 1 Apr. 2010 http://www.eumetsat.int/HOME/Main/AboutEUMETSAT/InternationalRelations/InternationalAgreements/index.htm?l=en

[32] "Annual Report 2008." EUMETSAT. 1 Apr. 2010 http://www.eumetsat.int/home/Main/AboutEUMETSAT/Publications/AnnualReport/groups/cps/documents/document/pdf_ar_2008.pdf

[33] "Road Map for the Common Economic Space – Building Blocks for Sustained Economic Growth" 27 Oct. 2010 http://eeas.europa.eu/russia/docs/roadmap_economic_en.pdf

[34] "Compendium on Science& Research Cooperation Between the European Union and the Russian Federation", European Communities, 2009.

[35] "EU-Russia Dialogue on Space Cooperation – 3rd Meeting of the Steering Board." 27 June 2008. ESA. 30 Mar. 2010 http://ec.europa.eu/enterprise/newsroom/cf/itemlongdetail.cfm?item_id=1628

involvement in the principal EO-related organisations.

Russia is, for example, a member of the Group on Earth Observations (GEO) and the Committee on Earth Observation Satellites (CEOS). Russia is likewise participating in various institutions within, or associated with, the UN that operate or utilise EO applications, such as the UN Economic and Social Commission for Asia and the Pacific (UN ESCAP), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the World Meteorological Organization (WMO), the Coordination Group for Meteorological Satellites (CGMC) and the Special Monitoring & Coastal Environmental Assessment Regional Activity Centre (CEARAC).

5. Prospects for Future Cooperation

Given the growing interest of the international community in environmental issues, disaster management, prediction and other areas involving EO space systems, it is likely that Russia will seek to participate in a number of efforts associated with these fields. Russia has already begun to position itself as a more prominent player in these areas, notably through its recent International Global Monitoring Aerospace System (IGMASS) programme. It remains to be seen, however, to what extent Moscow will commit more of its economic, political and other resources to expand existing cooperation in the EO field, which has until recently been the exclusive domain of Russia's national security apparatus.

Broader geopolitical considerations between Russia and Europe likewise condition decision-making on EO-related cooperation.

Events like the 2007 suspension of Russia's participation in the Conventional Forces in Europe Treaty, the August 2008 Georgian conflict, the disruption of natural gas supplies to EU countries and possible tensions associated with international sanctions against Iran, are some of the developments that could impede cooperative initiatives.

On the positive side, Russia is keen to reassert its position in the world following a perilous slide during the recent global financial crisis. Expanded cooperation with the EU and other organisations and countries -- leveraging its more advanced space-related capabilities (at least in some areas) -- would advance this "recovery" goal. A strengthened relationship with Europe is squarely in Moscow's strategic interests.

The field of civilian EO has specific attributes, including the fact that remote sensing-related activities are still largely the domain of the military establishment and are perceived as a strategic sector. Funding for civilian EO tends to be tighter and the demand on the part of government has been lower in comparison with other priorities. At the same time, cooperation with Russia has sizeable potential and attention needs to be paid to existing challenges, including: the lack of more comprehensive data exchanges on a regular basis; the low number of scientific exchanges when compared, for example, to that of the U.S.-European relationship; the generally low turn-out of Russian participation in European international conferences and vice versa; communication problems due to the nature of the decision-making process in Russia; information and copyright issues; and general issues of non-transparency and complex bureaucratic procedures.

That said, patience, persistence, adequate budgetary capabilities, better bureaucratic coordination and political will can create an expanded number of opportunities to take advantage of the sizeable benefits associated with European-Russian EO-related cooperation.

European Space Policy Institute

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