

Future of European Foreign Policy Seminar

Briefing paper

EUROPEAN SPACE POLICY: Modest Reforms

EVENT: On the 22nd of May, 2007, the European Space Council will discuss a Commission communication, detailing its vision for Europe 's space policy

SIGNIFICANCE: Space is a strategic asset which Europe has successfully exploited in the past. However, the space industry is growing, and new powers are emerging. To maintain competitive and affordable access to space, Europe must reform its space policy.

ANALYSIS: With a growth of 38% recorded since 2000, investment in space is increasing rapidly.[1] At present, even conservative estimates put the size of the space industry at €90 billion, growing at a rate of 7% annually.[2] Meanwhile, the rapid rise of China, which recently demonstrated its ability to hit a satellite with a missile, illustrates the new space scene that is emerging. In response to these developments, the United States published a new National Space Policy only last year, emphasizing its vital interest in access to space. Europe, despite its different outlook, now follows in the footsteps of the U.S. in revising its approach towards space. The Communication of the European Commission seeks to establish a coherent policy to strengthen Europe's position. The document does not limit itself to the space programs connected to the European Union, but adopts a broad scope to argue for a common, comprehensive approach.

Global context

Increased world spending on space and the emergence of new space powers such as China and India have diversified the market. The United States remains in a dominant position and its pre-eminence will be unchallenged in the short and medium term. It has shown little interest in a transatlantic alliance in the area of space policy. Europe has therefore turned its attention east, to Russia and China, with which it has developed successful partnerships.

- **The United States.**

- a. **Vision.** The 2006 National Space Policy constructs access to space as vital to the national interests of the U.S. and thereby demonstrates a tendency towards securitization. The policy expresses commitment to the use of space for peaceful purposes, but includes defense and intelligence-related activities under this

heading. It also commits itself to take any action necessary to guarantee its rights and space capabilities. This includes, if necessary, the denial of the use of space to adversaries hostile to its interests.[3]

- b. **Space power.** Consistent with this declared policy, the U.S. has pursued pre-eminence in military space. Its military investments in space now amount to \$21.25 billion – more than 94% of the world total, and more than the public investments in civil space of the rest of the world combined. In civil space, too, its public investments of \$17.3 billion put it at the top of the list, accounting for 62% of the world total.[4] Stringent export controls and an expected shortfall in its technical labor force will put its competitiveness at risk, however.[5]
- c. **Cooperation.** Europe's cooperation with the United States has been limited, especially when compared to the extensive transatlantic cooperation in other areas. Cooperation has mainly taken place in the area of science and exploration, through missions such as the Hubble Space Telescope and the Mars Express.[6] The sharing of technology has been hampered by concerns over commercial competition. Furthermore, the U.S. has discouraged the development of a mutual strategy by declaring that its space initiative was "very much going to be a U.S.-led endeavor" aimed at achieving national objectives.[7]

- **Russia**

- a. **Space power.** Russia's public space expenditure is negligible compared to the world total: 1%. Nevertheless, it has aimed at maintaining space leadership and has generally succeeded in doing so. With 20% of the space launches over the period 2000-2005, it follows in second place behind the U.S. and ahead of Europe . As the U.S. Space Shuttle fleet is aging, Russia 's capabilities in the area of human spaceflight have become especially important: its Soyuz spacecraft are now used to rotate the crew of the International Space Station.[8] Russia has recently sought to become more competitive by grouping its space industry into one company.[9]
- b. **Cooperation.** Russia has been a willing partner in international space cooperation, and has signed bilateral contracts with numerous national agencies and more recently with the European Commission.[10] Russia and Europe have also cooperated intensely: A number of shared missions have been conducted and agreements have been signed on the sharing of data and a limited exchange of technology.[11] At present, a Soyuz launch site is being prepared at the Guiana Space Centre of the European Space Agency (ESA).[12] Space cooperation has thereby come to represent an important means of developing European-Russian relations. In fact, Russia now appears to have become Europe 's preferred partner in international space cooperation.

- **China**

- a. **Space power.** China is the clearest example of an emerging, technologically advanced power in space. It has mastered human spaceflight, and recently became the third nation to successfully target a missile at an orbiting satellite. In

absolute value terms, it spends a modest \$134 million annually, making its civilian space budget only slightly higher than that of the Netherlands.^[13] However, taking purchasing power into account, its space industry is clearly much larger, employing some 250,000 employees.^[14] China's access to a large workforce of engineers will save it from the shortfall in technical labor that is becoming problematic in both the U.S. and Europe.^[15] China's influence can therefore reasonably be expected to continue to increase.

- b. **Cooperation.** China, like Russia, has shown promising signs of cooperation. In 2005, it signed a Framework Agreement with ESA, and a partnership has developed with respect to Europe's GALILEO project and the use of Earth observation data from ESA's Envisat satellite. As China's space program expands, more opportunities for cooperation will become available.

- **Others**

- a. **India** has recently emerged alongside China as a new space power. It now spends more than half of its science and technology budget on space and has become extremely competitive in the manufacturing of small to medium-sized satellites.^[16] **Ukraine**, too, is a significant space power, as it inherited roughly 15% of the space industry from the Soviet block.^[17] Other space nations include **Brazil, Canada, Japan, and Korea**. Some partnerships have developed between Europe and the mentioned nations, but these have generally been of a more limited extent than the agreements with the U.S., Russia and China .

European investment. Compared to the U.S., Europe's space industry remains relatively small, largely due to much smaller public investment. In recent years, most attention has been focused on a few flagship (predominantly civilian) projects.

- **Amount and distribution.** European public sector investment amounts to roughly €6 billion on an annual basis. Half of this amount is spent on national programs and the other half is spent on programs administered by ESA.^[18] The largest share of the budget (33%) is earmarked for launch systems, followed by concrete applications such as telecommunications (15%) and earth observation (13%). Science and technology also continue to receive a significant share of ESA's budget (13% and 4% respectively).^[19] Spending roughly reflects country size, although France leads by a considerable margin. To a large extent this is a voluntary state of affairs. 72% of ESA's activities are optional and member states can choose whether to participate or not.^[20]
- **Key projects.** The added-value of the European space effort, and its unique identity, is mainly connected to three main projects.
 - a. **GALILEO.** This European Satellite Navigation System has been the prime project for many years and represents the European contribution to the Global Navigation Satellite System (GNSS). When completely deployed, it will consist of 30 satellites and is expected to become fully operational around 2011 or 2012.^[21]

The project is significant for two main reasons. First it guarantees Europe's strategic interests by providing it with an alternative to the Global Position System (GPS) developed by the U.S. Department of Defense.[22] Second, GALILEO is expected to have great commercial value. By 2025, the market for satellite navigation services is expected to amount to €400 billion. Over the years 2008-2020 alone, GALILEO is expected to produce net benefits of between €11 and €23 billion.[23]

- b. **GMES.** The Global Monitoring for Environment and Security (GMES) is part of the European contribution to the Global Earth Observing System of Systems (GEOSS). GMES is constructed on both ground and space-based assets, and will provide of services, including geological, meteorological and mapping information.

GMES will provide scientists with a wealth of information, but also has a number of more practical benefits. Earth observation data will improve environmental policies, facilitate management and early warning of natural disasters, and can be employed to increase productivity in sectors such as fishing and farming. It is also of strategic and military interest, allowing for surveillance and reconnaissance and the management of natural resources. The benefits of GMES are more difficult to quantify, but have been estimated at €138 billion in net present value terms for the period up until 2030.[24]

- c. **Satellite Communications Systems.** Driven by the private sector, Europe has also invested heavily in satellite communications. The market for telecommunications services has grown rapidly – in 2005, the global market was been estimated to be worth \$80 billion.[25] Europe is once again prominently present in the market, hosting three of the five largest satellite system operators. [26] Fixed and mobile satellite services now account for 40% of Europe 's space revenue.[27]

Space and ESDP. As opposed to the United States, Europe's space program has been virtually exclusively civilian in nature. However, the European Security and Defence Policy (ESDP) has created a demand for space assets to complement other civilian and military capabilities. To meet this demand, Europe is not likely to embark on an ambitious spending program, for which little interest has been expressed. Rather, it is likely to rely on pragmatic partnerships with public and commercial civilian assets.

- **Military space capabilities.** The development of military capabilities in space has remained under the authority of states, due to considerations of sovereignty and the perceptions of vital interests. ESA, therefore, has acquired no military competencies.[28] Yet, space assets are often prohibitively expensive to develop for a single client, and few nations in Europe have either the resources or the need to develop relevant capabilities individually. National investment in military space has therefore been very limited.[29] Moreover, to the extent that member states have developed relevant assets, the EU does not have automatic access to these and their use to ESDP is therefore limited.[30]
- **Military needs.** A panel of experts has recently identified a number of areas where space assets can contribute to ESDP. These include support to basic services like transportation, intelligence and policing, rescue operations, crisis management, border control, and assistance to humanitarian aid.[31] Space assets can contribute by providing reliable, secure information and enhancing communication. They can also help

detect threats arising from pollution, natural resources, trafficking, and provide a means of implementing arms control.[32]

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- **Increasing access.** A study on ESDP and Space has concluded that it would not be desirable to develop a stand-alone defense space policy. Instead, therefore, the European space program is likely to rely on double use technologies – technologies that can be employed for civilian as well as military purposes. This policy would be supplemented by access arrangements to member states' capabilities, and future programs of cooperative projects to develop critical capabilities.[33] Investment under this piggy-backing approach would be limited, so that any fears of initiating space race would be an unjustified exaggeration.

European competitiveness. Europe has maintained a competitive position in the world space market. Demand for its expertise remains high. In the market for satellite manufacturing, for instance, Europe controls roughly 40% of the supply market with an annual turnover of €4.4 billion.[34] However, Europe faces an increasingly competitive environment and will need to continue to reform its space industry in order to maintain its position in the international market. However, Europe's space industry is constrained by a number of factors that impede growth and investment, which put it at a comparative disadvantage.

- **Fragmented demand and supply.** The lack of full integration and coordination between nations has led to a fragmented market for space products and services. The various national space programs are not exploiting the pooling of resources to the full extent possible, and standardization remains a problem. For single nations a space solution is often not cost-efficient. Europe as a whole therefore relies less on space systems in its public policy than other space powers that possess larger, unified markets.[35] For the same reasons, suppliers, too, are fragmented. This results in efficiency losses due to duplication of services, overcapacity and poor interoperability, rendering the European market less competitive than it might otherwise be.[36]
- **Incoherent legal regimes.** Relevant regulation on, for instance, export controls and spectrum rights have not yet been harmonized among the European nations. As the manufacturing of satellites is most often a multinational process, suppliers have to go through a costly process to ensure that the various components conform to national export controls. Similar difficulties occur in the exploitation of the satellite, as licensing regulations frequently differ between the nations covered by a satellite's natural operating area.[37] This makes Europe an unattractive location for manufacturing and a difficult one to invest in.
- **Commercial weakness.** The space industry is an institutionally-driven sector. Its exploitation crucially depends on technology that often takes years to develop. This results in significant risk for the private sector, exacerbated by the sector's strong cyclical movements. The success of the industry therefore depends heavily on institutional involvement. In Europe, about two thirds of space investment is of this form, but this is still much less than in the U.S. where institutional investment accounts for 85% and where the market is much larger.[38] This provides Europe with a competitive disadvantage, and explains why Europe's added-value industry has remained weak and poorly integrated.[39]

- **Weak institutional structure.** Europe's space framework consists of efforts by states, by the EU and by ESA. The situation is complicated by incomplete overlap in EU and ESA membership. Although a Framework Agreement has sought to clarify the relations between the different European space actors, these factors slow decision-making.[40] Moreover, there is no central spider in the web, as competencies remain divided. The EU takes the lead in international relations on applications such as GMES and GALILEO, ESA is responsible for technology and science, whereas military aspects remain the responsibility of member states.[41] This structure is ill-suited to provide a comprehensive approach in an efficient manner.

Latest, modest reforms. The latest Communication of the European Commission is an attempt to address some of the problems faced by the European space industry. It does not discuss specific funding but seeks to develop a framework for all space-related activities. Its substantive content does not radically change the present institutional structure. However, it will assist in removing inefficiencies, improving coordination, and clarifying priorities.

- **European Space Programme.** The Commission proposes a European Space Programme under which all space-related activities would be implemented, and with which all relevant entities would be involved.[42] Such a common framework would assist in sharing information, improving harmonization of standards, aggregating needs and identifying critical technologies. ESA and the Commission would take a coordinating role.
- **Continued intergovernmentalism.** The Programme would not drastically alter the manner in which budgets are administered or decisions are made. The staff of the Commission instead envisages a continued combination of national programs and intergovernmental programs.[43] An alternative scenario might have been the supranationalization of space, by bringing national space budgets entirely under the framework of the European Community. This would be highly conducive to pooled investment and efficient spending, but is presently not perceived to be on member states' political agenda.[44]
- **Step increases in scope.** The Communication makes no attempt to increase the scope of intergovernmental programs. Defense-related space policies, for instance, will remain under the umbrella of member states.[45] Step increases in policies can still result from greater coordination and shared applications. However, this process would be slow as no roadmap has been set up for this, nor is there any political effort to push the development of European space policy forward.

Outlook. Based on the Communication and its priorities, Europe's space policy is unlikely to undergo a fundamental change of direction. Existing activities will be expanded and become more cost-effective, but Europe will remain a civilian power of roughly the same size, relative

to its competitors.

- **Exploitation of applications.** This aspect will remain the backbone of European space policy. Applications like GALILEO and GMES represent the most concrete benefits of space investment and benefit Europe as a whole, rather than particular member states.
- **More competitive space industry.** Competitiveness will be increased if the Communication is implemented, by stimulating a common regulatory framework and harmonization of standards. A boost for the industry can be expected from the €2.8 billion that the Commission has earmarked for space applications for the years 2007-2013.[\[46\]](#)
- **Security and defense.** Little of a fundamental change should be expected in Europe 's approach to the military side of space. The Commission emphasizes the dual use of civilian applications, but does not call for military investment. As military capabilities will remain the responsibility of member states, a concerted effort to establish a military space program should not be expected.
- **Guaranteed access to space.** The Commission's intent to ensure availability of necessary infrastructure and launch systems will establish Europe as a permanent power in space. However, the Communication also embraces the use of international assets, such as Russia 's launch systems. Europe will therefore not achieve "independent" access, as the document states, but will more accurately continue to rely on strategic partnerships.

CONCLUSION: Europe's space program has been modest, but successful. However, its commercial space industry is weak and is put at a disadvantage due to fragmentation and market inefficiencies. The greater coordination proposed by the Commission will reduce some of these problems, but will not fundamentally alter the course of European space policy. Europe will continue to rely on strategic partnerships, especially with Russia, and will remain a civilian power.

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[1] Euroconsult. "World Prospects for International Space Markets," available online at <http://www.euroconsult-ec.com/brochures/world-prospects-for-gov-space-markets-2007.pdf>, p. 1.

[2] European Union. "European Space Industry and Examples of Space Applications," Press Release (Brussels ; April 24, 2007; MEMO/07/154), available online at <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/07/154>. The Space Foundation estimates worldwide space activity at \$180 billion, see the The Space Foundation. "The Space Report 2006: Executive Summary," (Colorado Springs , CO ; 2006), available online at http://www.thespacereport.org/executive_summary.pdf, p. 10.

[3] Office of Science and Technology Policy. "U.S. National Space Policy," available online at <http://www.ostp.gov/html/US%20National%20Space%20Policy.pdf>.

[4] European Commission. "Impact assessment of the European space policy," (Brussels ; April 26, 2007; SEC(2007) 505), available online at http://ec.europa.eu/enterprise/space/doc_pdf/impact_assessment_en.pdf, pp. 10-11.

[5] George Abbey and Neal Lane . " United States Space Policy: Challenges and Opportunities," American Academy of Arts and Sciences (Cambridge , MA ; 2005), available online at <http://www.amacad.org/publications/spacePolicy.pdf>.

[6] European Space Agency (ESA). "Annual Report 2005," (Noordwijk; 2005), available online at http://www.esa.int/esapub/annuals/annual05/ESA_AR2005.pdf, p. 79.

[7] George Abbey and Neal Lane (2005), see note 5 above, p. 19.

[8] The Space Foundation (2006), see note 8 above, p. 6.

[9] European Commission (2007), "Impact assessment", see note 4 above, p. 12.

[10] European Commission. "Green Paper Discussion Point: The International Dimension", Consultation Closing Conference (2003), available online at http://ec.europa.eu/comm/space/doc_pdf/gp_international.pdf.

[11] See the numerous areas of cooperation listed at http://www.esa.int/SPECIALS/ESA_Permanent_Mission_in_Russia/.

[12] ESA (2005), see note 6 above, http://www.esa.int/esapub/annuals/annual05/ESA_AR2005.pdf, pp. 44-45.

[13] European Commission (2007), "Impact assessment", see note 4 above, p. 11.

[14] Idem, p. 12.

[15] George Abbey and Neal Lane (2005), see note 5 above, p. 14.

[16] European Commission (2007), "Impact assessment", see note 4 above, p. 12.

[17] European Commission (2003), "Green Paper Discussion Point," see note 10 above.

[18] European Union (2007), see note 2 above.

[19] ESA (2005), see note 6 above, p. 117.

[20] Idem, p. 110.

[21] European Union (2007), see note 2 above.

[22] European Union (2007), see note 2 above.

[23] European Commission (2007), "Impact assessment", see note 4 above, p. 28.

[24] *Idem*, p. 31.

[25] The Space Foundation (2006), see note 2 above, p. 4.

[26] European Union (2007), see note 2 above.

[27] European Commission. "European Space Policy," (Brussels ; April 26, 2007; COM(2007) 212), available online at http://ec.europa.eu/enterprise/space/doc_pdf/com_en.pdf, p. 6.

[28] European Space Agency (ESA). "Agenda 2007," (Noordwijk; 2003), available online at <http://esamultimedia.esa.int/docs/BR-213.pdf>, p. 8.

[29] As is obvious from the aforementioned fact that the U.S. accounts for 94% of the worlds' spending on military space, with the remaining 6% worth only \$1.25 billion. See European Commission (2007), "Impact assessment", see note 4 above, p. 11.

[30] Council of the European Union. "European Space Policy: ESDP and Space," (Brussels ; November 16, 2004; 11616/3/04 REV 3), available online at http://www.europarl.europa.eu/meetdocs/2004_2009/documents/dv/st11616_/st11616_en.pdf, p. 8.

[31] Space and Security Panel of Experts, "Report of the Panel of Experts on Space and Security," (March 1, 2005), available online at http://ec.europa.eu/enterprise/space/news/article_2262.pdf, p. 18.

[32] Council of the European Union (2004), p. 4.

[33] *Idem*, section IV.

[34] European Union (2007), see note 2 above.

[35] European Commission (2007), "Impact assessment", see note 4 above, p. 17.

[36] ESA (2003), see note 28 above, p. 8.

[37] European Commission (2007), "Impact assessment", see note 4 above, pp. 17-18.

[38] *Idem*, p. 13.

[39] ESA (2003), see note 28 above, p. 8.

[40] European Commission (2007), "European Space Policy", see note 27 above, p. 11

[41] *Idem*, p. 12.

[42] *Idem*.

[43] European Commission (2007), "Impact assessment", see note 4 above, sections 4.2 and 5.5.

[44] *Idem*, pp. 26.

[45] European Commission (2007), "European Space Policy", see note 27 above, p. 7.

[46] *Idem*, p. 10.