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**Space in a Changing Environment:**

A European Point of View

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*March 2015*

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ISBN: 978-2-36567-364-8  
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## Ce qu'il faut retenir

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Le développement des activités spatiales en Europe s'est longtemps joué dans le cadre de l'agence spatiale européenne et des agences nationales. Les Européens ont acquis ce faisant une expérience inégalée pour résoudre les tensions entre intérêts nationaux et collectifs. L'émergence de l'Union européenne comme acteur spatial de premier plan a depuis suscité un certain nombre d'initiatives et d'opportunités.

Pourtant, la politique spatiale européenne est encore loin de pouvoir projeter les objectifs d'une stratégie spatiale européenne cohérente et déterminée. Il faut d'une part évaluer l'équilibre pertinent entre intégration et diversité des acteurs nationaux, mais surtout définir les objectifs et les valeurs qui doivent fonder le projet spatial européen.

Pour mettre en lumière d'éventuelles solutions, une série de cas d'étude révélateurs est passée en revue. Elle explore tout d'abord les motivations des différents acteurs : entre un modèle français d'autonomie, un modèle britannique reposant sur le marché et un modèle allemand fondé sur la coopération. Elle étudie ensuite les différentes méthodes de coopération utilisées par les Européens, depuis la coopération type ESA jusqu'à la coopération type Union européenne, en passant par les mécanismes mis en œuvre dans le cadre de programmes internationaux.

# Executive Summary

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The development of European space activities has long been pursued under the framework of the European Space Agency and other national space agencies. More recently, the emergence of the European Union as a new actor for space has paved the way for a series of initiatives and opportunities.

However, the European space policy still does not promote a consistent and successful European space strategy. A first difficulty is to decide how to balance diversity and unity amongst European space-faring nations. Additionally, Europe must define reasons, goals, and above all values for its space program.

In order to outline possible future solutions, this paper reviews a series of significant case studies. It looks first at the motivation of different European actors: from the French model of autonomy to the British market-based model and the German cooperative model. It then considers different cooperation mechanisms: the ESA type, the EU type and the international program type.

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# Introduction

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With the end of the Cold War, the United States has become the sole great power and the space sector, same as terrestrial international relations, has been unipolar.<sup>1</sup> Whereas its erstwhile foe, Russia, though still one of the preeminent space powers in terms of satellite launches and number of assets employed in outer space, saw the relative share of its contribution to global space activities decline, the US has remained capable of investing in every aspects of the use of space. It still claims today more than 60% of all global civil space expenditures and concentrates over 80% of the world's military space activity. Close to half of all satellites in orbit around the Earth are American (528 out of a total of 1,265 in 2015), compared with approximately 10% for Russia and China and just over 8% for Europe. Japan and India own together around 8% of the total. The 22% remaining are composed of the growing 60+ nations and government consortia that own and operate satellites, in addition to the world's largest commercial fleet operators.<sup>2</sup> Yet the space sector has also experienced those past few years a new dynamic brought about by four major changes, thus allowing a more nuanced and complicated picture to be put together.

1. First and foremost, the most obvious trend, though maybe the least understood, is the growing dependency which firmly connects our societies to the many space systems currently evolving in orbit. In a way, there would have been no successful globalization without space. And indeed, many sectors now rely on the applications provided by space technology often on an absolute basis, hence putting the question of assured access to space on par with how valued today are secure energy or raw material supplies. Space activity has thus gained a strategic dimension it was previously lacking. Specifically, it has come to be viewed as a powerful tool for a modern nation to acquire, particularly because of its perceived economic, political and military importance in a geopolitical

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<sup>1</sup> Nuno P. Monteiro, *Theory of Unipolar Politics*, New York: Cambridge University Press, 2014.

<sup>2</sup> Quoted in Xavier Pasco, "Vers de nouveaux équilibres stratégiques dans l'espace," *Questions internationales*, N°67, May-June 2014, pp. 83-91, at 84. See also UCS Satellite Database available at <[www.ucsusa.org/nuclear\\_weapons\\_and\\_global\\_security/solutions/space-weapons/ucs-satellite-database.html](http://www.ucsusa.org/nuclear_weapons_and_global_security/solutions/space-weapons/ucs-satellite-database.html)>.

environment full of uncertainty. The interest raised by this evolution justifies that the “space club” countries, especially the United States, maintain their capabilities, same as it encourages smaller and emerging countries to invest in space applications for a wide specter of reasons. Although latecomers still find space hard, the availability and diffusion of new space technologies worldwide are making space applications more accessible than ever. The democratization of space is gaining ground in Asia, Africa, Latin America and many other developing regions.

2. Policy developments within the space programs of the main industrialized countries constitute the second major change. In the U.S. as in Europe and Russia, the time has come to engage in new rationalizing management methods, reforming existing institutional frameworks, and decreasing costs to enhance efficiency. References to the “golden age” of space policy as it existed during the beginnings of the space age, when the values of “exploration” were guiding the overall space effort of these nations have not been forgotten, but ambitions have been revised downward. Attention to more practical, market-oriented, down-to-earth considerations through the adoption of what one could call a “space utilitarian” doctrine is now standard practice.<sup>3</sup> Of course, adaptation, notably in the U.S., has been slow if not controversial as anyone might have guessed given the role historically played in this country by large-scale civilian programs. Besides, the absence of a long-term vision and political will resulting from this “normalization” of space activities is not unconnected to the general feeling that the space program is adrift or in a “crisis” mode with neither mission nor purpose.<sup>4</sup> The magnitude of criticisms that have targeted the Obama administration after the cancellation of the *Constellation* program can be explained this way.

3. This is in contrast with a third development that has been going on in the rest of the world, especially in Asia.<sup>5</sup> New space programs there – belonging to states that can be seen as both powerful rising entities and weak developing nations such as China or India – do not seem to lack any *raison d’être*. Indeed, while investing massively in programs aiming to use space to make Earth a better place, they are showing great interests in activities like lunar missions and placing humans in space (as well as anti-satellite experiments), many of which are deemed irrational or contradictory by established actors. Was not the Moon a *cul-de-sac*, “a dead end undertaking in

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<sup>3</sup> Xavier Pasco and Laurence Jourdain, “Comparative Space Policy: The Space Policy Crisis in the American, European, and French Space Programs,” in Eligar Sadeh (ed.), *Space Policy and Politics: An Evolutionary Perspective*, 2004, pp. 317-334.

<sup>4</sup> See for instance John M. Logsdon, “Which Direction in Space?,” *Space Policy*, Vol. 21, N°2, 2005, pp. 85-88.

<sup>5</sup> James Clay Moltz, *Asia’s Space Race: National Motivations, Regional Rivalries, and International Risks*, New York: Columbia University Press, 2011; Ajey Lele, *Asian Space Race: Rhetoric or Reality?*, New Delhi: Springer, 2013.

terms of human travel beyond the immediate vicinity of this planet”<sup>6</sup>? As stressed by Jacques Blamont, “seeking the national prestige that comes with a successful space program, [those nations] are replaying the 1960s space ventures”, thus implying how immature and anachronistic their efforts look like.<sup>7</sup> Indisputably, the persistence that they demonstrate in engaging on a path that the judgment of history seems to have rejected asks tough penetrating question about the motivations – instrumental and expressive/symbolic goals alike and how they combine<sup>8</sup> – behind a space program, questions that the “space club” countries are no longer in the habit of answering or even understanding.<sup>9</sup>

4. The fourth and last trend feeds on several tensions. Those include the multiplication of space players, in both the public and private sector, and the resulting array of interests, attitudes, and emotions engaged in the use of space. They also evolve around the risks posed by overcrowding and lack of coordination and the need for all the actors that benefit from the utilization and exploitation of outer space to keep order in the most useful orbits. There is a growing consensus that without a collective reflection on a new set of rules and regulations concerning responsible behavior, no sustainable and equitable development of space activities will be possible. So far, though, the increasing interest of new countries regarding the use of space for civilian and military purposes has resulted in so-called self-defense military postures by historic space powers, including – but not limited to – programs aiming at “controlling” space.<sup>10</sup> In parallel, during the Cold War, the U.S.-Soviet duopoly in space made it possible to resolve the most pressing concerns through bilateral arrangements. Today, however, the pool of relevant stakeholders is larger and more complex. Developing countries are worried that any effort to change the *status quo* might be a way to lock in the advantages of more advanced nations.<sup>11</sup>

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<sup>6</sup> John M. Logsdon, *John F. Kennedy and the Race to the Moon*, New York: Palgrave Macmillan, 2010, p. 240.

<sup>7</sup> Jacques Blamont, “US Space Exploration Strategy: Is There a Better Way?,” *Space Policy*, Vol. 28, N°4, 2012, pp. 212-217, at 212.

<sup>8</sup> T. V. Paul, Deborah Welch Larson, and William C. Wohlforth (eds.), *Status in World Politics*, New York, NY: Cambridge University Press, 2014.

<sup>9</sup> See Vernon Van Dyke, *Pride and Power: The Rationale of the Space Program*, Urbana, IL: University of Illinois Press, 1964.

<sup>10</sup> Xavier Pasco, “Space: A New Theatre of War?,” in Yves Boyer and Julian Lindley-French (eds.), *The Oxford Handbook of War*, Oxford: Oxford University Press, 2012, p. 489-502. See also, more recently, Brian Weeden, “The End of Sanctuary in Space: Why America is Considering Getting More Aggressive in Orbit,” *War is Boring*, January 7, 2015, <<https://medium.com/war-is-boring/the-end-of-sanctuary-in-space-2d58fba741a>>.

<sup>11</sup> See for instance Peter B. de Selding, “Europe Changes Tactics in Push for Space Code of Conduct,” *Space News*, April 24, 2013, <[www.spacenews.com/article/military-space/35033europe-changes-tactics-in-push-for-space-code-of-conduct#.UXo5gqI9Lno](http://www.spacenews.com/article/military-space/35033europe-changes-tactics-in-push-for-space-code-of-conduct#.UXo5gqI9Lno)>.

In this evolving though still unbalanced international space landscape, the importance of “space power” is increasing. The very notion of a European space power is still difficult to grasp however. It is no wonder it is so rarely used in the European context.<sup>12</sup> Not only member states have not all equally lived up to the potential of space assets for national objectives and goals, but since the pioneering activities of Europe in the 1960s, the European space governance has also changed a lot. For quite a long time, the development of space activities has been carried out almost exclusively under the framework of the European Space Agency (ESA) and other national agencies. More recently, the emergence of a solidified European actor for space represented through the European Union (EU) and, more precisely, its executive arm, the European Commission (EC), has opened up a series of opportunities. But convergence has been slow in coming to say the least, and the European space policy is still far away from projecting a true European space power able to successfully promote the objectives of a consistent European space strategy or foreign policy. The issue remains in a way the transformation of a collection of individual and fragmented efforts into a more organized collective endeavor. From most points of view, Europe has not figured out yet how much diversity it must maintain to achieve a meaningful unity, and the same that goes for “political Europe” goes naturally to European space power.

### ***Setting the stage: the danger of turning inward***

This does not prevent Europe from being uniquely positioned to address this evolving situation and playing as one of the main player a critical role in the design of a new framework regulating outer space activities. The European space program is after all, according to Xavier Pasco, “one of the most significant efforts to construct a space policy that is suited to the post-Cold War era.”<sup>13</sup> But its main weakness is that it is precisely in construction. It is not that the issue at hand is only about resource extraction and domestic mobilization capabilities, and therefore the relatively lesser ability of Europe to develop its full space power potential so as to successfully pursue emulation or innovation. Collectively, European actors spend six times less than the U.S. government in space activities, with only a small fraction of it – approximately EUR 1 billion a year – devoted to military applications.<sup>14</sup> Certainly they could do better and more, but

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<sup>12</sup> Christophe Venet and Kai-Uwe Schrogl, “European Experiences with Space Policies and Strategies,” in Eligar Sadeh (ed.), *Space Strategy in the 21<sup>st</sup> century: Theory and Policy*, London: Routledge, 2013, pp. 263-277 at p. 273.

<sup>13</sup> Xavier Pasco, *A European Approach to Space Security*, Cambridge, MA: American Academy of Arts and Science, 2009, p. 2.

<sup>14</sup> François Heisbourg and Xavier Pasco, *Espace militaire : l'Europe entre souveraineté et coopération*, Paris: Choiseul, 2011, p. 7.

the fact nonetheless that the European space program, at least in the civilian domain, compares very favorably with regard to the programs of the main space faring nations including the U.S. in terms of cost-effectiveness is a testament to the whole success of the enterprise. What have been missing more accurately are clear strategic objectives of a comprehensive nature. Space is a strategic tool, and as such, the demand for space systems, must be based on a coherent political project. As said by Nicolas Peter, "to maintain a leading space role and consequently to be able to exercise space power to a greater extent Europe must foster more "political will" and develop associated encompassing policies."<sup>15</sup> Put differently, if one is to look at space power theory to explain this weakness, as the rest of this study will suggest, the discussion should not be based on conceptual tools developed mainly in the U.S. context which focus on how to turn needs into capabilities,<sup>16</sup> but a more indigenous understanding instead. To use the subtleties of the French language, Europe's space power challenge is not related to *pouvoir*, understood as the greater or lesser ability (in terms of material resources) to impose one's will on others, but *puissance*, which refers to a more normative aspect of power. *Puissance* in contrast to power is a positive notion: it is the faculty to act and to express oneself. It implies being able to create one's own identity and follow one's interests.<sup>17</sup>

An important step in this regard has come with the discussions engaged within the context of ESA's last ministerial conference in Luxembourg in December 2014: the emphasis placed on the autonomous capability to access space compelled Europeans to ask more or less willfully the question of their future, what they wanted to do together in space – payloads, missions, programs – and also why they wanted to do it – reasons, goals, values. As it might be guessed, these two existential questions go beyond space policy to tackle the more general issue of how Europe thinks of itself, what it is and what it wants to create in concert as a group, not only as a space power but as a global entity too. Answering these is more important *hic et nunc* than trying to decide which organization is best if only because it

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<sup>15</sup> Nicolas Peter, "Space Power and Europe in the 21<sup>st</sup> century," *ESPI Perspectives*, N°21, April 2009, p. 4.

<sup>16</sup> Charles D. Lutes and Peter L. Hays (eds.), *Toward a Theory of Spacepower: Selected Essays*, Washington, DC: National Defense University Press, 2011. The most used definition is the one from Lupton defining space power as the "the ability of a nation to exploit the space environment in pursuit of national goals and purposes and includes the entire astronautical capabilities of the nation." David E. Lupton, *On Space Warfare: A Space Power Doctrine*, AL: Maxwell AFB: Air University Press Military, 1988, p. 7. Colin S. Gray, "The Influence of Space Power upon History," *Comparative Strategy*, Vol. 15, N°4, 1996, pp. 293-308, points out that space power definitions must focus on the ability to use space and to deny its use by any foe.

<sup>17</sup> Hans J. Morgenthau, *The Concept of the Political*, Basingstoke: Palgrave MacMillan, 2012. See also Olivier Schmitt, "A Tragic Lack of Ambition: Why EU Security Policy is no Strategy," *Contemporary Security Policy*, Vol. 34, N°2, pp. 413-416, to whom I am indebted for making this argument.

is a process that will necessarily take time. Europe's time-consuming debate about its internal construction cannot qualify as a purpose; it is at best a mean. As noted by two space experts, "while most member states waste time and energy to make sure that the competence of the EU in space does not threaten their national ambitions, while the EC fails to understand the full extent of the strategic importance of space for Europe, and while ESA tries to control the decision-making process, the European space sector is being overtaken by other space powers."<sup>18</sup>

This study is based on the assumption that the analysis of the "why" of the space program will enable to better understand and put into perspective the "how" of Europe's whole space effort.<sup>19</sup> The first part's objective is to give a clear conception of the different motives at stake by developing ideal-type models and identifying the main countries for which the goal identified is significant and how they think space activities might help to serve this goal. The second part concerns methods. It focuses on how Europe has organized itself for the implementation of the space program: both the strategies and the actors that it employs in mobilizing the resources at hand and the way it uses international cooperation for promoting its goals. Naturally, the few examples given in this two-tier framework are not meant to be a comprehensive account of Europe's space endeavor. Like a painter brushing a canvas so as to create an overall impression pleasing to the eye, so this study provides interesting scenes and case studies that it believes are relevant and representative, as well as helpful to avoid any ambiguity or future misunderstanding concerning the European space policy.<sup>20</sup>

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<sup>18</sup> Aurelien Desingly and Olivier Lemaître, "European Space Policy: 2 Years After Lisbon," *Space News*, December 7, 2011, <<http://spacenews.com/european-space-policy-2-years-after-lisbon>>.

<sup>19</sup> Van Dyke, *Pride and Power*, was the first to use this method while identifying the rationale behind the nascent US space program.

<sup>20</sup> For a more detailed account of the development Europe's space program, the reader might prefer for example John Krige and Arturo Russo, *A History of the European Space Agency, 1958-1987: The Story of ELDO and ESRO, 1958-1973*, Vol. 1, Noordwijk: ESA-1235, 2000 and John Krige, Arturo Russo, and Lorenza Sebesta, *A History of the European Space Agency, 1958-1987: The Story of ESA, 1973-1987*, Vol. 2, Noordwijk: ESA-1235, 2000; Kazuto Suzuki, *Politic Logics and Institutions of European Space Collaboration*, Aldershot: Ashgate, 2003; Brian Harvey, *Europe's Space Programme: To Ariane and Beyond*, Chichester: Springer/Praxis, 2003; FRS, CNRS, ROSA, FOI, IAI, RAeS, *Understanding the European Space Policy: The Reference Book*, Paris: Fondation pour la Recherche Stratégique, October 2011; and John Krige, *Fifty Years of European Cooperation in Space: Building on its Past, ESA Shapes the Future*, Paris: Beauchesne, 2014. See also Guilhem Penent, *L'Europe spatiale: Le déclin ou le sursaut*, Paris: Argos, 2014, from which this present study is partially inspired. The author is responsible for the translation of all French texts cited in this study.

## Europe as a Space Power: A Concept with Many Flavors?

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Decline is often a slow and incremental phenomenon. It is carried out in successive stages without being detected, or if detected, without much likelihood of reaction or assessment of the seriousness of the situation until it is too late. Space is exemplary from this point of view as the free access to and use of its resources cannot be permanently acquired and need to be regularly re-established. It is even truer for the nations that are left with no choice but to follow the actions of the leader and to choose among these which one should be emulated and, conversely, which one should be set aside.

Such has traditionally been the difficult and uncomfortable position of Europe up to the present day. The long awaited decision to go along with a new launcher despite (or because of) the commercial success of *Ariane 5* is but one example out of many that space remains even today “an ongoing challenge.”<sup>21</sup> The Europeans know too well that in space perhaps more than anywhere else nothing is irreversible. Not unlike the life of the Puritan who puts his faith on trial to demonstrate to himself as well as to the rest of the world that he belongs to the happy few elected by God, the fifty years history of Europe in space has been a series of tests of its continued willingness and ability to stay in the top group. How to remain master of one’s own destiny and not merely a spectator of the great endeavors of others?

The story of Europe as a “space power” shows three different but complementary answers: autonomy, competitiveness on the market, and cooperation. Each relates to how Europe thinks of itself and how it uses space to actually do things. Each suggests a number of characteristics of the ideal-type space program as promoted by, to take only a few representative examples, France, the United Kingdom, and Germany. Italy, one of ESA’s main contributor and a very active space actor since the *San Marco* project, deserves also a lot of interest. However, it is this author’s belief that Italy’s way of doing space falls between France and Germany. It is therefore not very telling as a model.

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<sup>21</sup> Catherine Procaccia and Bruno Sido, *Rapport sur les enjeux et les perspectives de la politique spatiale européenne. Europe spatiale : l’heure des choix*, Paris: Office parlementaire d’évaluation des choix scientifiques et technologiques, November 2012, p. 11.

## Setting the Rationale: No Europe in Space without Autonomy

There is an obvious “technological imperative” at work behind the constant leap forwards that characterizes Europe’s joint space effort. The technological imperative has a similar function to that of anarchy in international relations theory, except that it forces states to fear for their technological position in absolute as well as relative to others, rather than for their survival as such. The main motive behind the slow but steady movement toward the Europeanization of space activities that was inaugurated in the early sixties was more about keeping up with the leading edge of technological standards than it was about keeping up with the United States and the USSR whose all-encompassing efforts situated themselves in another dimension. European space cooperation first attempted through the European Space Research Organization (ESRO) and the European Launcher Development Organization (ELDO) before being passed on to the European Space Agency was indeed intended to follow the speed of technological development that was clearly out of the reach of individual nations like France or Germany if not of the two superpowers. As stressed by an historian, the real value of the space race belonged for Europe not in space exploration itself or the demonstration of technological prowess for prestige considerations, but in the perfection of techniques for large-scale R&D and industrial mobilization in the drive for technological independence.<sup>22</sup>

Not to say that the urge not to be technologically and scientifically marginalized or “provincialized” did not have political implications. The permanent tension between cooperation and competition that has characterized the transatlantic relation since the very beginning clearly shows that it had. But the political value of space when explicitly stated by the Europeans as such was spoken preferably in the language of autonomy<sup>23</sup> rather than influence or power (often referred to in the space context as leadership), which Americans, for instance, might prefer.<sup>24</sup> For far from validating the “global institutionalist” hopes that space would help to transcend conflict on Earth<sup>25</sup> the use of space – though made theoretically available for nearly everyone one – has been tantamount to limiting the possibilities of actions coming from all the states with the exception of one. Be it satellite communications, launching

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<sup>22</sup> Walter A. McDougall, “Space-Age Europe: Gaullism, Euro-Gaullism, and the American Dilemma,” *Technology and Culture*, Vol. 26, N°2, April 1985, pp. 179-203, at p. 194.

<sup>23</sup> Cenani Al-Ekabi (ed.), *European Autonomy in Space*, New York: Springer, 2015.

<sup>24</sup> Van Dyke, *Pride and Power*; John M. Logsdon, “Space in the Post-Cold War Environment,” in Steven Dick and Roger Launius (eds.), *Societal Impact of Spaceflight*, Washington: NASA, 2007, pp. 79-102.

<sup>25</sup> James Clay Moltz, *The Politics of Space Security: Strategic Restraint and the Pursuit of National Interests*, Stanford: Stanford University Press, 2008, pp. 27-31.

capability, navigation or the Europeanization of military space technology, Europe's experience in the domain of space has singled out the United States as the main if not the only country able to put the Europeans into a situation of dependency both for reasons of genuine generosity (NASA's historical proposal to launch for free scientific experiments on board of American launchers) and selfish interest (U.S. Department of State's attempts to discourage any move towards self-sufficiency and strict regulation of technology transfer).<sup>26</sup> If ever security is to be considered as one of the main drivers behind the European space program, it is therefore not so much as the protection and defense of one's physical existence than as the affirmation of a more immaterial conception that can be called "security as being" in contrast to "security as survival."

This larger interpretation helps convey two important issues of concern that participated to the building of the European space program. The first touches on the will to perpetuate one's personality and social and cultural identity. It also builds on the fact that satellites are by their very nature ignorant of political borders. Indeed, the ability they have to collect and transmit information – be it for telecommunications, remote sensing or navigation – simultaneously from one point to many points on Earth in cooperative or non-cooperative contexts puts them directly at odds with the idea that it is each country's sovereign prerogative to control the exchange of knowledge coming within its territory. No wonder if Charles de Gaulle who rose to power just eight months after *Sputnik 1* crossed the sky, believing France had the absolute right to determine its own destiny, spontaneously associated space technology with telecommunications when the decision to create a national space agency, or Centre National d'Études Spatiales (CNES), was submitted to him.<sup>27</sup> It took nearly one decade before the European states asserted themselves as a force to be reckoned with in a field then dominated both technically and politically by the U.S. The experimental *Symphonie* satellite put together by France and Germany was critical in acquiring the industrial and technological know-how. As for its political importance, one might add that the transatlantic controversy that surrounded the launch into orbit of this program was used to legitimate the building in Europe of an autonomous launching capability that would clear the way for the *Ariane* series.<sup>28</sup>

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<sup>26</sup> John Krige, Angelina Long Callahan, and Ashok Maharaj, *NASA in the World: Fifty Years of International Collaboration in Space*, Basingstoke: Palgrave Macmillan, 2013, chap. 2-6. See also Xavier Pasco, "L'histoire des relations spatiales franco-américaines," in *Les Relations franco-américaines dans le domaine spatial (1957-1975)*, Paris: IFHE, 2008, pp. 63-74.

<sup>27</sup> Claude Carlier and Marcel Gilli, *Les Trente premières années du CNES. L'agence française de l'Espace : 1962-1992*, Paris: La Documentation française, 1994, p. 13.

<sup>28</sup> On this point see notably Lebeau, "Naissance d'Ariane," in Emmanuel Chadeau (ed.), *L'Ambition technologique. Naissance d'Ariane*, Paris: Rive droite, 1995, p. 85 and, from an opposite perspective, Richard Barnes, "Symphonie Launch Negotiations," *News & Notes*, Vol. 23, N°1, 2006, pp. 1-5.

The second issue rests upon how one sees oneself and how one wants to be seen by others. “Autonomy in space” – which a joint policy report published in the late 1980s identified as “Europe’s stated goal”, *i.e.* the “capability to reach, to operate in and to return from space, and to do so, not on sufferance of friend or foe, but according to one’s own perception of what is to the common good”<sup>29</sup> – constituted a rallying cry reminiscent in a way of Gaullist France’s call for “Grandeur.” It was a self-definition implying that there could be no Europe in space worth the effort without technological independence and technological independence was the indispensable minimum required for a true European space policy to emerge. The whole idea of Europe becoming the “third space power” participated to this logic.<sup>30</sup> Even before *Ariane* was born and became the striking symbol of Europe’s high status as member of the “club,” it was clear that any less that an autonomous launching capability would have meant surrender both at home and abroad since it would have kept the major European powers in a secondary, inferior position for all time.

### Case study n°1: France’s Political Conception of Space Power

Though it was first embodied by Britain which was at the time the most advanced country in terms of satellite launching capability, it was France that came to be associated the most with space power – to the point sometimes of making it suspect to its European partners.<sup>31</sup> One of the reasons for this might have to do with the importance and seriousness with which French decision-makers have traditionally considered the role of a Great Power while having difficulty in maintaining their aspirations a reality.<sup>32</sup> Great power status without which apparently France would never really be France implies in effect responsibilities.<sup>33</sup> To be a space power, then, is to be a great power not so much because of the material capabilities it conveys both technologically and financially, but because of the different missions it enables to fulfill. And just as France accomplishes the domestic and international duties it knows to be its own thanks to the use of space, so, too, incidentally, does it demonstrate the “reputation

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<sup>29</sup> Clingendael, et al., *L’Espace, un enjeu pour l’Europe*, Paris: Masson, 1988, p. 13.

<sup>30</sup> John Krige, “Building a Third Space Power: Western European Reactions to Sputnik at the Dawn of the Space Age,” in Roger D. Launius, John M. Logsdon, and Robert W. Smith (eds.), *Reconsidering Sputnik: Forty Years Since the Soviet Satellite*, Amsterdam: Harwood, 2000, pp. 289-307.

<sup>31</sup> André Lebeau, *L’Espace. Les enjeux et les mythes*, Paris: Hachette, 1998, p. 225.

<sup>32</sup> For example, Bertrand Badie, “French Power-Seeking and Overachievement,” in Thomas J. Volgy, Renato Corbetta, Keith A. Grant, and Ryan G. Baird (eds.), *Major Powers and the Quest for Status in International Politics: Global and Regional Perspectives*, Basingstoke: Palgrave Macmillan, 2011, pp. 97-113.

<sup>33</sup> The plural conception of responsibility is taken from Martin Wight, *International Theory: The Three Traditions*, Leicester: Leicester University Press, 1992, chap. 6 and Robert Jackson, *The Global Covenant: Human Conduct in a World of States*, Oxford: Oxford University Press, 2000, pp. 169-178.

for power” needed to secure in its own opinion and in the eye of others its membership in the club of great powers. This axiom might explain why the connection between the “why” and “how” of space technology has always been so deep in France. The fact that the link remains very much alive and strong today as witnessed by French continued investments in civil and military space capabilities cannot deceive. CNES will have in 2015, for instance, a stable overall budget of EUR 2,126 million.<sup>34</sup>

The first responsibility that a state has is to its own citizens. Leaders are responsible in priority for their security and welfare. They may also be responsible for international order but only to the extent that it involves promoting the national interest. That is basically a question of maintaining freedom of action: freedom of action comes from freedom of decision; and freedom to decide what one’s interests are implies to decide what one’s duties are, indifferent from what others can say. Space, in France’s experience, has been useful to both.<sup>35</sup> Satellites are, after all, first and foremost, the guarantee of French autonomy in assessment of situations and thereby in decision-making. The decision not to follow the United States in Iraq in 2003 was taken in accordance with intelligence based for the most part on military satellite *Helios 1* whose findings were in contradiction with what was being said at the UN Security Council to which France is a permanent member.<sup>36</sup> Space resources also contribute to autonomy of action. As exemplified for the first time in Libya in 2011 and Mali and the Central African Republic two years later, satellites participate to the ability to engage in coercive and initial-entry operations and preserve France’s strategic initiative. France is also well equipped thanks to its many orbital sensors to carry out its contribution as a respected partner and “framework-nation” in every multinational coalition in which it takes part. And not only does its use of space assets represent a genuine “force multiplier” but it also

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<sup>34</sup> <[www.cnes.fr/web/CNES-en/11637-gp-jean-yves-le-gall-in-2015-cnes-will-be-making-climate-central-to-its-space-policy.php](http://www.cnes.fr/web/CNES-en/11637-gp-jean-yves-le-gall-in-2015-cnes-will-be-making-climate-central-to-its-space-policy.php)>.

<sup>35</sup> For a brief overview, see Guilhem Penent, “Space, Luxury or Necessity: Situations and Prospects for France after the Livre Blanc and Opération Serval,” *The Space Review*, July 29, 2013, <[www.thespacereview.com/article/2340/1](http://www.thespacereview.com/article/2340/1)>.

<sup>36</sup> As added by one French intelligence officer, “Interestingly, the British military intervention, during the second war against Iraq, cost approximately EUR 10 billions, not counting the death of 179 of our British military comrades. For Great-Britain, rendered totally dependent on the United States, for lack of having its own Earth observation satellites, the estimated cost of this war is five times superior to the total cost of the *Helios 1* program.” In Pascal Valentin (ed.), *Espace & Opérations: Enseignements et Perspectives*, Paris: L’Harmattan, p. 38. One parliamentary report noted back in 2001: “[...] it would be a serious step backwards to renounce to military intelligence satellites, both as regard to France’s international status and from the point of view of operational forces.” Jean-Michel Boucheron, *Rapport d’information sur le Renseignement par l’image*, Commission des finances, de l’économie générale et du plan, juillet 2001, p. 30. See also Pierre Tran, “Space Intel Gives France Policy Independence,” *Defense News*, February 26, 2015, <[www.defensenews.com/story/defense/air-space/space/2015/02/26/france-intel-satellite-independent-geo-russia-ukraine-share-intelligence/24011253/](http://www.defensenews.com/story/defense/air-space/space/2015/02/26/france-intel-satellite-independent-geo-russia-ukraine-share-intelligence/24011253/)>.

provides a strong currency allowing further intelligence via exchanges agreements with its allies.

The second responsibility derives from a country's role as a member of the international society which brings specific rights and obligations as defined, for example, by the UN charter, diplomatic practice and international law. Great powers bear a heavier responsibility than other states because of their weight. As the ones that by definition can both protect and imperil the norms and rules of international peace and security, they are especially answerable for their conduct regarding important international matters. Satellites thus enhance the monitoring and countering of proliferation of ballistic missiles and weapons of mass destruction. They provide an assessment of other nations' respect for treaty rights and obligations as well as refraining from unilateral actions. Particularly relevant here is the 1967 Outer Space Treaty that authorizes the "militarization of space" for peaceful purposes on the basis of respect of freedom of exploration and use of space and non appropriation of its resources. Independent space surveillance awareness (SSA) capability, which only recently came within France's reach, enables the attribution of responsibility for intentional space events that lead to unwelcome consequences, such as debris collisions. The ability to monitor space also gives credibility to initiatives aimed at promoting the security, safety, sustainability and greater transparency of activities in orbit. The EU proposal for an International Code of Conduct for Outer Space activities, which France contributed to launch in 2008, provides a good example of Europe trying to be a model citizen.<sup>37</sup>

The third responsibility is humanitarian. Not only are states all answerable to their citizens and to each other but also to every human beings around the world. Such a conception implies the obligation to provide charity and assistance to those in need. It was with those precepts in mind that France, along with the United States, Canada, and the former USSR, created the international Cospas-Sarsat programme of satellite-based search and rescue in 1979. Since then, this joint effort has been instrumental in rescuing over 35,000 lives worldwide.<sup>38</sup> By the same token, the International Charter on Space and Major Disasters established in 1999 under the auspices of ESA and CNES have made satellite data available for free to those affected by natural or man-made disasters. More than 110 countries victims of natural and accidental disasters have benefited from it.<sup>39</sup> Responsibility for the good health of the "spaceship Earth," though not related directly to the protection of the human race as a whole, shares a similar logic. Because humanity now has the power to upset the balance of nature, it has also a responsibility to restore it and preserve it for future generations.

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<sup>37</sup> Laurence Nardon, "Europe Chooses Peace in Space," *Space News*, February 9, 2011, <<http://spacenews.com/oped-europe-chooses-peace-space>>.

<sup>38</sup> <<https://www.cospas-sarsat.int>>.

<sup>39</sup> <<https://www.disasterscharter.org/web/guest/home>>.

“Space for Earth,” as goes the slogan attached to the French space agency since 2004.<sup>40</sup> Space monitoring of land, oceans, vegetation and atmosphere contributes to understanding climate change and helps support the sustainable management of resources. With space debris now proliferating, this “stewardship” should be extended to what might be called “Greater Earth.” All the more so since the major space powers are also the ones which bear the main responsibility for polluting the most useful orbits. The Europeans, and among them the French which were the first to implement a domestic space law in 2008, have set the example here at the risk of paying a heavy price in terms of satellite and launcher competitiveness.<sup>41</sup>

## ***Useful Space: Balancing Autonomy with the Market***

The space industry and the economic balance on which it depends generally rely on strong government support, as embodied in important institutional markets, notably military ones, reserved for national suppliers only. This applies to the situation in the United States where almost three quarters of turnover come from NASA and Defense Department orders. China, Russia and Japan, to mention just the bigger players, have all followed this pattern. The European model works differently. Because Europe’s space policy has put special emphasis on the commercial market to sustain itself (worth 48% of sales in 2013 according to Eurospace<sup>42</sup>), it has traditionally favored a more bottom-up than top-down approach. Not that Europe had much of a choice: for lack of a true institutional market, based in particular on security and defense needs, and without clear European preference regarding launchers, it needed from the very start to smartly blend aspects of sovereignty and logics of commerce and provide, at very low cost and risk, an access to the market that was autonomous and both competitive and cost-effective. That explained for instance the choice, at the time quite controversial, that Europeans made in favor of an autonomous expendable launch capability to capture the market of geostationary telecommunications satellites that was then emerging (*i.e. Ariane 1*) against the partially reusable launcher that the United States was asking them to adopt

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<sup>40</sup> Its counterpart mantra adopted this year is “space for climate,” as France will be hosting in December 2015 the 21<sup>st</sup> yearly session of the Conference of the Parties to the 1992 United Nations Framework Convention on Climate Change, also known as COP 21.

<sup>41</sup> See for instance “Leadership in Debris Mitigation,” *Space News*, November 11, 2013, <<http://spacenews.com/38113editorial-leadership-in-debris-mitigation>>; Peter de Selding, “French Debris-mitigation Law Could Pose Issue for Arianespace,” *Space News*, April 10, 2014, <<http://spacenews.com/40171french-debris-mitigation-law-could-pose-issue-for-arianespace>>.

<sup>42</sup> <[www.eurospace.org/Data/Sites/1/pdf/positionpapers/simpositionpaper2014final.pdf](http://www.eurospace.org/Data/Sites/1/pdf/positionpapers/simpositionpaper2014final.pdf)>.

instead, despite its huge limitations (*i.e.* the *Space Transportation System*, *a.k.a.* the space shuttle). Success in the marketplace helps secure a significant business volume and, thus, maintains high performance and reliability for the institutional activities.

The space telecommunications sector is the perfect illustration. Four of the five major global telecommunication service providers are European – overall, they own a fleet of more than 150 satellites that is currently in operation in geostationary orbit above if not all the planet at least its wealthiest and most populated areas. Regarding fixed satellite services (FSS), Intelsat and SES of Luxembourg continue to lead the way, outperforming any rivals. And though Eutelsat of Paris ranks below, it remains in third position far ahead of Telesat and Sky Perfect Jsat from respectively Canada and Japan. All three of them generated almost USD 7 billion in revenue in 2013 out of a total amounting 16.4 billion worldwide, while the market is becoming more and more competitive with a growing number of national satellite operators, many with only one satellite, setting up business. As for Inmarsat of London, it still dominates the market of mobile satellite services (MSS) estimated at around USD 2.6 billion.<sup>43</sup> This strong European presence on the market for satellite transponder capacity is due to two factors. The first one is historic: echoing the logic of autonomy stated in the section before, Inmarsat and Eutelsat were created respectively in 1976 and 1977 with the ambition that Europe would be able to develop an industry strong enough to build, launch and operate communication satellites based on the pre-operational platforms provided by ESA (*ECS* and *Marecs*). Hence the fact that they began their activities as cooperative organizations that exist to serve their users and not private entities listed on the stock exchange.<sup>44</sup> The second factor lies in the entrepreneurial vision that Luxemburg developed after 1985 to the great benefit of SES, thanks to a highly favorable if not aggressive fiscal policy.

This political, industrial and commercial success – worth reminding at a time when Europe is trying to be leader in new applications such as imagery data (*Copernicus*) and navigation (*Galileo*) – is not without importance. In addition to being by far the most developed space market, accounting for USD 118 billion in revenue in 2013, satellite telecommunications have become mature enough to take at least partial responsibility for their own development and help sustain the rest of a space chain whose

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<sup>43</sup> “Satellite Telecommunications,” in OECD, *The Space Economy at a Glance 2014*, Paris: OECD Publishing, 2014, pp. 54-55; SIA, “State of the Satellite Industry Report,” September 2014, <[www.sia.org/wp-content/uploads/2014/05/SIA\\_2014\\_SSIR.pdf](http://www.sia.org/wp-content/uploads/2014/05/SIA_2014_SSIR.pdf)>. See also Peter B. de Selding, “2013 Top Fixed Satellite Service Operators,” *Space News*, July 7, 2014, <[www.spacenews.com/article/satellite-telecom/41157the-list-2013-top-fixed-satellite-service-operators](http://www.spacenews.com/article/satellite-telecom/41157the-list-2013-top-fixed-satellite-service-operators)>.

<sup>44</sup> Respectively, the International Maritime Satellite Organization and the European Telecommunications Satellite Organization.

solidity is only a function of its weakest links. Because these four operators are among the first clients of the European satellite manufacturing industry, representing almost 60% of their turnover, which in return contributes largely to support the whole space activity further upstream to launching services, each one of them constitutes an engine of growth, prosperity and jobs. To speak only of France, Eutelsat has invested around EUR 550 million each year over the past period. Eutelsat is a historic client of the Spacebus and Eurostar platforms made by Thales Alenia Space (TAS) and Airbus Defense & Space (ADS), two groups that are directly responsible for about 57% of the total space industry employment in France. It has also been Arianespace's biggest commercial customer over the years and a great supporter for the development of a next generation rocket as successor of *Ariane 5*, going as far as volunteering to place one of its satellites on the inaugural *Ariane 6* flight.<sup>45</sup> This state of affairs has naturally benefited the launch industry and notably European space-hardware builders ADS and Safran.

This apparent virtuous circle is not proof that there is no need any more for the state to remain in the loop. On the contrary, it has never been more important to have a pro-active and ambitious industrial policy that can structure and develop institutional demands and support, when needed, the competitiveness of the European industry. That space agencies have tried to maximize their gains while minimizing risk by "delegating" certain activities with high growth potential to the private sector does not mean indeed that one has cut the state umbilical cord. As evidenced by the last ESA Council meeting at Ministerial level that took place on December 2, 2014, in Luxembourg, even the most commercial of space activities requires some public R&D to help the industry it depends on to keep up with the pace of technological change and unforeseen market evolutions. Among the programs approved were thus public private partnerships such as "Eutelsat Quantum" and "Inmarsat Communications Evolution," whose developments are both supported by the British government.<sup>46</sup> The reality in the light of the above is that space remains a strategic niche on which the economic rationale fails more often than not to apply. Neither here, nor anywhere else, has there been a "pure and perfect competition." As has always been the case, space technology is not really a money-making activity: profits as such are of secondary importance; payoffs are not just in the ends but

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<sup>45</sup> Peter B. de Selding, "The World's Biggest Satellite Fleet Operators Want Europe To Build Ariane 6 by 2019," *Space News*, September 10, 2014, <<http://spacenews.com/41821world-satellite-business-week-the-worlds-biggest-satellite-fleet>>.

<sup>46</sup> Peter B. de Selding, "ESA Ministerial Produces a Few Surprises," *Space News*, December 12, 2014 <<http://spacenews.com/esa-ministerial-produces-a-few-surprises>>; UK Space Agency, "UK Space Industry set to Rocket with over £200 million of New Investment for Europe's Space Programme," December 12, 2014, <<https://www.gov.uk/government/news/uk-space-industry-set-to-rocket-with-over-200-million-of-new-investment-for-europes-space-programme>>.

in the means and stakes are less direct than indirect, less short term than long term. The fact that the space sector has resisted so well against the backdrop of difficult economic conditions those past few years is not accidental in this respect.

## Case study n°2: Britain's Renewed Interest in Space in the Face of the Crisis

The ongoing economic and budgetary crisis affecting Europe is indicative of two interrelated developments concerning space.<sup>47</sup> First, as a test, it shows that the strategic nature of space is progressively being recognized by decision-makers. The British government's surprise decision in 2012 to dramatically increase spending at ESA sets an archetypal example in this regard. Indeed, what was even more unexpected was that the pledge Britain made to boost its annual investment by 25% for the next five years from what the country offered at the previous 2008 ministerial came directly from the UK Chancellor of the Exchequer, George Osborne, instead of the minister actually in charge of the space sector, thus proving, if needed be, how committed Britain was, as well as certain of the validity of the economic, industrial and political rationale behind the move.<sup>48</sup> Though it is not unique in Europe as witnessed by France and Germany's continued efforts to remain leaders in this sector, UK's commitment to space is nonetheless revealing given the fact that the British government went a long way towards recognizing the strategic advantages of space. Suffice to say for that matter that until April 2010 Britain did not have a funded unified space agency in the style of the United States' NASA or France's CNES.<sup>49</sup> The establishment of the UK Space Agency (UKSA) with its own budget signaled a change in Britain's traditional stance and provided a new impetus for the country's space sector. Now that it has embraced the idea that space needs a dedicated government activity to flourish, the UK can raise the profile of space both within the government and throughout the country while becoming a bigger player in ESA and claim therefore a larger share of agency spending for its own domestic industry.

So far, UK's renewed interest for investing in space in particular through ESA seems to have paid off. Of immediate consequence was that the increased importance given to space in Britain caused the Agency to relocate the European Centre for Space

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<sup>47</sup> See for instance Christophe Venet, "Space in the Financial and Economic Crisis," in Kai-Uwe Schrogl, Spyros Pagkratis, and Blandina Baranes (eds.), *Yearbook on Space Policy 2009/2010: Space for Society*, Vienna: Springer, 2011, pp. 184-198.

<sup>48</sup> Editorial, "Britain Steps Up in Space," *Space News*, November 19, 2012, <<http://spacenews.com/editorial-britain-steps-up-in-space>>.

<sup>49</sup> Douglas Millard, *An Overview of United Kingdom Space Activity 1957-1987*, Noordwijk: ESA, 2005; André Lebeau, *Recollections: Interview with Roy Gibson*, Paris: Edite, 2011, pp. 211-227.

Applications and Telecommunications (ECSAT) to Harwell, in Oxfordshire, with the objective of establishing there a major cluster for space activities and business. “[O]ur commitment to growing ESA’s facility here in Harwell,” ESA Director General Jean-Jacques Dordain reportedly said, “confirms that the U.K. Space Agency is taking up more of a leadership role in key parts of the space sector.”<sup>50</sup> In the medium-long term, the growing weight of Britain is also bound to give way to more leverage in negotiations with the Agency’s main contributors – France, Germany and Italy. Looking again at the results of the ministerial in December of last year, this rebalancing is already at work. With Britain new interests and participating among others in optional programs such as human spaceflight, the four bigger partners are now more equals than ever.

Second, as an opportunity, the crisis allows Europe to better understand the economic challenges of the space sector and explore ways to strengthen its foundations. With an agenda placed under the label of “boosting Europe’s competitiveness and growth,” it is telling that the Organisation for Economic Co-operation and Development (OECD) became for the first time an official observer at that same ESA 2012 ministerial council during which the UK distinguished itself.<sup>51</sup> As illustrated by the fact that OECD launched a research project focusing on space as soon as 2003, there is indeed a growing need to identify and measure the space sector’s socio-economic impacts without losing the space “link” that gives them meaning and risking overselling them. One can wonder then what the “space economy” is really all about. According to OECD, which advocates a wider definition than the one usually referred to by the space industry – incidentally reflecting UKSA’s own evolution of methodology –, the space economy comprises the space industry’s core activities, as exemplified earlier, in space manufacturing (infrastructure and technology) and in satellite operations (direct space services), plus other consumer downstream activities which rely on some satellite capacity for part of their revenues without necessarily belonging to the space community in its strict meaning (space-enabled value added applications).<sup>52</sup>

The “space economy” is an important driver of economic growth and of high-tech skills and research. Although the Europeans

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<sup>50</sup> Peter B. de Selding, “Britain Pledges 25% Boost in ESA Spending,” *Space News*, November 12, 2012, <<http://spacenews.com/32288britain-pledges-25-boost-in-esa-spending/>>.

<sup>51</sup> <[http://www.esa.int/About\\_Us/Ministerial\\_Council\\_2012/European\\_Ministers\\_decide\\_to\\_invest\\_in\\_space\\_to\\_boost\\_Europe\\_s\\_competitiveness\\_and\\_growth/](http://www.esa.int/About_Us/Ministerial_Council_2012/European_Ministers_decide_to_invest_in_space_to_boost_Europe_s_competitiveness_and_growth/)>. See brochure : <<http://esamultimedia.esa.int/multimedia/publications/boosting-competitive-ness-and-growth/>>.

<sup>52</sup> “The Space Sector in 2014 and Beyond,” in OECD, *The Space Economy at a Glance 2014*, Paris: OECD Publishing, 2014, pp. 15-37.

use the space sector to create wealth in many ways,<sup>53</sup> there is at least one socio-economic impact derived from space activities that clearly stands out in the case of the UK. It relies on the positive industrial and economic returns coming from each additional British pound invested by the government: the so-called catalytic or spillover impacts the space industry helps to facilitate across the economy. Building on the downstream space services' sector which have been growing increasingly in the UK, accounting for 89% of total industry (actually stimulated by the satellite communications sector), a recent national economic impacts study broadly estimated that the space industry's value-added multiplier on the British economy approximated 2.2 and the employment multiplier 3.1. The space industry's direct value-added contribution to GDP was estimated at some GBP 4.8 billion and the indirect and induced economic impacts amounted to an additional GBP 6 billion. The total UK-based employment supported by the space industry was estimated to be 106,300 jobs in 2012-2013.<sup>54</sup>

### ***Holding Everything Together: Cooperation as the Other Face of Autonomy***

ESRO, the first European space agency, from which ESA inherited most of its current principles, was born out of a shared recognition by a small group of European scientists in the aftermath of *Sputnik* that the emergence of space-based instruments would have a great impact in several areas of scientific activity. Three people, to quote but a few, were most influential in the process of setting up European cooperation in space: Edoardo Amaldi for Italy, Pierre Auger for France and Sir Harrie Massey for the UK. Those men had been some years before behind the creation of the European Center for Nuclear Research (CERN), whose objective was, and still is today, to provide Europeans with the means to play a major if not leading role in world research on particle physics. Their ambition regarding space research was quite similar: to overcome the weakness and inefficiency that a Europe divided into various national but limited programs would necessarily be by unifying all the resources and expertise available. Hence the purpose of ESA, according to its Convention signed in 1975, "shall be to provide for and to promote, for exclusively peaceful purposes, cooperation among European States in space research and technology and their space applications, with a view to their being used for scientific purposes and for operational space applications systems." These words, which welcome the reader to every issue of the *ESA Bulletin* (the quarterly publication of the

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<sup>53</sup> "Measuring Socio-economic Impacts from Space Activities," in OECD, *OECD Handbook on Measuring the Space Economy*, Paris: OECD Publishing, 2012, pp. 89-97.

<sup>54</sup> UKSA, *The Size & Health of the UK Space Industry*, October 2014.

Agency),<sup>55</sup> show that the primary mission of ESA is cooperation. Innovation, as illustrated by the slogan celebrating the fiftieth anniversary of the European space program, comes only second.<sup>56</sup>

The emphasis on “cooperation” in ESA’s mandate and public self-portrayal stems from two factors. On a theoretical and institutional level, the early choice of CERN as a model set European space collaboration on a critical path that diverged from the one followed by the then European Communities (now the European Union, or EU), eventually creating the “two-Europe” situation that still remains at issue today.<sup>57</sup> Part of what makes the European space arrangement different from the European community construction project as it has come to be known is the method on which it is based and what it implies regarding the extent and nature of cooperation: by contrast to supranational “integration” which by definition involves some loss of national sovereignty, intergovernmental “cooperation” puts states in situations and conditions they can control and depart from, should they disagree or their interests change. Indeed, the Agency embodies a way of working together that does not touch on controversial topics. On a practical level, cooperation through ESA is less an end in itself than a mean for achieving more practical and profitable goals. Though ESA is well aware of its role as one of the key actors of the story that narrates how Europe successfully placed itself under the label of peace, prosperity and unity after World War II – it is after all a living proof that European cooperation can work –, it sees itself as a realistic “down to earth” organization.<sup>58</sup> The value of pragmatism is all pervading in the rhetoric and daily activity of the Agency.<sup>59</sup>

The already mentioned joint policy report that was so virulent about the necessity of achieving autonomy in space also identified outer space as a “major area in which Europe can consolidate a common identity and develop its unity.”<sup>60</sup> Given the constraints it imposes on itself, though, ESA’s understanding and practice of cooperation might seem at first view self-contradictory regarding those two objectives. Two specific issues arise. The first is summarized in the oxymoron of “unity in diversity.” How to have both? What mechanism could help Europe avoid dependence on the United States and others without creating a unified program at the expense of the specificities that distinguish one European country from another? The answer that ESA offers is “harmonization” (“internationalization” in the text), specifically the way in which the

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<sup>55</sup> <[www.esa.int/About\\_Us/ESA\\_Publications/ESA\\_Publications\\_Bulletin](http://www.esa.int/About_Us/ESA_Publications/ESA_Publications_Bulletin)>.

<sup>56</sup> <[http://www.esa.int/About\\_Us/Welcome\\_to\\_ESA/ESA\\_history/Highlights/The\\_first\\_50\\_years](http://www.esa.int/About_Us/Welcome_to_ESA/ESA_history/Highlights/The_first_50_years)>.

<sup>57</sup> Suzuki, *Politic Logics and Institutions of European Space Collaboration*, pp. 44-46.

<sup>58</sup> See, for instance, as proof, one recent public campaign making that point very clear: <<https://www.esa-downtoearth.eu>>.

<sup>59</sup> Stacia E. Zabusky, *Launching Europe: An Ethnography of European Cooperation in Space Science*, Princeton: Princeton University Press, 1995, pp. 52.

<sup>60</sup> Clingendael, et al., *L’Espace, un enjeu pour l’Europe*, pp. 19.

Agency helps to combine expertise at European level to benefit from economies of scale and avoid unnecessary duplication and competition.<sup>61</sup> Cooperation through harmonization insures European unity at the international level while implying an abdication of autonomy at the level of the national state (see for instance the controversial issue of the preference for a European launcher still existing today despite decades-long investments in the *Ariane* family). It, then, authorizes states to resist such regional unity by demanding that their interests be respected and eventually that a kind of “competition through cooperation” be implemented: national programs are still a reality even as member states continue to contribute to ESA.<sup>62</sup>

The second issue has to do with identity. Does it matter? Suffice is to say that space, in particular human spaceflight, in view notably of the very positive image it conveys to a society that has made the costly choice of committing to it, naturally contributes to national cohesion by bringing people together around a project they can be proud of. But while space has long been identified as an opportunity for creating a true European identity,<sup>63</sup> the question remains: how to catalyze a common identity when the act of dreaming is both by necessity and choice held in check by the pragmatic realities of European cooperation and the refusal to engage in any kind of romantic endeavors, which Americans or Russians, for instance, immediately associate with space? One way of answering this question has been for ESA to retain a critical place for science despite the decreasing interest it suffered from national governments after the merging of ESRO within ELDO. Science is, indeed, a “mandatory” program that many view as the backbone of the Agency: the key element keeping nations working together and binding their various interests in a long-term vision for Europe in space. The *Horizon 2000* plan, which attempted for the first time to revitalize European space science and pursue, both alone and in cooperation, the intellectual adventure begun by Aristarchus, Galileo, Newton and Einstein, was thus prepared in 1984.<sup>64</sup> *Horizon 2000+* was drawn up in 1994-95, followed in 2005 by yet another program named *Cosmic Vision* for one more decade (until 2025).

Worth mentioning in this regard is the *Rosetta-Philae* mission that was approved in 1993, launched aboard an *Ariane 5* rocket in 2004, and successfully put into orbit around its target in 2014. Never has an ESA science mission provoked such enthusiasm before. One

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<sup>61</sup> Zabusky, *Launching Europe*, pp. 53-54.

<sup>62</sup> *Ibid.*, p. 54.

<sup>63</sup> Christophe Venet and Blandina Baranes (eds.), *European Identity through Space: Space Activities and Programmes as a Tool to Reinvigorate the European Identity*, New York: Springer, 2013.

<sup>64</sup> Roger-Maurice Bonnet, *Les Horizons chimériques*, Paris: Dunod, 1992; Roger-Maurice Bonnet and Vittorio Manno, *International Cooperation in Space: The Example of the European Space Agency*, Cambridge: Harvard University Press, 1994, p. 28.

can only speculate about the possible political, social and cultural fallouts that hit both the world and Europe. If anyone had any doubt, it is now clear that Europe is a force to be reckoned with. Surely the U.S. government and NASA, to name but just them, would pay more attention in the future about collaborating with Europe and be more careful about canceling previously agreed joint project (see *ExoMars* as a late example).<sup>65</sup> Also, the fact that the last ESA ministerial meeting was such a big success, with member states agreeing to new commitments despite the budgetary constraints many of them currently face, might not be unrelated to the professionalism and efficiency the Agency showed on this occasion, thereby earning confidence and respect. “We are the first to have done that and that will stay forever,” said Jean Jacques Dordain, in a too rare demonstration of Europe pride and inspiration at a time more accustomed with the rhetoric of decline and the weakened popular legitimacy of the EU itself.<sup>66</sup> At last, as made implicit in many comments, there is one instance in which European cooperation is working. Finally, not only the mission may have brought all the Europeans closer together but it might also stimulate society and motivate youth to pursue careers in the field of science and engineering, something that needs to be encouraged given current demographics.

### Case study n°3: Germany and the Future of Europe’s Contribution to Space Exploration

The history of the European human spaceflight program is full of puzzles. One perplexing challenge that has already been addressed deals with the so-called “European paradox.”<sup>67</sup> How the European space program was able to grow, even thrive, while never having fully committed itself to human spaceflight and the unparalleled visibility and symbol it would have secured, as exemplified by the U.S., the ex-USSR or even China? Not only was there a time-lag of two decades between the first European satellite ever to be launched (1962) and the first European human/ESA astronaut to fly in space (1978/1983), but Europe felt that it could depend on others to get people into orbit on the cheap – a strategy from which it departed only once when it

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<sup>65</sup> Peter B. de Selding, “Europe’s Next Mission: Capitalizing on Stunning Success of Philae,” *Space News*, November 14, 2014, <<http://spacenews.com/42555europes-next-mission-capitalizing-on-stunning-success-of-philae>>.

<sup>66</sup> See also for instance Roger-Maurice Bonnet, “Rosetta, une réussite européenne,” *Le Monde*, November 12, 2014, <[http://www.lemonde.fr/idees/article/2014/11/12/rosetta-une-reussite-europeenne\\_4522149\\_3232.html](http://www.lemonde.fr/idees/article/2014/11/12/rosetta-une-reussite-europeenne_4522149_3232.html)>.

<sup>67</sup> Alexander C. T. Geppert (ed.), *Imagining Outer Space: European Astroculture in the Twentieth Century*, Basingstoke: Palgrave Macmillan, 2012.

tried to promote the French-led *Hermès* space plane.<sup>68</sup> Another riddle is why (West) Germany's space policy chose to closely associate itself with human spaceflight activities. Indeed, with the exception of the episode stated above, CNES never claimed any leadership in this field, preferring instead to focus on the immediate commercial and technological prospects of an independent expendable launching system whereas the value of human spaceflight was, if not doubtful, in any case difficult to estimate. Yet, Germany has always been a big supporter of space exploration. Europe's first human space project – made in cooperation with the United States – was the *Spacelab* module for which Germany undertook prime responsibility (55%). One of the core “optional” programs that founded ESA at the time of the “second package deal” of 1973, *Spacelab* was also dubbed “Europe's most expensive gift to the people of the United States since the statue of Liberty” by a German official.<sup>69</sup>

That did not prevent its heritage to live on in *Columbus*, Europe's contribution to the U.S.-led *International Space Station* (ISS) and *Ariane 5*'s counterpart in the agreement Germany reached with France at the end of the 1980s and negotiated again in 1995. The emphasis on human spaceflight activities on the part of the then Federal Republic in those successive “package deals” was less evidence of genuine interest, though, than of two inevitable tensions linked to the position occupied by post-war Germany. First, the burden of National Socialism in general and Peenemünde in particular shaped the re-entry of West Germany into the space age. By fear of being associated with their dark history, German policy decision makers tended to favor international space projects deemed more legitimate with partners in Europe and the United States. Despite calls from scientists and industries to develop a stronger domestic program – if only to cooperate on an equal footing –, a balance always had to be struck with international obligations. Second, West German space activities had no choice but to perpetually oscillate between Washington and Paris, the United States and Europe. Human spaceflight projects had the huge advantage to allow a way out of the dilemma of having to decide between a European and a transatlantic path of cooperation, hence generating the multiple combinations with *Ariane* and *Hermès* on the one side, the space shuttle and the space stations on the other. However, to meet the interests of both parties was necessarily costly; besides, too often, the ventures the Germans felt obliged to accept so

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<sup>68</sup> Roger B. Handberg and Joan Johnson-Freese, *The Prestige Trap. A Comparative Study of the United States, European, and Japanese Space Programs*, Dubuque: Kendall/Hunt Publishing Company, 1994.

<sup>69</sup> Howard E. McCurdy, *The Space Station Decision: Incremental Politics and Technological Choice*, Baltimore: The John Hopkins University Press, 1990, p. 102.

as to conciliate everyone were technologically and scientifically questionable.<sup>70</sup>

Those lines are now shifting. After the reunification, the voices of those who advocated a more proactive role for Germany won the argument. The industrial and institutional landscape of space also changed a lot. The situation, as a result, is that Germany's interests in space have never been so diversified (exploiting space for both security and socio-economical purposes) and focused (heavier national program and focus on industrial competitiveness), thus putting an end to its ability and even will to forge compromises around human space exploration only. Of course, Germany is still concerned about maintaining human spaceflight activities in Europe: its last space strategy focuses notably on making the most of the ISS both in itself as a unique laboratory (for research and political purposes, *i.e.* international cooperation) and as a platform for future space exploration (development of autonomous robotic systems).<sup>71</sup> Indeed, Germany was critical in convincing Washington to agree on extending the use of the ISS from 2016 to 2020. But now that NASA has retaken the initiative under the new Obama space policy and announced that it will keep the program running through at least 2024, the Europeans, and first among them the Germans, have remained vague about their views, to say nothing of any post-ISS strategy which is conspicuous by its absence. As witnessed by the last ministerial council, priority for now is funding ESA's contribution to 2020. To put it in a nutshell, Germany's traditional leadership in this area appears uncertain.

This evolution should not be trivialized. It was important politically for Europeans in the early 80s to be part of the space station program that the U.S. was putting together since it associated the main countries of the free world, conveying the idea that all partners were allies of equal status. And the program was important again in the early 90s for the same reason: to be integrated in a club of "ontological equals," gathering not only the world's technologically more advanced nations, but also nations that were politically and economically on the same page, with Russia being then engaged in many reforms at home (the so-called "engagement and enlargement" process promoted by the Clinton administration). Therefore, though what Europeans will eventually decide may count for little when the main question the ISS is now facing is how well it may escape from tensions following the Ukraine crisis, Europe retains an important role with regard to reflections on the future of international space

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<sup>70</sup> Helmuth Trischler, *The "Triple Helix" of Space: German Space Activities in a European Perspective*, Noordwijk: ESA, 2002; Niklas Reinke, *The History of German Space Policy: Ideas, Influences, and Interdependence 1923-2002*, Paris: Beauchesne, 2007.

<sup>71</sup> Federal Ministry of Economics and Technology, *Making Germany's Space Sector Fit for the Future: The Space Strategy of the German Federal Government*, November 2010.

exploration, if only because it serves as a bridge between the U.S. and the rest of the world. Indeed, for American leadership to endure in the future, Washington will need to be able to sustain good relations over a broad group of followers. Put simply, there is no leadership without a basis of support and Europe is crucial in this regard. Not only because it would by definition increase the legitimacy of any U.S.-led global program in which it is one of the participant, but also because of what it is: a pioneer in regional space cooperation, “in a world where the norm in most regions [...] is mutual mistrust, nationalism, and competition.”<sup>72</sup> Perhaps this quality makes it somehow less suspicious if not less permeable to self-interests, or, more importantly, perhaps it gives it the kind of *gravitas* that goes hand in hand with being an example or a model now, that it is very unlikely, but not impossible, that human space exploration may be carried out by one country acting alone.

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<sup>72</sup> James Clay Moltz, *Crowded Orbits: Conflict and Cooperation in Space*, New York: Columbia University Press, p. 69.

## Europe as a Space Power: A Concept in the Making?

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“Space, a domain that no nation owns but on which all rely,” writes the U.S. National Security Space Strategy, “is becoming increasingly congested, contested, and competitive.”<sup>73</sup> There are more satellites – and more debris – in space than ever before, as well as more countries and corporate players engaged in space-related activities, and greater interaction among these. In the face of all of these new dynamics, Europe, a real but atypical space power, finds itself in a unique position. Indeed, as already surmised from the previous discussion, the European way of doing space differs from others in that, while carried out in collaboration, there is no comprehensive and solid space policy.

This characteristic does not necessarily convey the message that Europe is doomed to failure or stagnation. As an expert pointed out, Europe is “spread (not lost) in space.”<sup>74</sup> It simply implies a constant sharing of power between various stakeholders – all trying at the same time to satisfy different levels of relations, be it at the European supranational level (institutions and bodies of the European Union) or at the intergovernmental level (ESA and space agencies) – in order to exercise such power under the best possible conditions. Hence the all pervasive debate in Europe about “governance without government” which underlines how diversity and integration combine to achieve full potential in the field of space, and thus fulfill agreed but also sometimes divergent goals.

On the one hand, even if it remains excellent in a wide range of activities, Europe has a limited ability to adapt to changes and external developments, thus stressing how challenging and still in the making the internal dimension of its “space power” is. On the other, the fact that it evidently suffers from a lack of ambition short of better coherence does not prevent it from playing a key role on the international scene.

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<sup>73</sup> US Department of Defense and Office of the Director of National Intelligence, *National Security Space Strategy: Unclassified Summary*, January 2011, p. i.

<sup>74</sup> Lucia Marta, “Europe Spread (but not Lost) in Space,” *Brief*, N°22, EUISS, June 2013.

## ***The Choice of Europe: ESA and the Splendid Remains of the First European Space Governance Revolution***

ESA forms the centerpiece of Europe's space efforts. The Agency is the result of the negotiations held between 1973 and 1975 to turn into order the chaos characterizing at that time the European space program,<sup>75</sup> thus signaling the "first revolution in European space governance."<sup>76</sup> Far from inaugurating a new era – as suggested by its very symbolic name, until then a monopoly of national entities –, though, the birth of the European Space Agency reaffirmed the wish to safeguard the individual interests of its member states. Two mechanisms are evidence of the intergovernmental nature of ESA. The first is based on the principle "one state, one vote." It applies to all decision-making processes, meaning that each and every one of the individual states is taken into consideration in the positions adopted regardless of how much they weigh in terms of GDP. The second is the rule of *juste retour*. It follows from a similar logic in the way that it recognizes the need to protect all national industries despite their differences or degrees of maturity. The introduction of an industrial policy into the text of the ESA Convention, in departure from the former ESRO Convention, aims at preventing the kind of unintended and undesirable consequences that could happen when rules are not made to guarantee fair industrial return and contributions tend to go to the benefit of strong and competitive companies of big member states.<sup>77</sup> Speaking more broadly, conceived as a R&D organization lacking any capacity for commercialization and forbidden to engage in "non-peaceful" activity, the Agency according to article 2 of the Convention (also available at the inside front cover of the *ESA Bulletin*) is required to: (1) elaborate and implement a long-term European space policy; (2) elaborate and implement activities and programs in the space field; (3) integrate progressively and as completely as possible national programs into the European space program; and (4) elaborate and implement a coherent industrial policy.

Speaking of the implementation of a European space program, the fact that ESA compares very favorably with regard to NASA in terms of cost-effectiveness while spending three times less is a testament to the whole success of the enterprise. As for the rest, the picture is a mixed one. This stands true with regard, first, to the development of a comprehensive space policy. If only because the

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<sup>75</sup> Harvey, *Europe's Space Programme*, p. 157.

<sup>76</sup> Florent Mazurelle, Jan Wouters, and Walter Thiebaut, *The Evolution of European Space Governance: Policy, Legal and Institutional Implications*, Working paper N°25, Leuven Centre for Global Governance Studies, April 2009, p. 11.

<sup>77</sup> E. Morel de Westgaver and P. Imbert, "Le 'juste retour' : contrainte ou instrument d'intégration européenne?," *ESA Bulletin*, N°59, 1989, pp. 62-67.

policy of the Agency has been reduced, in practice, to the search for necessary compromises taking into account widely divergent trends among member states, instead of a true and clear long-term concerted space policy, as the policy of a government can be. Not that this needs entirely to be interpreted as a weakness or a failure though, despite what the EU could say in order to highlight its added value.<sup>78</sup> Indeed, the advantages of flexibility of the two-tier system set up by ESA are well known, authorizing the pursuit of optional activities which allow each state the possibility of not participating and the participants of freely fixing the level of their participation, in addition to scientific mandatory activities which all the member states to contribute in proportion to their national income. For the mandatory activities, a simple majority vote determines the nature of the projects to which is allocated an envelope known in advance. Such decision-making lends itself easily to accurate medium-term planning, but any change of the level of financing needs unanimous agreement. On the other hand, for the optional programs, which correspond to more than 80% of the total budget of ESA, the decision covers both the content of the projects and the allocation of resources. On one side, the idea of a *menu à la carte* to which each “participating state” is free to commit or not means uncertainty. But “package deals” are generally so difficult to negotiate that once an agreement has been obtained nobody would seriously think about calling it into question. The slowness of the process may be irritating but it creates stability and security in the end.<sup>79</sup>

Continuing with the remaining objectives as stipulated in the paragraphs contained in article 2, the text of the Convention is beset by two possible contradictions. The first one of them deals with the elaboration and implementation of an industrial policy. The fact that ESA must relentlessly conciliate between two competing requirements speaks volumes. The Agency should reinforce the competitiveness of the European space industry in the world market and promote European autonomy through the use of competitive methods, while maintaining the application of artificial geographical return rules so as to reduce the technological gap between the industry of smaller states and that of big states. Indeed, the question remains to know whether the principle of industrial *juste retour* is an end in itself or a mean.<sup>80</sup> According to some, it is simply a useful tool to fix the imbalances in industrial capabilities which would eventually converge. It is not designed to endure over time once they pass a certain level of development. For others, particularly small countries like Belgium or Sweden, the rule should be implemented indefinitely in return for participation in optional programs. In fact, the existence of a space industry in those states and therefore their determination

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<sup>78</sup> See next section.

<sup>79</sup> Lebeau, *L'Espace. Les enjeux et les mythes*, pp. 207-208.

<sup>80</sup> Suzuki, *Politic Logics and Institutions of European Space Collaboration*, pp. 89-90.

to support a European space program rests essentially on their certainty of getting a minimum level of activities in return.

The progressive integration of national programs into European activities constitutes another challenge. This objective, repeated many times in the text of the Convention, hides once again two fundamentally competing trends.<sup>81</sup> For small countries, ESA's mandate urges to go beyond coordinating one European space program and several national programs. It also includes the rapid absorption of national programs into the collective European space effort and therefore the disappearance of national agencies. Small countries are after all fully committed to the Agency with little or no national ambitions, implicitly demonstrating the disproportionate influence they have on the decision-making process at ESA in view of their level of contribution. Lacking their own national agency, ESA has somehow been their own space agency. Such reasoning is obviously unable to convince big countries such as France or Germany which both can dream of having significant national space programs of their own. Given the fact that the decision-making mechanisms are not in their favor, they do not wish to simply deprive themselves of the means of actually exerting any real influence of the kind allowed by a strong dynamic national program. For them, and particularly France, participation to ESA represents a direct continuation of an ambition carried on with other means; an ambition that can only express itself through Europe or runs the risk of being constrained by national limitations.<sup>82</sup>

Solving those structuring conflicts between big and small countries is no easy task. There are some safety valves however and the institutional structure offered by ESA has proven flexible enough to endure. Going alone can be appealing if it were not for its costs, as exemplified by the "Europeanization" of the small launcher *Vega* initially financed by Italian funds only. Conversely, even though the Agency is dominated by national programs that have been Europeanized, thus illustrating in a way the idea that the leadership of a single "pilot country" is more important than the collective effort of all (55% of the budget of ESA comes from two countries and 80% comes from four, illustrating that national motivations have been the main driver of the European space enterprise, at least as far as big programs are concerned), small countries know how to take advantage of the situation. Some, Spain being the best known example, have greatly fostered their industrial capabilities and improved their technological skills to levels that would have been impossible otherwise. Besides, the dualism or dialectic between a national structure and a European one – what McDougall once called

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<sup>81</sup> Ibid., pp. 88-89.

<sup>82</sup> See for instance Robert Aubinière, "L'Espace ne peut être qu'eupéen," *Revue défense nationale*, July 1971, pp. 1063-1070.

“Euro-Gaullism”<sup>83</sup> – has proven instrumental to spur competition and dynamism. All the more so since a relative specialization has eventually emerged on occasions. CNES, which ESA put notably in charge of managing *Ariane*, is archetypal. When the European partners and especially among them Germany refused the Europeanization of the optical satellite program *SPOT* that France had submitted in 1977, in accordance with the Convention that requires member States to present their projects before committing to them, far from disappearing, *SPOT* actually found a place at the national level, while succeeding in securing bilateral participations of other European countries determined to invest in that particular technology. Thereafter, when ESA decided to encourage the development of a remote sensing activity in Europe, it opted in favor of radar with *ERS*, thus harmoniously and effectively complementing the global European picture.<sup>84</sup> The complementarities constructed over the years, together with the success of many missions and programs, has been conducive of a true spirit of solidarity and alignment.

#### **Case study n°4: ESA as a Pole of Attraction for All European Countries Wishing to Go into Space**

European governments have demonstrated their approval with concrete actions. ESA’s membership has more than doubled from 10 to the present 22 member states,<sup>85</sup> plus Canada as an associate member, in the years since its inception almost 40 years ago. The achievements and successes of ESA have attracted more and more countries to become member states (from 14 to 19 in 10 years and three others have since followed in less than 5 years, while it took 25 years to go from 11 to 14) and it is very likely that there will be a further rapid extension of membership to include all the European Union’s member states not yet members of ESA, bringing the total membership eventually to 30 (EU28 plus Norway and Switzerland). The recent (*i.e.* 2004, 2007, 2013) Europeanization of Central and Eastern Europe has set the pace and put heavy pressure on the gradual cycle of integration of all EU member states into ESA. As the Director General of ESA, Jean-Jacques Dordain, stressed in the Agenda 2015: “the most significant and visible changes for ESA in the years to come are undoubtedly the increase of the number of its member states with a progressive accession of all the EU member states to the Convention of ESA. This will make a different ESA,

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<sup>83</sup> McDougall, “Space-Age Europe: Gaullism, Euro-Gaullism, and the American Dilemma.”

<sup>84</sup> Lebeau, *L’Espace. Les enjeux et les mythes*, p. 213.

<sup>85</sup> Austria (1986), Belgium, Czech Republic (2008), Denmark, Estonia (2015), Finland (1995), France, Germany, Greece (2005), Hungary (2015), Ireland, Italy, Luxembourg (2005), The Netherlands, Norway (1986), Poland (2012), Portugal (2000), Romania (2011), Spain, Sweden, Switzerland and the United Kingdom.

much closer to the membership of the EU, with many more member states, but still with programmes and budget driven by a few big contributors.”<sup>86</sup>

This development seems quite inevitable. The fact that all EU member states are fully part of the development of a European space policy, but not fully engaged in the decision-making processes of ESA creates an imbalance that can cause great harm to both the promotion of space as a critical instrument in managing policies across Europe – the agricultural policy, the environment, security and development policies, etc. – and the funding for European “flagship” projects – *Galileo* and *Copernicus*. What is more, EU funding instruments are somewhat inadequate to cope with the space program cycle organized under the ESA framework, as well as the *juste retour* mechanism, which appears to be in clear contradiction with the uncompromising rules of open and fair competition promoted by the EU. If the benefits of space investments were not shared, some countries could indeed consider that the funding of the space policy should not be in fact the responsibility of the Union. For instance, the EU-led *Copernicus* program – which has been identified as an engine for economic growth by the Commission – has shown in the past that non-ESA member states can be reluctant or uncertain in funding a program in which they are not fully engaged also on the ESA side. As pointed out by Erich Klock and Marco Aliberti of ESPI, “only through an enlarged ESA, could the EU provide a more coherent and “legitimate” framework of space activities in Europe and fully implement pan-European Space Programmes.”<sup>87</sup>

Historically, then, ESA’s composition has grown as part of a gradual and step-by-step process intended to preserve the objectives of the Agency’s characteristic industrial return arrangements and affect as little as possible its working rules. This process has followed an evolutionary pattern, according to which the cooperation established by article 14 constituted a kind of precondition or springboard for any subsequent accession pursuant to article 22.<sup>88</sup> The acquisition of associate member status is not mandatory for a state to become a full member of ESA but allows associate members to be fully cognisant of the agency’s overall approach, its deliberative bodies as well as its current programs and activities. For example, Austria, Norway and Finland began by taking part in certain optional

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<sup>86</sup> *Agenda 2015: A Document by the ESA Director General*, Paris: ESA, BR-303, 2011, p. 45.

<sup>87</sup> Erich Klock and Marco Aliberti, “ESA Enlargement: What Interested Countries Can Do to Prepare Themselves for Ultimate Accession – With a Special Focus on the CEE Region,” *ESPI Report*, N°47, January 2014, p. 60. See also Peter B. de Selding, “Space Programs Facing Cuts in Seven-year EU Budget,” *Space News*, February 1, 2013, <[www.spacenews.com/article/space-programs-facing-cuts-in-seven-year-eu-budget](http://www.spacenews.com/article/space-programs-facing-cuts-in-seven-year-eu-budget)>.

<sup>88</sup> Jean-Pol Poncelet, Anabela Fonseca-Colomb, and Giulio Grilli. “Enlarging ESA? After the Accession of Luxembourg and Greece”. *ESA Bulletin*, N°120, November 2004, pp. 49-53.

Agency programs in line with Article 14 of the Convention before they later joined ESA as full members, while Portugal, Greece and Luxembourg skipped this interim status and moved directly from Cooperation Agreements to full membership. The Czech Republic and the most recent member states Romania, Poland, Estonia and Hungary skipped associate membership, but went through the enlargement process via a Cooperation Agreement, the so-called European Cooperative State (ECS) Agreement associated with the Plan for European Cooperating States (PECS) which both provide a special status for future Eastern (and Southern) European candidates.<sup>89</sup> Notwithstanding their lack of industrial backing, aspiring states can take part in certain ESA projects by making a limited contribution (e.g. the minimum EUR 1 million) more commensurate to their resources, and become better acquainted with the Agency's work. Benefits expected from the ongoing Eastern (and Southern) enlargement process can thus go both ways and involve both political and economic opportunities.

### ***Close Encounters of the Third Kind: the EU and the Promises of the Second Space Governance Revolution***

Concomitant to Europe's growing ambitions and capabilities in space is the reality that European space governance is currently evolving around two different dynamics.<sup>90</sup> First, players with the political legitimacy that ESA is lacking – a fact stressed in the European Commission's first Communication on Space as early as 1988<sup>91</sup> – can breathe new life into space through both an influx of political coherence and institutional investments. This is a key factor explaining the strengthening of ties between the European Union and ESA as well as the support publicized by some important member states for a prominent EU role in the space domain. Indeed, the emergence of a solidified European actor for space represented through EU and its executive arm, the European Commission, opens up a series of opportunities. One of these is financial. The fact of the matter is that the EU is now one of the main, if not the first, financial contributors to ESA (EUR 624 millions in 2014, 1,031 in 2015) in intimate proximity with France (755 in 2014, 718 in 2015) and

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<sup>89</sup> On this point, see also Klock and Aliberti, "ESA Enlargement," and Charlotte Mathieu, "Space in Central and Eastern Europe. Opportunities and Challenges for the European Space Endeavour," *ESPI Report*, N°5, September 2007, and "Addendum Exploratory Study on Estonia and Slovenia," *ESPI Report*, N°8, October 2007.

<sup>90</sup> Mazurelle, Wouters, and Thiebaut, *The Evolution of European Space Governance*, p. 15.

<sup>91</sup> COM(88)417 final, Brussels, 26 July 1988.

Germany (766 in 2014, 797 in 2015).<sup>92</sup> It has actually become increasingly important as a “force multiplier” at a time when the budget is relatively flat on the side of national governments and the Agency itself. Another opportunity to consider has to do with changes in mindsets and attitudes. It must be acknowledged that only very few nations in Europe regard space as a political issue like France does.<sup>93</sup> Too often, as a result, the necessity for Europe to be independent and to keep intact the possibility of autonomous decision-making has been looked upon as a purely French problem that deserves no special commitment outside its scientific and technological aspects. The EU’s entry into space can change that and, in effect, it has given space a strategic dimension and the recognition it previously lacked.

Second, precisely because of the strategic benefits it provides, space must be part of the toolbox of the EU if Europe wants to play a more prominent role in the international arena as the following section will show. By the same token, though, the process of fostering a European strategic vision of space is necessarily bound to remain in the making for the time being as it has already been addressed in the introduction. As put by Mazurelle, Wouters and Thiebaut, “[s]pace will truly become a strategic asset when the EU has clarified for itself its political role, in other words when a “political Europe” has clearly emerged.”<sup>94</sup> This reasoning makes sense since, by definition, there can be no strategy without a political project to help articulate goals with ways to achieve them and available means and resources at hand. Yet this is where the problem lies: Europe is not fixed in stone but in a dynamic process, appearing both in potentiality and actuality. In the absence of a common guiding vision, the EU can have no true coherent strategy or roadmap for space, which ends up being limited to the various contributions space makes to European policies in a large variety of policy areas. This is why the key issue behind space governance is actually European governance.<sup>95</sup> The long-promised renewed space governance in Europe appears therefore to be in standby, with experts and policy makers in Brussels, Paris and the capitals continuously pondering over the idea of reforming European space governance, while having in fact little impact on the debate itself which two decades after being put on the agenda shows no sign of ending, and is even more alive today, since the EU has now codified its ambition of making space a direct EU competence in a treaty.<sup>96</sup>

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<sup>92</sup> <[www.esa.int/About\\_Us/Welcome\\_to\\_ESA/Funding](http://www.esa.int/About_Us/Welcome_to_ESA/Funding)>.

<sup>93</sup> See section above.

<sup>94</sup> Mazurelle, Wouters and Thiebaut, *The Evolution of European Space Governance*, p. 15.

<sup>95</sup> *Ibid.*, p. 15, 30.

<sup>96</sup> Be it through workshops or studies about where Europe is heading, see for example Kevin Madders and Jan Wouters, “Finding a ‘Genuine’ Space Policy for Europe: the European Space Policy Workshop Series,” *Space Policy*, Vol. 19, N°1, 2003, pp. 41-46; Kevin Madders and Jan Wouters, “Taking Stock of Europe’s Developing Space Policy: From the European Space Policy Workshops to the

It is no wonder, then, that the terminology used in Europe is focused on “a European space policy” (ESP), and not a “space strategy” *per se*.<sup>97</sup> The stated goal of elaborating an ESP is closely associated with the need to clarify the respective roles of the Union and ESA and the establishment of an institutional framework for effective cooperation between the two entities. In 2003, a scholar thus lamented that there were two captains on the European spaceship.<sup>98</sup> Similarly, to quote them again, Mazurelle, Wouters and Thiebaut recall that: “The existence of two autonomous international organisations sharing space responsibilities in Europe leads to unpredictable decision-making, lack of coherence, and often duplication of activities with its significant budgetary implications.”<sup>99</sup> The regulatory framework for space activities in Europe has reached a culminating point in the provisions on space contained in the “Treaty on the Functioning of the European Union” (the so-called treaty of Lisbon) signed in December 2007.<sup>100</sup> Until then, indeed, there was no explicit reference to space in the EU’s constitutive documents. However, although it represents a major breakthrough saluted as such in the relevant literature in the sense that it confirms for the first time the existence of competence of the EU in the space sector, the treaty does not provide additional clarification with regard to the structure of the European space governance since it merely states that: “The Union shall establish any appropriate relations with the European Space Agency.” As summed up by Bertrand de Montluc: “The progress made in the concrete synergy of European efforts in the matter of governance has been relatively poor.”<sup>101</sup>

Since, while the EC issued a communication in which it presented the structural obstacles preventing any improvement in the current EU-ESA relations, stating incidentally that this can only be solved in the long term “through the rapprochement of ESA towards the European Union” between 2020 and 2025,<sup>102</sup> ministers at ESA also resolved to discuss the issue of the European space governance. The Agency recognized that with the entry into force of

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European Space Policy Forum,” *Space Policy*, Vol. 20, N°1, 2004, pp. 31-36; Katharina Kunzmann and Thomas Reuter, “Creating a Legal Framework for a Coherent Structure for European Space Activities,” *Space Policy*, Vol. 20, N°1, 2004, pp. 59-61; Alain Gaubert and André Lebeau, “Reforming European Space Governance,” *Space Policy*, Vol. 25, N°1, 2009, pp. 37-44; including a special issue edited by Thomas Hoerber on “New Horizons for Europe: A European Studies Perspective on European Space Policy,” in *Space Policy*, Vol. 28, N°2, 2012, pp. 73-140.

<sup>97</sup> Venet and Schrogl, “European Experiences with Space Policies and Strategies,” p. 262, 264, 269.

<sup>98</sup> Frans G. von der Dunk, “Towards One Captain on the European Spaceship – Why the EU Should Join ESA,” *Space Policy*, Vol. 19, N°2, 2003, pp. 83-86.

<sup>99</sup> Mazurelle, Wouters and Thiebaut, *The Evolution of European Space Governance*, p. 29.

<sup>100</sup> In particular Articles 4 and 189.

<sup>101</sup> Bertrand de Montluc, “What is the State of Play in European Governance of Space Policy?,” *Space Policy*, Vol. 28, N°2, 2012, pp. 74-76, at p. 75.

<sup>102</sup> COM(2012) 671 final, Brussels, 14 November 2012, p. 4.

the treaty of Lisbon, the EU had become one of the three key actors of the “European space triangle.” Nevertheless, the member states also outlined that the Agency should continue to provide the flexible framework for investing that made it so successful in its first phase and equivalent rights and obligations to all member states, including non-EU countries. “ESA,” they said, “must further evolve, in coherence and complementarity with the other actors, towards the European space agency that best serves Europe in a competitive world-wide environment.”<sup>103</sup> “First, do no harm,” as one ESA official concluded in an attempt to describe how the ESP must enable the EU to make the most of the strengths of ESA and conversely.<sup>104</sup>

There are indeed several strengths to maintain in the current model: on the one hand, both the managerial and technical expertise gained at ESA from nearly half a century of investment and its resources and procurement policy as demonstrated by its capacity to attract significant investments in spite of the crisis, as well as the flexibility provided by optional programs and continued interests aroused among member states are worth preserving; on the other hand, the ability the EU has to increase funding for space-related programs, its R&D efforts embodied in seven-year Horizon 2020 program and its political and regulatory competences must be nurtured as well. There are also weaknesses to mitigate: the lack of any single decision-making authority needs to be fixed, same as the asymmetry in membership, the divergence of procurement policy, the absence of any clear space industrial policy, the asymmetry in security and defense matters, and the mismatch of financial rules.<sup>105</sup> For all those reasons, both ESA and the EC have thought long about the possible evolution of their relations. Different scenarios have been put together. One can for instance distinguish between three options: improved cooperation under the *status quo*; making the EU become a member of ESA; or turning ESA into a “space agency of the EU” which over the medium-long term seems more probable.<sup>106</sup> But for

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<sup>103</sup> ESA/C-M/CCXXXIV/Res.4 (Final), 20 November 2012, p. 2.

<sup>104</sup> Géraldine Naja, “L’Espace européen après Lisbonne,” *Géoéconomie*, Vol. 61, 2012, pp. 107-114, at p. 113.

<sup>105</sup> Lucia Marta, “National Visions of European Space Governance: Elements for a New Institutional Architecture,” *Space Policy*, Vol. 29, N°1, 2013, pp. 20-27, at pp. 21-23.

<sup>106</sup> Philippe Achilleas and Thomas Royal, “Le futur visage de la gouvernance du spatial en Europe. Éléments de réflexion juridique,” in *Une ambition spatiale pour l’Europe. Compléments: Gouvernance Européenne*, Paris: Centre d’Analyse Stratégique, 2011, pp. 5-62, esp. 47-49. See also Julien Béclard, “The Lisbon Treaty and the Evolution of European Space Governance,” *The Europe & Space Series*, N°12, July 2013, p. 3. In this last scenario, ESA would eventually become one of the agencies of the Union while preserving the culture and characteristics that made its success. For ESA, at least as stated by Jean-Jacques Dordain, the best model of relationship should be one in which the EC acts as an “educated customer” such as EUMETSAT (European Organisation for the Exploitation of Meteorological Satellites) and get involved in the development phase, relays needs and develops initiatives. See House of Commons, *Oral Evidence Taken Before the Science and Technology Committee: Work of the European and UK Space Agencies*, 3 July 2013, p. 14. For

now, only the “status quo” scenario of a closer relationship based on the framework agreement formalized in 2004 (setting the “Space Council” as a coordination mechanism<sup>107</sup>) obtained a broad support.<sup>108</sup>

### Case study n°5: From Tried-and-Tested EU to Space-Proven?

According to Article 189 of the treaty of Lisbon (the so-called “space clause”), space policy is a new “shared competence” of the EU. As put by scholars, although this clause represents an important concession on the side of the individual member states, it is difficult to construe its exact scope and meaning. Indeed, while the EU has now an explicit mandate to define and implement space programs, states still retain sovereign discretion and, as a result, the competence could not be regarded as a shared one but a “parallel” or “supporting” competence.<sup>109</sup> Interestingly, any future institutional and programmatic balance remains then heavily reliant on the choices and policies of member states and, particularly of the most prominent among them. After all, “governments decide on national space activities, which are fundamental elements of the European space panorama. They decide ESA’s direction, by sitting on the Council, and they influence the EU’s position and priorities through the Competitiveness Council or as budgetary authority.”<sup>110</sup> Everything depends thus upon the coherence of the decisions adopted by the states delegations in both structures.<sup>111</sup> The EU just needs to convince that the expectations and trust placed in it are not unwelcome. There is plenty of debate about the “actorness” of the EU. Most focus on how the EU scores in different criteria in order to test the credibility and legitimacy that its actions convey both internally and externally in international space governance.<sup>112</sup> One measure, for instance, the capacity it has to set objectives in a discretionary way, to make decisions as well as to implement them, and to seize opportunities. Another deals with how it manages to act

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Lebeau, former Deputy Director General of ESA, former Director General of Météo France and former President of CNES, ideally, EU and ESA must evolve towards a similar relationship as the one that exists between a national government and a specialized public body such as CNES. *L’Espace. Les enjeux et les mythes*, p. 296. See also Carl Bildt, Jean Peyrelevade, and Lothar Späth, *Towards a Space Agency for the European Union*, Report to the ESA Director General, 2000.

<sup>107</sup> 12858/03 (RECH 152 OC 589), 7 October 2003.

<sup>108</sup> ESA/C-M/CCXLVII/Res. 3 (Final), 2 December 2014.

<sup>109</sup> Mazurelle, Wouters and Thiebaut, *The Evolution of European Space Governance*, p. 26.

<sup>110</sup> Marta, “National Visions of European Space Governance,” p. 23.

<sup>111</sup> Gaubert and Lebeau, “Reforming European Space Governance,” p. 43.

<sup>112</sup> Julien Béclard, “With the Head in the Air and the Feet on the Ground: The EU’s Actorness in International Space Governance,” *Global Governance*, Vol. 19, N°3, 2013, pp. 463-479.

in a unified way in the running of its external relations in the face notably of ESA.

The EC's ability to build and exploit large and complex space programs while keeping costs under control will be checked on the test bed provided by initiatives like *Galileo* and *Copernicus*, EU's so-called two "flagship programs." As the first major space project undertaken under EU, *Galileo*, the European program for positioning, navigation and timing, is the symbol *par excellence* of a PSE in construction and the many difficulties to get there.<sup>113</sup> Officially launched in 1999, even before the treaty of Lisbon came into force, *Galileo* has largely led the EU to anticipate its space competencies. It is also the first large-scale project associating the EU, as the initiator responsible for its political governance, and ESA, which is providing technical oversight. The EU has faced a number of challenges coming from the opposition of some member states to a fully public financing of the program and the constant interfering of the United States. It nonetheless succeeded in keeping the project on track with a completion date of 2020, though not without some institutional creativity.<sup>114</sup> Launched in 1998, *Copernicus*, initially dubbed the *Global Monitoring for Environment and Security* (GMES), entered into operational mode after the launch of *Sentinel-1A* in 2014.<sup>115</sup> This very ambitious earth observation program has not been immune either to the many contradictions raised by the PSE, going so far as to throw doubt on the determination and commitment of the EC. All in all, these examples highlight the innovation and leadership capacity the EU is able to show. They also demonstrate its growing credibility in supporting various projects on the international scene when dealing with third actors.

It is also acknowledged that ambitious space projects related notably to security cannot do without a political consensus at the highest level that only the EU can guarantee given ESA's reluctance to go beyond the "peaceful purposes" clause of its Convention and the fact that ESA member states are generally represented by their research ministries rather than more strategy-minded national decision makers. The EU's (International) Code of Conduct for Outer

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<sup>113</sup> Laurence Nardon and Christophe Venet, "Galileo: The Long Road to European Autonomy," *The Europe & Space series*, N°2, December 2010.

<sup>114</sup> In essence when the EU took charge of *Galileo* after the failure of the envisaged public-private partnership (PPP) approach, what matters most from the point of view of this study was not the new public financing scheme as such, but the fact that the Commission no longer needed to present the project according to its economical/commercial dimension in order to have the support of national states. The political/strategic option that was unconceivable in 2000 because of the reluctance of some states victoriously re-emerged in 2007 as the main if not sole rationale, thus authorizing *Galileo* to be consolidated under EC leadership as a program designed to promote first and foremost European sovereignty and autonomy. See also Paul Stephenson, "Talking Space: The European Commission's Changing Frames in Defining Galileo," *Space Policy*, Vol. 28, N°2, 2012, pp. 86-93.

<sup>115</sup> Laurence Nardon and Christophe Venet, "GMES, The Second Flagship," *The Europe & Space Series*, N°3, March 2011.

Space Activities, first drafted at the end of 2008, supports this approach. Not only should it be considered as a bold move for the EU which at that time had never taken any initiative in the area of security, thus showing its ability to jump at opportunities as in the cases of *Galileo* or *Copernicus*, even sometimes at the price of possible misunderstandings by many foreign states wondering about this unprecedented involvement. But this proposal was also remarkable given the deadlock of the international discussions about arms control in space.<sup>116</sup> Obstacles to the code's final adoption since then has been at least partially testament to the EU lack of cohesion and diplomatic skills as it struggled to learn how to engage in the making of foreign and security policy with the new power appointed by the treaty of Lisbon. Setting up the European External Action Service (EEAS) placed under the authority of the High Representative of the EU for Foreign Affairs and Security Policy was a laborious process that did not foster effective leadership until 2012. Incidentally, though, the reinvigoration of multilateral consultations could also be attributable to a change of attitude on the part of the U.S. which began to support and, above all, sponsor the code around that time, as a good starting point toward an international set of rules governing responsible space behavior.<sup>117</sup>

## ***International Relations: Europe in the World, Europe and the World***

When speaking of space collaboration outside Europe, one must raise one general issue and make two more specific points as a framework for discussions. The first issue has to do with the notion of cooperation as such. To start, cooperation must be distinguished from harmony. Harmony refers to a situation in which unilateral choices (pursued in one's own self-interest without regard for others) automatically maximize both individual and collective interests. Cooperation requires that active attempts be actually made to adjust the policies or preferences of one actor to the demands of another through a process of negotiation. Not only does it depend on common interests, but it emerges from a pattern of discord or a potential conflict of interests. Without discord, harmony would reign and there would be no need for cooperation.<sup>118</sup> Needless to say that such a

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<sup>116</sup> Max M. Mutschler and Christophe Venet, "The European Union as an Emerging Actor in Space Security?," *Space Policy*, Vol. 28, N°2, 2012, p. 118-124. See also Pasco, *A European Approach to Space Security*.

<sup>117</sup> On the topic, see notably Ajey Lele (ed.), *Decoding the International Code of Conduct for Outer Space Activities*, New Delhi: IDSA, 2012; Rajeswari Pillai Rajagopalan and Daniel A. Porras (eds.), *Awaiting Launch: Perspectives On The Draft ICoC For Outer Space Activities*, New Delhi: Observer Research Foundation, 2014.

<sup>118</sup> Robert O. Keohane, *After Hegemony: Cooperation and Discord in the World Political Economy*, Princeton: Princeton University Press, 1984, p. 12, 51.

world is rare and does not characterize space anyway. Also, it has to be noted that in a situation of pure (zero-sum) conflict, there is no reason to cooperate or coordinate policies either, because one party's loss is another's gain.<sup>119</sup> This leaves only two cases, coordination without distributional conflict in which actors may cooperate by agreeing on a common rule no matter what its content is, and cooperation with distributional conflicts in which finding an agreement may be as important but actors disagree about precisely what the terms of that agreement ought to be.<sup>120</sup> Space cooperation navigates from one to another, depending on the domain or the topic. Whereas states generally agree on the fact that each and every one of them can freely engage in the peaceful uses of space, they are less likely to cooperate when the outcomes unreasonably benefit one party at the expense of the others. Moreover, cooperation does not preclude some competition provided that it remains in accordance with some minimum shared rules of non-interference.

The second issue is more specific to Europe and deals with the fundamental objective of strategic autonomy. As defined by André Lebeau: "Independence [...] does not mean isolation or refusal to cooperate, but refusal to accept uncontrolled dependence."<sup>121</sup> Directly arising from this aim is the idea that international cooperation should only be pursued when the various components that give it form and meaning do not interfere explicitly with the creation and maintenance of an independent space capability in Europe. In this regard, according to him, "a distinction must be made at the outset between cooperation with the United States and cooperation with other partners as the latter are not likely to put Europe in a situation of dependency."<sup>122</sup> This distinction appears all the more justified since the relation with the U.S. follows a long tradition that is as much about ESA as national agencies. It is no wonder, for example, that Jacques Blamont has claimed repeatedly that "CNES is the child of NASA, and I would add, the loving child of NASA."<sup>123</sup> The generous approach encapsulated in the Space Act of 1958 that gave NASA the mission to collaborate with foreign partners is not at odds with more hegemonic policies as manifested by the determination to keep a monopoly over certain strategic tools and avoid as much as possible mutual dependence. There is no need to be surprised by this "basic duality" given that, according to NASA's senior negotiator during the Cold War, Arnold Frutkin, "We seek new levels of joint cooperation with other nations [...], yet simultaneously we compete for

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<sup>119</sup> Joseph Grieco, "Anarchy and the Limits of Cooperation: A Realist Critique of the Newest Liberal Institutionalism," *International Organization*, Vol. 42, N°3, 1988, pp. 485-507.

<sup>120</sup> Stephen D. Krasner, "Global Communications and National Power: Life on the Pareto Frontier," *World Politics*, Vol. 43, N°3, 1991, pp 336-366.

<sup>121</sup> André Lebeau, "The Changing Role of Europe in Space," *ESA Bulletin*, N°6, p. 3.

<sup>122</sup> Lebeau, *L'Espace. Les enjeux et les mythes*, p. 270.

<sup>123</sup> Jacques Blamont, "International Space Exploration: Cooperative or Competitive?," *Space Policy*, Vol. 21, N°2, 2005, pp. 89-92, at p. 89.

preeminence and the preservation of the national security. There are, in short, elements of both cooperation and competition in the picture.”<sup>124</sup> This explains why transatlantic cooperation is especially successful when based on “controlled dependence” on the one side and domains not deemed of strategic importance on the other, such as but not exclusively science.

The last issue touches upon a problem already encountered, which is Europe’s structural principle of unity in diversity and, therefore, perpetual challenge to respect independence while promoting integration. It is true that the existence of not just one but several “Europe” may be from time to time confusing or counterproductive when looking for further cooperation. The risk of engaging into unrecognized duplicates in cooperation cannot be entirely discarded either, especially if there are no real coordination efforts to rationalize extra-European relations and monitor export control issues. On the other hand, the EU now possesses a legal identity in international relations and has owned a responsibility in security policy that is likely to make it more effective in protecting and improving Europe’s place in the international arena. The ESP has a clear external dimension. In its April 2011 Communication “Towards a space strategy for the EU that benefits its citizens,” the EC stated that international cooperation should not only be a matter of collaboration on technologies and services, but also support “the promotion of European values through space-based projects focused on environmental protection, climate change, sustainable development and humanitarian action.”<sup>125</sup> Therefore, whereas ESA’s involvement is limited by its programmatic interests and available resources as a R&D organization, the EU can be more proactive on the international scene, since it can cooperate at various different levels with various other partners, with a true “foreign policy” objective in mind.<sup>126</sup> Europe’s tradition of multilateralism and openness towards international cooperation through the establishment of partnerships by ESA, national space agencies and now the EU, provides thus a variety of opportunities, illustrating that European diversity is a genuine “multiplier factor” in international cooperation. ESA has for example supported the Space Dialogues the EC has set up with notably the United States, Russia, China, and recently Japan.

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<sup>124</sup> Arnold Wolfe Frutkin, *International Cooperation in Space*, Englewood Cliffs, NJ: Prentice-Hall, 1965, p. 172.

<sup>125</sup> COM(2011)152 final, Brussels, 4 May 2011, pp. 9-10. See also “Elements for a European Strategy for International Relations in Space,” in COM(2008)561 final, Brussels, 11 September 2008, pp. 14-18.

<sup>126</sup> Nicolas Peter, “The EU’s emergent space diplomacy,” *Space Policy*, Vol. 23, N°2, 2007, pp. 97-107.

## Case study n°6: Entering the 21st century

Trends leading to an internationalization and globalization of the space sector suggest that space is going to be a much more complicated environment for all those that seek to benefit from it as the 21<sup>st</sup> century moves forward. At a time when the balance between established and emerging space powers is evolving and the division of responsibilities between the public and private sectors is changing very rapidly as well, the position of Europe has to be carefully examined along with each step it takes. Defining and ranking the different space powers is no easy task, except for the U.S. which still enjoys a much larger margin of superiority over the next most capable space nation or, indeed, all other space users combined. But one cannot fail to notice that changes are looming large and that in order to continue being successful, Europe will need to flexibly adapt to new ways of cooperating, new partners and maybe new methods, in particular when competitiveness in the global commercial market is at stake and the “space market” itself is losing its distinctiveness. Not only, therefore, do the Europeans have to ensure further consistency and coherence between various players’ actions and interests until they reach a more complete political construction, but they must also find the strategies if not to contain the new dynamic forces being unleashed in the space sector, then at least to learn how to channel them to their benefit. Europe’s reputation for excellence might well be its greatest asset in this quest. The total of cooperative agreements with foreign partners signed by Europe’s different stakeholders clearly confirms this global recognition of the European skills in space science, engineering and management.<sup>127</sup>

Collaboration with the U.S. is more comprehensive and symmetrical than ever. In a 1987 speech, Reimar Lüst, ESA’s then Director General, characterized the metamorphosis of the relationship between NASA and ESA as having gone through three stages: “1. Tutorship of Europe by the United States, 2. Europe as the junior partner of the United States, 3. Partnership and competition between Europe and the United States.”<sup>128</sup> This characterization, that sums up Europe’s priorities with regard to the first space power, *i.e.* to develop its own niche and keep its position of an “equal” partner, can easily be expanded to national agencies such as CNES or DLR. Today, cooperation with the U.S. still contributes to leveraging action and resources for European and national programs as demonstrated by programs such as the ISS and the future propulsion service module of the *Orion* deep-space capsule, based on ESA’s former *Automated Transfer Vehicle (ATV)*, or, to mention only France, activities like oceanography (*Jason 3*, *SWOT*), search-and-rescue (*Cospas-*

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<sup>127</sup> FRS et al., *Understanding the European Space Policy*, pp. 77-78, 81.

<sup>128</sup> Reimar Lüst, “Cooperation Between Europe and the United States in Space,” *ESA Bulletin*, N°50, pp. 98-104, at p. 99.

Sarsat), and Mars exploration (*Curiosity, InSight, Mars 2020*).<sup>129</sup> In the face of the shift occurring in the United States usually referred to as the “new space” movement – the multiple private-sector initiatives in launching, Earth observation and telecommunications that have found investors on the other side of the Atlantic –, though, maintaining the independence of Europe’s space technological and industrial base necessary to be recognized as a key actor might well prove more difficult than anticipated. To date, the strategy adopted has been two-fold: innovation and emulation at all levels – hence *Ariane 6* which was decided because it provided the best solution against SpaceX – and careful monitoring going as far as active participation in the case of CNES’s recent agreement to work with Google.<sup>130</sup>

Considering Russia, the situation is much more ambiguous. The country, with which cooperation has significantly grown over the last decades, culminating in the launch, starting in 2011, of *Soyuz* from Europe’s Spaceport in French Guiana, is indeed, still today, Europe’s first partner in its efforts to ensure long-term access to space. The creation with Starsem, in 1996, of a company dedicated to providing commercial launch services with the reliable and proven *Soyuz* family of launch vehicles, associating the Samara Space Center and the Russian Space Agency with ex-Astrium and Arianespace, was actually critical in ending the dangerous Russian-American quasi-exclusive *tête-à-tête* of the early 1990s.<sup>131</sup> Since then, although the momentum has been kept, taking notably into account win-win situations such as in the case of ambitious joint exploration programs towards Mars (*ExoMars*) and cooperative relations with European partners in the field of satellite telecommunications where Russians are lacking state-of-the-art technologies, the development of closer ties between the two neighbors has remained at best incomplete.<sup>132</sup> One main reason for this has been a lack of responsiveness and consistency on the side of Europe due to its specific *modus operandi* spread among several actors. Russia, like other international partners, does prefer to interact bilaterally with a single European country that has clearer priorities

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<sup>129</sup> Charles Bolden and Jean-Yves Le Gall, “An Exemplary Trans-Atlantic Achievement,” *Space News*, March 17, 2014, <<http://www.spacenews.com/article/opinion/39894an-exemplary-trans-atlantic-achievement>>.

<sup>130</sup> As explained by one official, this does not mean that CNES necessarily believes in Google’s *Loon* program, only that Google and CNES might learn a lot from each other, including business models and better access to financing. Peter B. de Selding, “Europe Tired of Playing ‘Simon Says’ with SpaceX,” *Space News*, February 3, 2015, <<http://spacenews.com/european-space-officials-tired-of-playing-simon-says-with-spacex>>.

<sup>131</sup> James Oberg, *Star-Crossed Orbits: Inside the U.S.-Russian Space Alliance*, New York: McGraw-Hill, 2002.

<sup>132</sup> Charlotte Mathieu, “Assessing Russia’s Space Cooperation with China and India: Opportunities and Challenges for Europe,” *ESPI Report*, N°12, June 2008. See also Isabelle Facon and Isabelle Sourbès-Verger, “La coopération spatiale Russie-Europe, une entreprise inachevée,” *Géoéconomie*, Vol. 43, 2007, pp. 69-82.

and a more efficient decision-making process. Another might have been concerns about Russia's overall political orientations, leaving one to conclude that the modest extent of space cooperation was actually an objective indicator of the global state of affairs between Europe and Russia. Given ongoing developments over Ukraine and escalating tensions between Moscow and the West in general, it seems that no arguments would be able to rebut this feeling.

China, which has become a leading space power, involved in the full range of space activities, constitutes Europe's third strategic partner. It is true that China's current image of success in space is less a reflection of actual ambition and capabilities than an extrapolation of biased projections about the future. This being said, space technology is both seen there as a great power status marker and a very powerful source of support for a country whose main problem has been to keep up with the dramatic changes occurring within its huge territory and their impacts on the sustainability of national development, thus creating many possibilities of cooperation. China has established quite active collaborative relationships with ESA as well as the national agencies and industries of individual European states, particularly in France, Italy, Germany and the United Kingdom, all of which view China's new demanding huge market with appetite even if they still prefer to interact selectively based on synergies with their own activities. Technological developments on critical aspects and other security-related issues associated with space will continue to be a challenge for Europe's improved cooperation. As indicated by a consortium of space experts, going after Chinese growing needs remains indeed "both sensitive and essential."<sup>133</sup> To date, thus, bilateral relationships, thought likely to grow as symbolized by discussions on human spaceflight,<sup>134</sup> have been instable and uneven, based on *ad hoc* partnerships, instead of a trusting long-term strategic cooperation.<sup>135</sup>

Even if the United States, Russia and China retain more attention on the side of Europe,<sup>136</sup> they do not represent the unique opportunities of international cooperation; far from it. Riding the wave provided by globalization requires focusing on the Southeast Asia and Pacific region as a whole, which is emerging as an epicentre of global

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<sup>133</sup> FRS, et al., *Understanding the European Space Policy*, p. 82. German mixed experience is quite revealing in this regard with cooperation with China having resulted in both negative and positive outcomes, in those instances, the so-called Sino-German Joint Robotics Laboratory in 2008 and cooperation projects including experiments on life science conducted onboard the *Shenzhou 8* spaceship in 2011.

<sup>134</sup> Andy Pasztor, "China and Europe in Talks on Space Exploration Program," *Wall Street Journal*, July 17, 2014, <[www.wsj.com/articles/china-europe-in-talks-on-space-cooperation-1405592579?mod=\\_newsreel\\_3](http://www.wsj.com/articles/china-europe-in-talks-on-space-cooperation-1405592579?mod=_newsreel_3)>.

<sup>135</sup> Wolfgang Rathgeber (coord.), "China's Posture In Space: Implications for Europe," *ESPI Report*, N°3, June 2007.

<sup>136</sup> See *Agenda 2015*, pp. 54-55.

geopolitical and economic activity in the 21<sup>st</sup> century.<sup>137</sup> What is happening in India, for instance, where the Indian Space Research Organisation (ISRO) is developing advanced technologies for “low-cost” access to and use of space and planetary exploration (Mars), does not keep Europeans indifferent. This way of proceeding due to a very different engineering culture, based on ingenuity and resourcefulness, is in sharp contrast to what is currently done on the West Coast of the United States for instance, and could thus provide many lessons. Long-term cooperation through co-development, as already ambitioned by CNES, for which India represents the third largest space partner in terms of the volume of exchanges, might be one way forward.

Unlike in India, the relationship with Japan is less driven by construction of satellites or elaboration of joint missions than R&T. ESA and the Japanese Aerospace Exploration Agency (JAXA) have a long track record of cooperation but, while there have been a surprisingly large number of comparable programs and goals, there has been relatively little effort to promote Europe-Japan partnership at a governmental level as both sides have historically sought autonomous capabilities.<sup>138</sup> Japan’s recent reorganization of its space mandate and management structure, acknowledging the fruitful connectivity between space policy, security and diplomacy as space is not perceived to be used only for purposes of defense, thus paralleling similar developments in Europe, offers a compelling rationale for closer space ties.

Finally, relevant opportunities increasingly include also the development of agreements with second-tier space countries in Southeast Asia interested in operating ground stations to receive foreign satellite data, as well as operate and, in some cases, build their own spacecraft. This pattern of relationship between a senior and junior partner is promising and may actually be seen as opening a new era in the space cooperation of Europe.<sup>139</sup>

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<sup>137</sup> Jana Robinson and Fabian Evrard, “Status of Europe’s Space Cooperation with Asia,” *ESPI Perspectives*, N°61, July 2012.

<sup>138</sup> Jana Robinson, “Europe-Japan Strategic Partnership: the Space Dimension,” *ESPI Report*, N°40, April 2012.

<sup>139</sup> FRS, et al., *Understanding the European Space Policy*, p. 82.

## Conclusion

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This study has presented a series of views and analysis on the issue of the very distinctive notion of “space power” in Europe. Such an effort is deemed necessary for the European space program can seem very byzantine in its complexity to an outside observer. The mixture of national, intergovernmental and community-based entities and processes makes it a unique if not confusing object. It is a topic one cannot avoid dealing with however. Now that the space landscape is changing, one needs everyone’s good will and energy to open new possibilities for space regulation, and Europe is not placed in the worst position in this respect given its “experience as a regional collective political and institutional construction with regular and sometimes difficult discussions on the balance between national and collective interests.”<sup>140</sup> On the whole, the method applied throughout the pages of this report has been the following: 1) to contribute to reflections on the (too often forgotten) question of “why” Europe has a space program and on the basis of what (more or less matured) vision(s) it is based, considering that some, if not all, the individual ESA and EU member states are still in the process of understanding the many challenges and opportunities potentially offered by the use of space assets for national objectives and goals and that, as a result, inconsistency might appear more often than not; 2) to study the question of “how” Europe has effectively organize itself for the implementation of its space program and promotion of its goals in the face of duplication of authority and overlapping responsibilities, especially given that in spite of everything space activities remain mostly in the hands of member states and that international cooperation (and competition) continues to suffer from the excessive fragmentation and lack of common political project.

On the whole, it is useful to reiterate some of the key opposing concepts on which Europe’s “space power” is based since their possible resolution holds the key to an important and more enduring increase in space capabilities. The three founding tensions that I mentioned in the introduction – power/puissance, unity/diversity, motivation/organization – can thus now be exposed in a more conclusive and space-tailored way.<sup>141</sup>

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<sup>140</sup> Pasco, *A European Approach to Space Security*, p. 40.

<sup>141</sup> See also Guilhem Penent, “Ariane 6 : les défis de l’accès à l’espace en Europe,” *The Europe & Space Series*, N°15, November 2014, p. 5.

The first of them focuses on the difference of position among European actors on the question of relations with the outside world. It relies on the historic refusal to let any dependency exceed a certain threshold below which the autonomy so critical to Europe's understanding of space power would be reduced to an unacceptable level. The question is of course very much timely since Europeans know well that in space nothing is irreversible. This goes well beyond the specific issue of space access, embodied most recently in *Ariane 6*, to encompass, for instance, research aiming at the achievement of independence in "strategic technologies" at a time when more than one-third of the critical satellite parts embedded in European spacecrafts are non-European.<sup>142</sup> The challenge is whether or not this logic will continue to play a role and which process will eventually decide where the cursor is placed.

The respective roles of the state and private sectors when the space industry is getting more mature and at a time of declining public funding are another factor of divergence. As in the previous case, the problem deals with an issue of appropriate policy mix. The difficulty lies in adapting space policy to different but complementary temporal dimensions given that most programmatic choices now include both short-term (commercial competitiveness and economic challenges) and more uncertain long-term (issues of sovereignty) effects and ask for both immediate reactivity and sustained and disciplined strategic thinking. How far public authorities are willing to go to support and finance an autonomous space capability when the alternative consists of increasing the dependence on the global market at the risk of paying heavily when unforeseen external developments happen such as new emerging competition, changes in rates of currency or fluctuations in demand?

The last issue deals with the expected outcomes and inevitable burden of collaboration. It turns around finding the right balance between the maintenance of national autonomy within Europe (centrifugal tendencies) and the defense of European autonomy towards the outside world (centripetal forces). Europe's preferred approach has been, at least until now, pragmatic, establishing the development of space technologies on the idea of, as named by one expert, "space strategic sufficiency," rather than a logic more American in inspiration that makes space a central element of the national strategy.<sup>143</sup> And with good reason, because as much by choice as by necessity European are only capable collectively of asserting a "presence" consistent at best with the promotion of their

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<sup>142</sup> Peter B. de Selding, "European Satellites Still Heavily Dependent on U.S. Parts," *Space News*, January 29, 2015, <<http://spacenews.com/european-satellite-still-heavily-dependent-on-u-s-parts>>. See also Jean-Jacques Tortora, "European Autonomy in Space: The Technological Dependence," in Al-Ekabi (ed.), *European Autonomy in Space*, pp. 165-172.

<sup>143</sup> Xavier Pasco, "The Transformation of Space: From Peripheral Asset to Core Capability," *The RUSI Journal*, Vol. 144, N°5, 1999, pp. 43-46.

interests and the creation of more options for themselves on the international scene, rather than explicitly directed at embodying an alternative and countering something or somebody.<sup>144</sup> How much Europe do the Europeans actually need?

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<sup>144</sup> This approach is consistent in a way with Christopher Layne's definition of "leash-slipping" in the realms of security and foreign policy. See his "The Unipolar Illusion Revisited: The Coming End of the United States' Unipolar Moment," *International Security*, Vol. 31, N°2, 2006, pp. 7-41.