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THE RELEVANCE OF THE FRANCO-GERMAN ENGINE IN THE EUROPEAN INSTITUTIONAL SPACE TRIANGLE

"To what extent will France and Germany, despite their inner differences and while evolving in an unusual three-level institutional context, be able to express their role as engines for Europe in space? "

Charles GALLAND

Under the supervision of Pr. Valérie LOZAC'H and Pr. Dr. Timm BEICHELT

Summary

The following thesis presents an analysis of the Franco-German relationship in European space policy (EUSP), a new field of European integration in the European Union in such that space has only become shared competence of the European Union with the Lisbon Treaty in 2007. The aim of this work is to verify if the common myth of the Franco-German's leading role for the EU is relevant in a scientific domain that has constructed itself outside and in parallel of the Community institutions. First, a comparison of both France and Germany, will reveal that each country is guided by different historical, strategic and economic logics when dealing with space issues. Second, the thesis suggests that, despite these differences, a Franco-German consensus within the European space triangle will have the effect to reinforce Europe as a first-order space power.

Foreword

This thesis was produced under the supervision of Pr. Valérie LOZAC'H, of the *Institut d'Études Politiques* of Strasbourg, and Pr. Dr. Timm BEICHELT, of the *Europa-Universität Viadrina* of Frankfurt (Oder). I would like to thank them for their insightful comments and encouragement, but also for the hard questions which incented me to widen my research from various perspectives.

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List of abbreviations

CERN:	European Organization for Nuclear Research
CoE:	Council of Europe
CNES:	*Centre National d'Études Spatiales*
CSG:	*Centre Spatial Guyannais*
DLR:	*Deutsches Zentrum für Luft- und Raumfahrt*
ELDO:	European Launcher Development Organisation
ESRO:	European Space Research Organisation
EU:	European Union
ESA:	European Space Agency
GMES:	Global Monitoring for Environment and Security
ISS:	International Space Station
MS:	Member States
UK:	United Kingdom of Great Britain and Northern Ireland

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INTRODUCTION

> *« Nous formons aujourd'hui avec l'Allemagne une équipe forte et soudée : à Bruxelles, avec Copernicus, Galileo et Horizon 2020 ; à l'ESA, avec les lanceurs, la Station Spatiale Internationale et les sciences ; dans nos relations bilatérales, avec la lutte contre le changement climatique et Merlin. C'est la clé du succès lorsqu'il s'agit de construire les programmes spatiaux de l'avenir. » (*le Gall, Jean-Yves. 2016)

France and Germany maintain today a strong partnership in the field of space. In June 2nd 2016 at the "*Internationale Luft- und Raumfahrtausstellung"* in Berlin, the biennial German exhibition dedicated to aeronautics, they have agreed on a new framework on bilateral cooperation through the French space agency, the "*Centre National d'Etudes Spatiales" (CNES)* and the German one, the "*Deutsches Zentrum für Luft- und Raumfahrt" (DLR).* On this occasion Jean-Yves le Gall, President of the CNES since 2013, recalled that the two countries are privileged partners for Europe in space, both at a bilateral level but also within the European Space Agency (ESA) and the European Union (EU).[1]

Europe in space is not to be confused with the European Union's space policy. Thus, the organization of Europe in space is such that the EU has only played its institutional role since 2007, with the Lisbon Treaty, which gave the European institution a shared competence in space, with its Member States. Nevertheless, in the last few years, the increasing power of the EU on space issues, to the detriment of the European Space Agency, testifies from a new paradigm developed by the institution. For Jean-Yves le Gall, the European Union has gradually become the main driving force behind Europe in space, alongside the European Space Agency and the Member States. This momentum culminated in the adoption of a space strategy for Europe by the European Commission in October 2016 [2], an area so far reserved for the ESA. As a consequence, Europe in space, at a policy level, is organized around three main poles officially including since 2007 the European Union, the European Space Agency, but also the Member States of the EU. It is therefore within this institutional triangle that the Franco-German cooperation will be expressed, making Donato Giorgi, Head of the European and International Relations to the French Space Agency, considering that the ESA brings by its technical expertise and its ability to successfully manage major research and development

[1] Speech of Jean-Yves Le Gall, President of the CNES, 2 June 2016.
[2] European Commission, Space Strategy for Europe, COM(2016) 705 final, 26 October 2016.

programmes; that the European Commission, on the other hand, brings by a political and strategic dimension and the potential to federate the needs in Europe over the long term; and that bilateral cooperation between national agencies is necessary to meet specific needs and to develop skills that would otherwise not be available elsewhere[3]. Finally, there can be no space in Europe without a strong European space industry, guarantor of Europe's independence.

The field of space has therefore both an industrial and a geostrategic dimension. Indeed, if one recalls the origin of space research, it was above all motivated for military reasons. Nazi Germany during the Second Word War, by developing the V1 and V2 ballistic missiles, laid the foundations of the space age and, after the war, many German scientists were looked for and helped the USA, the USSR and some other countries to develop their space capabilities. It is also an area which encourages cooperation between the countries, for several reasons, varying from country to country. Indeed, we can identify four main reasons for cooperation regarding space: international cooperation reduces overall budget efforts, generates diplomatic prestige, increases political sustainability, and enables workforce stability[4]. Moreover, as acknowledged by the former President of the European Commission, José Manuel Durão Barroso, in his opening speech of "*The Ambitions of Europe in Space*" Conference on October 15th and 16th 2009, "*space is an enabling tool allowing Europe to face some fundamental challenges: fighting the economic crisis, ensuring the well-being of our citizens, tackling climate change, finding ways to unleash our full potential for innovation and job creation, and to bring about a true knowledge society, as well as reinforcing Europe's position in the world scene*." He also highlighted the *"useful role played by space in invigorating European competitiveness and economic growth*".[5] It is worth mentioning that space economic activities in Europe was generally almost not affected by the recent world crisis so far leading to stability or growth in budgets and business intake. For Yannick D'Escatha, President of the French Space Agency from 2003 to 2013, space in Europe has a strong return on investment, thanks to four particularly important leverage

[3] CNES, "Coopération, une ambition mondiale", CNES Magazine 68, 25 May 2016.
[4] D.A BRONIATOWSKI,"The Case for Managed International Cooperation in Space Exploration", *Center for Strategic and International Studies*, 2006, p.2.
[5] Speech of José Manuel Barroso, President of the European Commission, 15 October 2009.

effects on the economy, the industry, science and on the society.[6] As a consequence, it gives to Europe's identity and action a strong visibility across the continent.

This propensity to cooperate in the space field can be illustrated with a significant example proving that, despite deep ideological differences on many fields, two or more states can join forces. Thus, amid the Cold War conflict and despite the space race, the US and Russia have maintained scientific ties and launched joint projects. The Soviet-American "*Agreement on Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes*"[7] from May 24th 1972, which provides, inter alia, for a US-Soviet space flight in 1975 and which opens the way for a wide spectrum of space activities to be carried out in cooperation, is one of the most significant examples. In Europe too, space cooperation quickly made sense. Thus, in reaction to the Soviet and American successes in the field, Europeans have developed since the 1960s their own ambitions linked to two major events.

In fact, in 1957, as part of the International Geophysical Year (IGY), the Soviet Union launched the space race with its first artificial Earth satellite called Sputnik 1. With this event the issue of space and its use became a priority for the states because of its new strategic dimension. At the same time, as part of the European Organization for Nuclear Research (CERN) experiment and on the proposal of the Italian and French physicists Edoardo Amaldi and Pierre Auger, the idea of the possibility of European cooperation in sectors hitherto prohibited to common European actions, especially for resources reasons, emerged. In 1960 in Nice, the first meeting of the Committee on Space Research (COSPAR) was held with the aim of further developing the process of all kinds of scientific investigations which were carried out with the use of rockets or rocket-propelled vehicles. In his report entitled "*Space Research in Europe*" Edoardo Amaldi proposed the creation of a European space organization.[8]

As a result, in 1963, three European intergovernmental organizations were created: the European Launcher Development Organisation, (ELDO), the European Satellite Research

[6] Y. D'ESCATHA. « La place du CNES dans le paysage spatial international », *Géoéconomie*, vol. 61, no. 2, 2012, pp. 31-38.
[7] "United States of America and Union of Soviet Socialist Republics Agreement concerning cooperation in the exploration and use of outer space for peaceful purposes. Signed at Moscow on 24 May 1972, n°12115."
[8] F. PIGLIACELLI, « Le rôle du tandem franco-allemand dans la coopération spatiale européenne 1957-1973 », in « La construction d'un espace scientifique commun ? - La France, la RFA et l'Europe après le "choc du Spoutnik" », 2012, pp. 249-267.

Organization (ESRO), and the European Conference on Satellite Communications (CETS).[9] They all aimed to promote the development of launchers and satellites for scientific and operational purposes. However, the failure of both organisations and particularly the "EUROPA" launcher has proved to be a chance for Europe's independence in space and the Franco-German partnership. Indeed, at the beginning of the 1960s, both countries have started to put in place a communication satellites' programme called "*Symphonie*" which represented an important technological breakthrough. These satellites were to be launched by "EUROPA", the first European launcher programme which prefigured Ariane but ended in failure in the late 1960s. The Americans, who had their own launcher, agreed to launch "*Symphonie"* but for a considerable amount of money and by demanding Europe that these satellites would have no operational utility, to the extent that they compete with theirs. As a result, the "*Symphonie*" satellites were therefore only used for scientific demonstrations and tests, and the need for an autonomous access to space for Europe was demonstrated.

Today France and Germany amount to the two biggest European countries regarding space issues. Their action in this technological field is institutionalized within a triangle composed of the European Union, the European Space Agency, and at the bilateral level.[10] Both countries, when dealing with space issues, are motivated by different objectives and constraints, mainly inherited from their past and from their inner economic traditions. Moreover, they seem to pursue different logics and do not share the same vision of how space should be considered, particularly on the launcher issue. As a result, they will often oppose on major European space programmes. However, today, Europe is mainly a first-order space power thanks to the influence of the French-German couple. Indeed, as it is often the case for other political fields within the European Union, France and Germany will play the role of engines for every other country which is constituent of the European space architecture. In fact, the multiplication of meetings at all levels of government between representatives of both countries and the search for compromises, intrinsic characteristic of the Franco-German couple, will prove to be crucial in the justification of this leading role for the European space sector.

[9] F. GERARD, M. GOLAY, « L'homme et l'espace », Banque Nationale de Paris, 1972, p. 98.
[10] Y. D'ESCATHA, *op.cit*, p. 31.

To what extent will France and Germany, despite their inner differences and while evolving in an unusual three-level institutional space context, be able to express their role as engines for Europe in space?

In a first part, it will be demonstrated that the histories of both countries will play an influential role in the way space has been institutionalised. While in France the influence of Charles de Gaulle will be determinant in the manner France links space, first and foremost, with geostrategic issues; in Germany, the heritage of the Nazi past will have the effect to put science and research at the very centre of the picture. Moreover, this heritage will also be expressed in the very last versions of France and Germany's national space strategies. Finally, despite these differences of paradigms, France and Germany do successfully put in place common programmes within the same institutional context composed of the European Space Agency, the European Union, and at the bilateral level.

In a second part, the success of Europe in space, mainly driven by France and Germany, will be reminiscent of the common idea of a Franco-German engine, in other fields, within the European Union. Indeed, parallels can be drawn between mechanisms from the Franco-German couple in the EU and within the European space sector. Indeed, critical programmes are mostly implemented after deep negotiations and compromises. However, the singular European space institutional context in which both countries evolve, will make these mechanisms unique. Finally, with the late emergence of the European Union as a main actor in Europe in space, it will be shown in which way France and Germany could see, or not, their leader status changing.

This paper takes only takes into account the institutional part of Europe in space setting aside the industrial aspect, in which France and Germany's private companies like Airbus are leading the European market.

1. France and Germany in the European space field: two countries marked by different histories and priorities, but which evolve within the same space institutional triangle.

1.1 The institutionalisation of space for both countries has been driven by different historical, political and structural logics, mainly inherited from the Post-war period.

It is not a matter of detailing here a complete and precise history of the construction of both French and German space policies, but of seeing, in the light of the historical events and contexts, what are the major trends which may explain the commonalities and the differences that exist between the two countries' actual space strategies and which could testify from the fact that, besides differences, Europe in space is working in greater part because of both countries. In this way, in each country, one event or series of event will assess and testify in which way France and Germany put an emphasis on one or more domain in their respective space policies. Whereas in France, this major turning point is related to the will of Charles de Gaulle to put France on the map alongside the USA and USSR; in Germany, the souvenir of *Peenemünde*, the country's version of the Sputnik shock, acted as an occasion to favour industry and scientific research.

1.1.1 In France, a Gaullist origin for an independent access to space for France and Europe.

One should remember the historical context in which Europe was at the end of the Second World War. The Axis was defeated and progressively an Eastern and a Western block competed for supremacy in nuclear warfare, where the access to space was of crucial importance. In this concert of nations, the birth of the French space policy is consecutive to

the election of General Charles de Gaulle as President of the country in 1958. Indeed, at the time, French defence was already beginning its searches on launchers' technology, particularly with its liquid-fuelled sounding rocket "*Véronique N*" successfully launched on May 22nd 1952 from Hammaguir in the Algerian Sahara Desert[11]. They also had, in cooperation with Germany, developed the telecommunication satellite "*Symphonie*" and, because they didn't master yet the launcher's technology, asked the Americans if they could launch it, to which they refused. With this refusal and failure of the negotiations between both countries, France, under the aegis of de Gaulle intended to become independent from the USA and the USSR by developing its own access to space. It embodied in his eyes an act of independence, but also a feeling of grandeur[12]; France was on the verge of mastering a set of technologies placing the country on the same level as the two superpowers.[13]

It was thus between the years 1959 and 1964 that everything was going to play out for France, making Jérome Penez describing it as a key period for the country's history with the creation of a good number of new institutions, under de Gaulle, dedicated to science and space.[14] Indeed, in this new strategic area with geopolitical and commercial prospects, the government of General de Gaulle considered it essential to ensure French presence in international debates, whether scientific or political. To this end, de Gaulle reorganized French science with the view that, by bringing the government and science closer, it would contribute to the power of the state.[15] In this way, he proposed in 1958 the creation of the "Inter-ministerial committee for scientific research" (*Comité interministériel de la recherche scientifique*), assisted by an "Advisory Committee on Scientific and Technical Research" (*Comité consultatif de la recherche scientifique et technique, CCRST*), composed of twelve scientific personalities (known as the twelve "*sages*"), who relied on a single structure, the "Delegate-General to Scientific and Technical Research" (*Délégué général à la recherche scientifique et technique, DGRST*)[16]. As a result, with this new structure, researches on space deeply increased[17] and on January 7th 1959, the "Committee on Space Research" (*Comité de*

[11] H. MOULIN, « La France dans l'Espace 1959-1979 – Contribution à l'effort spatial européen », *European Space Agency*, June 2006, p.5
[12] J. LAMY, « Grandeur scientifique et politiques de l'espace : la création et le transfert du CNES (1958-1974) », *Revue d'histoire moderne et contemporaine*, vol. 58-1, no. 1, 2011, pp. 156-177.
[13] P. VARNOTEAUX, « La naissance de la politique spatiale française », *Vingtième Siècle. Revue d'histoire*, vol. nº 77, no. 1, 2003, pp. 59-68.
[14] J. PENEZ. « L'essor de la politique spatiale française (1959-1964) », *Vingtième Siècle, Revue d'histoire*, vol n°50, avril-juin 1996. pp. 132-136.
[15] *Ibid.*
[16] G. RAMUNNI, « Le CNRS au temps de Charles de Gaulle », *La revue pour l'histoire du CNRS*, 1999.
[17] H. MOULIN, *op. cit.,* p.23

Recherches Spatiales, CRS) was set up, under the impulsion of Pierre Auger, to coordinate French space activities.[18] Moreover, it was created in order to draw up a report on the French situation and to propose to the Government a national space research programme. As a result, a six-year programme was proposed to the government on April 8th 1959 which includes four main lines of research: aeronomy and astrophysics, hertzian and infrared waves in the upper atmosphere, high energy radiation, and biological studies on living conditions in spacecraft.[19]

In the same year, the aerospace industry created the "Society for the Study and the realization of ballistic missiles" (*Société d'étude et de réalisation d'engins balistiques, SEREB*), a private company financed by the French Ministry of Defense, which played the role of prime contractor in the realization of the nuclear weapon and whose military achievements led to the "*Diamant*" launcher (component of the "*Pierres Précieuses"* programme), the first French space launch vehicle. On December 19th 1961, a small committee, chaired by General de Gaulle took the decision to create the "French National Centre for Space Studies" (*Centre National d'Etudes Spatiales, CNES*), the French Space Agency, with the objective to put France at the same level as the USA and USSR. Indeed, in charge of coordinating all the space activities of the country, this organization aimed mainly to convince the French not to be left behind by the Americans and the Soviets. The quite simultaneous creation of these two organizations, one more scientific and the other more technical and in relation to the military field, testifies to the originality of the French paradigm in the definition of a national space policy whose objectives are all set at the same level without pre-eminence from each other. This date marked the beginning of the French space policy which led on November 26th 1965 to the launch of "*Asterix"*, the first French artificial satellite, with the help of the "*Diamant"* launcher. With this successful launch, France opened up the access to space and demonstrated to the world its ability to master advanced scientific techniques. From a political point of view, this success confirmed that, to ensure its independence, France was ready to acquire the necessary scientific, technical, industrial, human and financial resources.[20]

As a result, the mastery of space has been from the start one of the great French ambitions. In the 1950s and 1960s, space appeared under the impulsion of Charles de Gaulle. Indeed, space was at the same time the means and the symbol of the French strategic

[18] *Ibid.*
[19] *Ibid.*
[20] *Ibid.*

independence: the means, because the technologies of the launchers constituted a key to the French deterrence vis-à-vis the USA and the USSR; the symbol, because the space effort allowed French presence on a crucial segment of the highest technologies and affirmed the vitality of French research.[21] Space is therefore a policy of power.[22]It is especially in this view that France, allied with its European counterparts (Belgium, United Kingdom, Germany, Italy, The Netherlands and Australia as an associate member), decided in 1963 to develop the European launcher "EUROPA", allowing these countries to have their own launch capabilities.

1.1.2 In Germany, the necessity to go beyond the memory of *"Peenemünde"* was the key to the country's space future.

In Germany, the historical logics behind the actual space strategy are different from France on many levels. Nevertheless, the deep origins are also related to military and defence reasons. Indeed, three years after Hitler's appointment as *Reichkanzler* on January 30th 1933, an ultramodern research and development centre, which was funded both by the army and by the *Luftwaffe*, the German air force, was built in Peenemünde on the island of Usedom, on the Baltic Sea. This new centre participated to the development of rockets as the rearmament objective of the German Reich. Wernher von Braun, a scientist who, during his youth, joined a group of astronautically enthusiasts, the *Verein für Raumschiffahrt*, to develop experimental small rockets, was appointed technical director of the Peenemünde test centre. As a result, between 1939 and 1942, his team developed the A4 rocket (*Aggregat 4*), later dubbed V2 (V stands for *Vergewaltungswaffe*, which means retaliation weapon). Under the supervision of Walter Domberger, a German army officer at the head of the rocket programme at Pennemünde, the A4 was the first rocket to break the sonic barrier and the first manmade object to penetrate into space, marking the beginning of the space age[23]. In Domberger's book entitled "*V-2: The Inside Story of Hitler's "Secret Weapon" - and the Men and Events Behind it - That Almost Changed the Course of History*" published in 1954, he shared his

[21] L. NARDON, « Où va le programme spatial français ? », *Politique étrangère*, vol. Eté, no. 2, 2007, pp. 293-305.
[22] F. AUTRET, « Quelle organisation pour l'Europe spatiale ? », *Politique étrangère*, vol. Été, no. 2, 2007, pp. 281-292.
[23] N. REINKE, « Geschichte der deutschen Raumfahrt », *DLR*, May 2010, p.12.

view that in Peenemünde, the team of scientists, technicians and specialists "*have led the present generation on the threshold of space [...] the path of the stars is now open to them".*[24]

After the war, most of the German scientists who were working in Peenemünde conducted their research within the framework of the winning countries' programmes (especially for the USA and the USSR, which could explain the later successes of both countries in the space race). As a concrete example, seventy jet propulsion experts participated to the French liquid-fuelled sounding rocket project "*Véronique N*". Few of them were also later involved in the "*Pierres Précieuses"* programme. Dr. Niklas Reinke, actual head of the DLR's Tokyo's office reports in the DLR document "*Geschichte der deutschen Raumfahrt- History of German Space Flight*" recognizes that all the investment made in Peenemünde has been proved almost worthless for the Reich itself, and has benefited the winning countries on two levels*: "while they sought to acquire practical experience and mastery of German technology with a view to deriving military applications from further development of the A4, they were also increasingly aware that the rocket, as a launcher, provided the ideal means of studying the little-researched upper atmosphere and near-Earth space. Thus, rather than success on the battlefield, the actual effect of the German rocket program on the Allies was to instigate a specific form of rivalry between them".*[25]

Nevertheless, there were several scientists from the Peenemünde team who remained in West Germany and who followed their researches in independent and private circles providing for Germany's jet propulsion research a certain form of continuity. In this context, one must recognize the major role of space societies in the German space sector. In 1947, the "Society for Space Research" (*Gesellschaft für Weltraumforschung, GfW*) was created from a group of students from the Technical Academy of Stuttgart deeply interested in rocket development. From just a small regional society, it soon started to develop its competencies by the publication of two technical journals, books and reports. The main goal of the GfW was to rehabilitate rocket research in Germany, but exclusively for peaceful purposes, due to the heritage of Peenemünde which was still present in the mentalities. Two years later, the GfW helped to the founding of the "International Astronautical Federation" (*Internationalen Astronautischen Föderation, IAF*) and the organization of the "International Astronautical Congress" which met for the first time in 1950, and in 1952 in Stuttgart.

[24] W. DORMBERGER, "V-2 The Inside Story of Hitler's "Secret Weapon" - and the Men and Events Behind it - That Almost Changed the Course of History", 1954, p.152.
[25] N. REINKE, *op. cit*., p. 26.

Peenemünde can thus be considered as the German version of the Sputnik shock, making Dr. Niklas Reinke reckoned that "*the way ahead [for Germany] was much more difficult, not least psychologically. Peenemünde weighed heavily on their minds. As the symbol of one of Germany's many historic responsibilities, it subliminally conditioned all the thinking of politicians, scientists and industrialists about new national space ventures and German involvement in high technology in general."*[26]

When the Bonn-Paris conventions were signed in May 1952 and came into force after the 1955 ratification, the Allied occupation of West Germany came into an end. On a political and scientific point of view, one positive point resulted: the political sphere could now support, through government-funded programs, the implementation of nationally-based space projects undertaken by German scientists. The German scientific community has thus played the leading role in the institutionalization of space in Germany by creating even more research institutes dedicated to space research, finally leading to a German Space Agency.

First President of the IAF, Eugen Sänger persuaded the German Federal Ministry of Transport to promote rocket research in the country. As a result, in 1954 opened at the Stuttgart Technical College the first official facility dedicated to rocker research, the "Research Institute for Jet Propulsion" (*Forschungsinstitut für Physik der Strahlantriebe, FPS*).[27] Financially supported by the *Land* of Baden-Württemberg, it concentrated mainly on arms research with a high participation of the industry. In 1958, the FPS got closer to the German Society for Aeronautics (*DFL*), created in 1936, dismantled during the Second World War and recreated in 1953 in Braunschweig, Lower Saxony.[28] On April 1st 1969, several scientific societies such as the *Aerodynamische Versuchsanstalt Göttingen* (AVA), the *Deutsche Versuchsanstalt für Luft- und Raumfahrt* (*DVL*) of Cologne and the *Deutsche Forschungsanstalt für Luft- und Raumfahrt Braunschweig (DFL)* merge to give birth to the ancestor of the DLR, the "German Test and Research Institute for Aviation and Space Flight" (*Deutschen Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, DFVLR*) located in Cologne, North-Rhine-Westphalia. In 1972, it was joined by the GfW and took the name of the DLR in 1989.

The institutionalization of space in Germany has therefore followed quite a different trajectory from that in France. It was not initially carried by a man of power like De Gaulle

[26] *Ibid.,* p. 27.
[27] *Ibid.,* p. 29.
[28] DLR, "100 Jahre Luftfahrtforschung", *dlr.de*, 15 January 2007

for France, but rather by a common will of German scientists. To go beyond the memory of Peenemünde and thus break with the use of launchers motivated by military purposes was the key to enable the country to assert itself on the world stage, as evidenced by the launch in 1969 of the first German research satellite called "*Azur*". With this launch from Vandenberg in California, Germany joined those states which already had their own satellites, among them France. As a result, "*twenty-five years after the termination of the Peenemünde project, Germany was represented in space by an object of its own which this time served a purpose that was peaceful and purely scientific.*"[29] This importance granted to science in Germany is, as confirmed by Jean-François Dupuis, Counsellor for space issues at the French Embassy to Germany, stronger than in France. Moreover, the fact that the excellent cooperation between the two States' space agencies, namely the CNES and the DLR, is due to the fact that they are really complementary. Indeed, the DLR is more scientific-oriented than the CNES, which must rely on scientific skills from other institutes such as the French National Centre for Scientific Research (*Centre national de la recherche scientifique, CNRS*). As a result, the DLR has a real scientific know-how with its own scientists while the CNES employs a majority of engineers and project managers.

On the other hand, and as a conclusion, we must also consider the case of East Germany, which, after the war, also faced a ban on aerospace research. Under the communist yoke, the country took more time than its western counterpart to recover, since it was almost entirely devolved to the USSR. As already said, while several German scientists conducted their research within the framework of the USSR a "*substantial portion of the potential resources for astronautics also became part of the Soviet capability. Paradoxically, it is exactly this path of loyalty that held back the opportunities for science in the GDR in the long term, as the country was entirely dependent on the policies of the Big Brother*".[30] It is therefore with these two heritages that space has built itself over the years in Germany, making the country one of the biggest space powers in Europe and the world.

[29] N. REINKE, *Op. cit*., p. 35
[30] *Ibid,* p. 44.

1.2 France and Germany's space strategies: differences of paradigms and priorities.

The legacy of these national historic constructions is strongly marked in todays' space strategies of the two countries. A country's national space strategy can be defined as the policy directions for the conduct of the government's civil, military and national security space programmes[31]. As Graham Gibbs, former Representative for the Canadian Space Agency (CAS) in Washington D.C, lists in his "*Analysis of space policies of the major space faring nations and selected emerging space faring nations*", a national space policy is implemented to clarify: 1. The roles and responsibilities of the government departments with a stake in the nation's space sector including their inter-relationships ; 2. The government's position on the conduct of its space programme ; 3. The government's position on space activities as they relate to national security, sovereignty, foreign policy, international cooperation and similar matters ; 4. The government's civil, military and intelligence space priorities ; 5. Policy directions for government departments, support of and relationships with, the commercial, research and education sectors.[32] Thus, while in Germany the role of the industry is predominant, for France, the autonomy in its access to space is an essential component of its national space strategy. Regarding their programme for space in Europe, both countries seem to have different inner priorities.

[31] G. GIBBS, "An Analysis of the Space Policies of the Major Space Faring Nations and Selected Emerging Space Faring Nations", *Annals of Air and Space Law Vol XXXVI*, 2012, p. 282.
[32] *Ibid,*

1.2.1 Germany's 2010 space strategy and its implementation by the German Space Agency, the DLR.

1.2.1.1 An economic oriented strategy aiming at making Germany's space industry prosperous.

The first official space strategy of Germany since 1980 was drafted under the government of Gerhard Schröder in 2001. Published by the Federal Ministry of Education and Research (*Bundesministerium für Bildung und Forschung, BMBF*), the strategy was organized around four objectives, mainly: "Aerospace - Focusing on the advantages and the needs" ("*Raumfahrt- Fokussierung auf Nutzen und Bedarf*"), "Space and Europe - Building the forces" ("*Raumfahrt und Europa - Bundelung der Kräfte*"), "Space globally - Cooperation and competition" ("*Raumfahrt global - Kooperation und Wettbewerb*"), and "More space by increasing efficiency" ("*Mehr Raumfahrt durch Steigerung der Effizienz*"). The Federal Minister of Education and Research of the time, Edelgard Bulmahn, presented the German space program as providing "*the basis and the understanding of the increasing application of space technology in the various industrial and political areas. It shows the framework to strengthen the performance of European research and business through the deployment of space in cooperation with the European partners, thus making Europe competitive across the other major economic regions of the world*"[33]

But the new CDU/CSU-FDP coalition, which came into power in September 2009, wanted to reinvigorate space activity with clear objectives for Germany's innovation capacity. Indeed, it is necessary to know that the space budget is counted in that of the "High-Tech Strategy" of 2006 which follows the "Agenda 2010", a series of reform undertaken by the Gerhard Schröder government, and aims to support growth through competitiveness and innovation for a probationary period of four years. Because of its success (increase in R&D investment by the industry: increase of 19% between 2005 and 2009; increase in the number of researchers in the industry; rate of R&D expenditure reaching 2.7% of GDP in 2008)[34], the

[33] BMBF, "Deutsches Raumfahrtprogramm", *BMBF Publik*, May 2001, p.2.
[34] This chapter mainly relies on data and piece of information collected on unpublished working documents personally given for this work by the Space Counsellor to the French Embassy in Germany

federal government formalized the "High-Tech 2020 Strategy"[35]. The strategy is translated into an additional six billion euros added to the German research budget. It was also accompanied by a 19% increase in the companies' research budget and a 5% increase in private researchers. The aim is therefore to mobilize the industry, the *Länder* but also research organizations in favour of the economy.

The German government has therefore revised its 2001 space strategy with the introduction in 2010 of its new component entitled "For a German space future – the space strategy of the federal Government" ("*Für eine zukunftsfähige deutsche Raumfahrt – Die Raumfahrtstrategie der Bundesregierung"*) this time issued by the Federal Ministry for Economic Affairs and Energy (*Bundesministerium für Wirtschaft und Energie, BMWi*). The *BMWi* is responsible for the development of the space policy in accordance with the orientations of the Chancellery. Moreover, it takes charge of the overall responsibility for the implementation of the space program.

It emphasizes the growing importance of space in the everyday life of the society, and especially in the economy. Indeed, the more liberal orientation of Germany brought by the FDP liberal political party has strengthened in Germany the economic vision of space. The second element is the consideration of a more international space with the question of the good balance between competition and cooperation. The third element of the strategy is the need to regulate space in accordance with international rules because of the strengthening of the private sector in space. Finally, and of course, the importance given to spatial optimization to answer global questions such as environment or security. With the new CDU-SPD coalition, which came into power on September 22nd 2013, the government's space strategy remained in place.

The German space strategy must address three issues:

i. Explore space for the cause of the Earth according to two criteria: responding to global challenges and proposing economically cost-effective space projects. In this sense, space is competing with other scientific disciplines;
ii. Consider the sustainability of space products: secure management of space networks, including control of space wastes;
iii. Increase international cooperation due to the cost and complexity of space projects while preserving Germany's commercial interests.

[35] French Embassy in Germany, « Stratégie High-Tech 2020 », *science-Allemagne.fr*, 5 February 2016

To this end, eight main priorities can be identified:

i. Develop strategic skills by focusing on national know-how for key technologies. This is the case for Earth observation, including radar remote sensing, satellite navigation by laser, navigation with the commercialization of the use of Galileo, and robotics, a transverse technology that is very present in the basic industry in Germany;
ii. Space research, which opens new opportunities for basic research stimulating innovation and technology transfer;
iii. Trade with support for space applications: the objective is to create new value chains and to enhance the public-private partnership. The aim is to strengthen Germany's share in the overall turnover of the aerospace sector;
iv. Propose a homogeneous legal framework for the private use of the space sector regarding the example of the French space law voted by the French Parliament on May 22nd 2008. The idea is to avoid the production of new space wastes with a European slogan "Security in space to ensure security coming from space";
v. The notion of security in the dual sense is quite new in Germany and this cross-cutting theme is now a full-fledged mission of the DLR, the German Space Agency. The analysis is as follows: the security of the country is linked to the proper functioning of the space infrastructures to be protected. In addition, Germany's strategic choices depend on its ability to anticipate emergency situations. It will therefore be necessary to master, in "*Standort Deutschland*" (understand Germany-based activities), the key technologies in the field of dual space systems;
vi. The Lisbon Treaty gives the EU a shared competence with the Member States in the space field. The objective is to enhance the competence (technical and financial) of each of the European partners (ESA, EU, Member States);
vii. Space exploration is naturally an area of international cooperation. Germany places emphasis on the International Space Station (ISS) as a precursor to exploration.
viii. Finally, the eighth priority concerns technological independence for the access to space, which must be the least expensive possible. Germany proposes to open up to international cooperation the allocation of competences for the access to space while promoting the availability in Europe of critical components.

As a conclusion, the German space strategy is clearly economic oriented, in accordance with the High-tech strategy, and with the view to strengthen the competitiveness of its space industry and lead the participation in new markets with high added value. A very significant

sentence in the document produced by the German Federal Ministry for Economic Affairs and Energy confirms this objective: *"Germany is the second largest European country for space issues; to be satisfied with the second rank is not enough, one must consider this ranking as a source of motivation"*[36]. Moreover, the new High-Tech strategy 2020, which is in line with the 2006 strategy, recalls and justifies this economic-oriented dimension of space for Germany: indeed, "*space technology plays an important strategic role in German industry. It is a leader in the development and testing of new technologies, and it affects other industrial sectors, as an innovation driver, via technology transfer. For this reason, the Federal Government is funding innovative applications in space research and is working to boost the competitiveness of the German space industry*."[37]

Lastly, it is important to note that from the point of view of the overall German economy, the relatively small number of jobs in the space sector relative to high investments (in 2015, the public expenditure was about 1.46 billion euros, and the expenditure of the industry accounted to 2.5 billion euros) plays against the development of space activity, which is being competed with other economic sectors (especially aeronautics and the automobile industry), with much more significant job creation prospects. However, space has positive indirect effects on a broad range of economic efforts.

Nevertheless, relating to the reconstruction's process of scientific and industrial fabrics in the "new *Länder*" (formerly the eastern *Länder*), the government, in conjunction with the relevant ones (Berlin, Brandenburg and Saxony) aims to create a scientific and industrial activity in the aerospace sector.

1.2.1.2 Germany's priorities for Europe.

Regarding Europe, the sixth priority of the strategy (as a reminder: *vi. enhance the competence - technical and financial - of each of the European partners - ESA, EU, Member States*), unveils the three German objectives in this area.

[36] BMWi, "Für eine zukunftsfähige deutsche Raumfahrt- Die Raumfahrtstrategie der Bundesregierung", 2010, p. 3.
[37] BMBF, "The new High-Tech Strategy Innovations for Germany", August 2014, p.36.

First, and as the largest economy and largest contributor in the European Union, Germany wants to play a major role in shaping the EU's role on the basis of the Lisbon Treaty. Particularly, the country will help being the guarantor of the clear limitation of the tasks in accordance with the principles of subsidiarity and complementarity. As follows, the avoidance of work and structures duplication, and the creation of appropriate financing and award procedures adapted to the specific characteristics of the space sector will be safeguarded. Moreover, the completion and the continuous operation of Galileo and GMES have top priority. As a reminder, Galileo, considered as the "European GPS", is a satellite constellation aiming to provide accurate positioning and timing information. The deployment of the entire Galileo constellation was entrusted to Arianespace, the world's leading satellite launch company, by the European Commission and the European Space Agency. It began in 2005 and 2007 with the launch of Giove-A and Giove-B.[38] GMES stands for Global Monitoring for Environment and Security but is well known under the name of the Copernicus programme. Also implemented by the European Commission in partnership with the European Space Agency, it aims to "*provide accurate, timely and easily accessible information to improve the management of the environment, understand and mitigate the effects of climate change and ensure civil security.*"[39]

Second, Germany aims to continue to work hard to strengthen the European Space Agency as an independent, intergovernmental organisation. Since its creation in 1957, the ESA has many years of management and coordination experience and proven instruments for carrying out complex and challenging space projects. As a result, the Agency remains to the eyes of Germany as the priority actor for European space policy and cooperation, even after the entry into force of the Lisbon Treaty and the growing role of the European Union in the space field. Moreover, ESA is considered as a lively and growing organization even after thirty-five years of successful work. Its continuous development, with regard to voting rights, the reform of its financial system and its programmatic focus, remains to Germany an important task for which the country actively and constructively contributes. The country also shares the view that it should open to further Member States.

Third, Germany puts an emphasis on the good representativeness of its officials. Indeed, participation in European space also means that Germany is adequately represented in the European institutions by qualified employees at all levels, especially in management circles.

[38] Arianespace, "Communiqué de presse : Arianespace, Galileo et GMES", *arianespace.com*, 2 May 2015
[39] ESA, "Copernicus", *esa.int*.

As a result, Germany will also continue to support the optimization of the share of German representatives in all European structures. Moreover, this goal also concerns the industry, which is called upon to ensure a balanced relationship between the participating nations when filling management positions in European companies.[40]

Not mentioned in the objectives directly regarding Europe in space, the autonomy in its access to space is briefly mentioned in the eighth priority of the overall strategy. Indeed, it recalls that the unimpeded access to space is an essential element of Europe's political sovereignty. As a consequence, Germany does everything in its power to develop and explore ways to give Europe this possibility as cost-effectively as possible. The main focus for Germany therefore lays in the system competency for the upper stage of the Ariane 5 launcher in order to keep Ariane 5 internationally competitive and to achieve a high added value to the country. However, without calling into question the idea of independence, the strategy opens the gate to cooperation with the United States on this field.[41]

1.2.1.3 Implementation by the DLR of the German's space strategy.

The German Aerospace Center (*Deutsches Zentrum für Luft- und Raumfahrt, DLR*) is one of the eighteen major research organizations of the "Helmholtz Association of German Research Centres" (*Helmholtz-Gemeinschaft Deutscher Forschungszentren, HGF*), the largest German scientific association, under the authority of the Federal Ministry of Education and Research, to support Germany's position in the major fields of research (health, environment, energy, aerospace, major scientific research infrastructures, mobility, security etc.). The DLR is composed of thirty-five research institutes in sixteen geographical locations. In 2015, the agency's research and operations budget amounted to 888 million euros, of which 51% was acquired as part of income of the DLR. Moreover, the budget dedicated by the Germany to space issues had a volume of 1357 million euros, among which 66% accounted for the German contribution to the financing of the European Space Agency,

[40] BMWi, "Für eine zukunftsfähige deutsche Raumfahrt- Die Raumfahrtstrategie der Bundesregierung", 2010, p. 21.
[41] *Ibid.,* p.26.

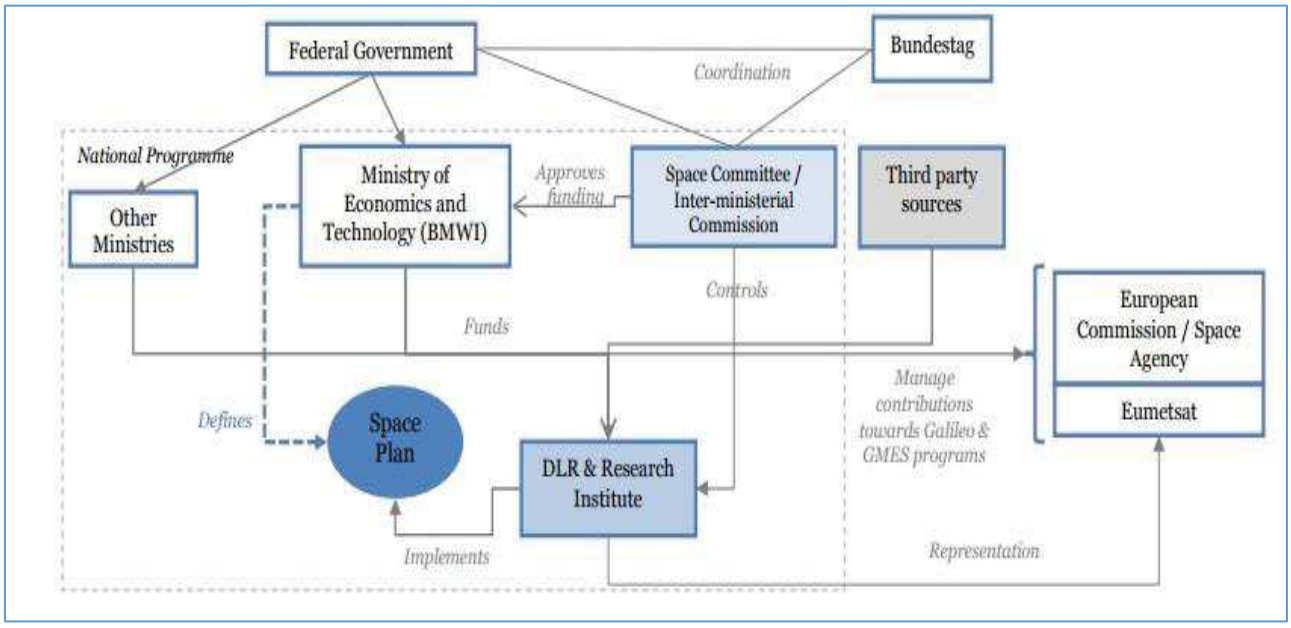
20% to the German space programme, and 14% to space research at the Agency itself.[42] As a comparison, its French counterpart, the CNES, has the 2nd biggest budget in the world regarding space. Indeed, with 35 euros per inhabitant and per year, the French budget dedicated to space is way ahead of Germany's one, with "only" 20 euros per year and per habitant. In the world, the only country that invests more than France is the USA with 50 euros per year and per inhabitant. Moreover, in 2017, CNES's resources will attain 2334 million euros, nearly three times more than DLR's. As an example, 728 million euros are dedicated to the French space programme. It shows the very high priority that space has for the country's public authorities.[43]

The DLR has two distinct functions. It is first a research centre member of the Helmholtz Association in charge of transport, energy, aeronautics, and space. In addition, the DLR acts as the German Government's Space Agency under the authority of the *BMWi*. As such, the DLR is responsible for the execution of the national space programmes and the representation of Germany at the European Space Agency.

In order to meet the priorities of the German government's space strategy, the German Agency develops its activities around three main areas: 1. research and development to master key technologies; 2. national projects to support the international competitiveness of the German industry; and 3. international cooperation. National space activities are carried out largely within the DLR Institutes in partnership with the German industry to master the critical technologies in "*Standort Deutschland"*. The institution also has international offices, among which one located in Paris and one in Brussels. Contrary to France, where the CNES representative in Germany is directly working from the French Embassy, as Counsellor for Space issues; for Germany, there is no direct intertwining between the institutional side and the DLR since the office is independent of the Embassy.

Finally, the DLR is also a research centre in charge of the management of scientific and technological projects for the implementation of the strategic priorities of the German government ("High Tech Strategy 2020" of the *BMBF* and the *BMWi*). As a consequence, more than 200 million euros each year from institutional funds go towards the research work of the DLR.

[42] DLR, "Das DLR im Überblick", *dlr.de*, 11 April 2017
[43] CNES, « Le deuxième budget au monde », *cnes.fr*, 6 January 2017



Source: EUROCONSULT, "International overview of space governance and policies for the Canadian Aerospace Review", 27 June 2012

1.2.2 France's 2012 space strategy and its implementation by the French Space Agency, the CNES.

1.2.2.1 Making France and Europe autonomous in its access to space

While Germany favours industrial aspects in "*Standort Deutschland*", France proposes a more comprehensive strategy that integrates the entire value chain, from decision-making and public action, and especially the issue of foreign policy, to the development of applications and services through research and technology.

The actual general official strategic framework regarding France is defined in the 2012 "French space strategy"[44] ("*Stratégie spatiale française*") issued by the Ministry of Higher Education and Research (*Ministère de l'enseignement supérieur et de la recherche*). To this regard, it is therefore interesting to note the difference, between France and Germany, on

[44] Ministère de l'enseignement supérieur et de la recherche, « Stratégie spatiale française », March 2012.

which institutional actor issued the document for each country (Higher education and research for France, and Economic Affairs for Germany): again, the industrial and economic part of space seems, at first, to be more important for Germany than for France.

In the document, the French Space strategy must address four issues:

i. To favour the shift from innovations driven by technology to innovations driven by needs;
ii. To make space investments in France grow;
iii. To continue to build the European governance of space;
iv. To promote the development of international cooperation.

To this end, eleven priorities can be identified:

i. France needs to play a driving role in Europe in space by putting in place an adequate governance within Europe in space, making the European Union a strategic actor, and using the existing expertise of the European Space Agency and its Member states;
ii. Maintain technological independence and the access to space. In this way, the strategy puts its emphasis on applying the European preference for critical systems and launches of the set of institutional missions carried out in Europe, but also on providing the necessary financial support for the existence of the European launcher sector;
iii. Accelerate the development of applications and services with high-added value;
iv. Conduct an ambitious industrial policy with established industrial rules harmonized at the European level
v. The importance of education, scientific culture, and communication;
vi. In terms of scientific and technologic researches, France needs firstly to participate as a ESA's compulsory scientific program missions;
vii. The access to space has a real importance in the French strategy. It is therefore needed that the country maintains and develops, in the framework of the ESA and the EU, the range of existing launchers (Ariane 5, Soyuz and Vega). It is also needed to prepare a follow up to Ariane 5 (i.e. Ariane 6 which is now on track and shall be available from 2021);
viii. Maintain the national industrial competitiveness in telecommunications and navigation;

ix. Earth observation especially trough the development of the "Global Monitoring for Environment and Security Programme (GMES) within the European Union;
x. Security and defence;
xi. Space exploration with the project to take part to a European exploration program with Mars as an objective.

The main differences between the French and the German space strategies lies in the notions of sovereignty, the autonomy of decision and the independence of the access to space, really marked in France, and nearly not addressed in the German strategic document. Indeed, whereas it is in second position in the French document, the German strategy only refers to it at the very end of the priorities, on the eighth position. This idea can also be confirmed in the several speeches given by the two last Presidents of the country on matters relating to space issues, proving that this dimension hasn't left French priorities since the 1960s, placing themselves in the legacy of de Gaulle's ideas on the subject. Indeed, Nicolas Sarkozy in a speech on the challenges and priorities of the European space industry on February 11th 2008 in Kourou, French Guiana, emphasized that autonomous access to space was a cornerstone of French as well as European space policy because it was the sign of an ability to structure very complex programmes and technologies, hence the mark of an industrial and technological power.[45] For him, it is of vital for France and Europe to preserve what is happening and in all circumstances an autonomous access to space and France's strategic independence. Five and eight years later, François Hollande also acknowledged the importance of the independence of France in its access to space in two speeches given in Kourou on December 14th 2013 and in Les Mureaux on November 14th 2016, considering France at the forefront of the Europe of launchers.[46]

According to the OECD[47], France spent more than 2.2 billion euros in its space industry in 2013 (of which 1.1 billion euros going to CNES for national and international programmes), which equals to 28.6 million euros per capita and nearly 0.1% of its GDP. This puts France in the top five of the world's biggest investors behind the United States, China, Russia and Japan. Moreover, with more than 10% of the budget devoted to research invested by the public authorities, France was in 2013 the fourth largest nation in terms of space research and development (R&D). According to Yannick D'Escatha, the country, convinced

[45] Speech of Nicolas Sarkozy, President of the French Republic, 11 February 2008.
[46] Speech of François Hollande, President of the French Republic, 14 December 2013.
[47] OECD, "France", in The Space Economy at a Glance 2014, *OECD Publishing*, 2014.

that space is a strategic area with a promising future, has continuously invested in this field: over the period 2007-2011, the average subsidy allocated to CNES was 1.4 million euros per year, which corresponds to an increase of 5% compared to the period 2002-2006.[48] For Germany, the increase is even more spectacular with an augmentation of more than 20% between 2007 and 2013[49].

Each year, almost half of the total French space budget is allocated to the European Space Agency, as it is also the case for Germany. But, and in accordance to its priorities, the CNES has invested more than 900 million euros for launchers programmes in 2013.[50] On the contrary, Germany allocated the highest amount of its institutional funds to earth observation, and corresponded to an amount of 311 million euros for the year 2013. Finally, the total budgetary effort in favour of space, at the national or at the European level, accounts to more than 2 billion euros for France, which is by far the largest in Europe (1.2 billion euros for Germany).

With the "*Midi-Pyrénées"*, especially the city of Toulouse, and the "*Ile-de-France"* regions, France has two core businesses and these are among the top five regions in the world at the forefront of space research, with respectively 5.8% and 4.7% of patents devoted to space. Consequently, France has consolidated its position as the largest exporter of satellites and launchers. Indeed, between 2007 and 2013, it sold more than 6 billion euros of equipment, compared with only 2 billion euros between 2000 and 2006.

In the French aerospace sector, space industry accounts for about 14% of revenues and 8% of total full-time employment in 2012. Moreover, 13 205 persons were employed in the space industry in France in 2012. As a whole, the OECD estimates that 16 000 persons work in the space sector in France.[51]

[48] Y.D'ESCATHA, *Op. Cit*., p.33.
[49] OECD, "Germany", in The Space Economy at a Glance, *OECD Publishing*, 2014.
[50] OECD, "France", in The Space Economy at a Glance, *OECD Publishing*, 2014.
[51] This estimate does not consider the many French universities, research institutions and defence-related administrations also involved in space research, development and in some cases spacecraft operations.

1.2.2.2 France's strategy for Europe in space.

Regarding Europe, the priority of the French strategy unveils both objectives of the country in this area.

As already mentioned, first, France aims to play a driving role in Europe in space by putting in place an adequate governance, making the European Union a strategic actor, and using the existing expertise of the European Space Agency and its Member states. Indeed, within the strategy, France takes the postulate that the country is the European space's leader and need to keep this role as an engine in order to be a training force for European space integration.

In addition, the country earmarks EU's new role in this scientific issue. European space must indeed find a new momentum (a "*nouveau souffle"* p.8*)* towards a federalist vision. In the same way, Germany, as the largest economy and largest contributor to the European Union, also wants to play a role in shaping the European Union's role on the basis of the Treaty. However, there is not, in the German strategy, a call towards a federalist vision. In French eyes, this necessary evolution is likely to provide the European space community with a higher political visibility and, consequently, additional means of action enabling Europe to have ambitions that match the stakes. As follows, France wants to accompany the effective implementation of the shared competence provided by the Lisbon Treaty. Moreover, the European institution has to play its role in each and every space issue but also must determine the needs to be met by the European space policy and define a European space programme. In the short term, and as the same way as Germany, the common priority remains the success of the Galileo and Copernicus programmes. Beyond that, France expects the EU to be involved in certain strategic space activities such as exploration, access to space, space surveillance, and to European defence and security.

However, the EU's space policy must fully respect the principle of subsidiarity, which underpins the effectiveness of European integration. In the same way as Germany, France wants to help being the guarantor of the clear limitation of the tasks in accordance with the principles of subsidiarity and complementarity. But while Germany aims to continue to work hard to strengthen the European Space Agency as an independent, intergovernmental organisation that remains in the country's eyes as the priority actor for European space policy

and cooperation, even after the entry into force of the Lisbon Treaty, France shows less enthusiasm towards ESA. An explanation to this idea can be found in the 2001 report from the French Senator Henri Revol, entitled "*French space policy: review and prospects*" ("*La politique spatiale française: bilan et perspectives"*). Indeed, the report underlines the difficult relations between the CNES and the European Space Agency. The problem would arise from the future of technical centres, and especially the space centre in Guiana (*Centre spatial guyanais, CSG*) in the implementation of programmes financed by public money and in the relationship with the industry. Indeed, paragraph c) to the Article II of the ESA Convention related to the inner purposes of the Agency, states that cooperation among European States in space research can be provided "*by coordinating the European space programme and national programmes, and by integrating the latter progressively and as completely as possible into the European space programme, in particular as regards to the development of applications satellites*"[52]. An extreme interpretation of this article was to foresee the disappearance of technical centres as national capacities. In addition, a report submitted on the French space transport policy of France by the French "*Cour des Comptes"* on April, 4th 2013 found that space policy is too costly and over-profits other countries. Indeed, France alone pays nearly 60% of the costs of the Ariane programme and 80% of those of the *Centre spatial guyanais*. In a new report published in September 2014, the French administrative court responsible for auditing public accounts, directly criticized the European Space Agency noting that the rate of intermediation levied by the European Space Agency to the French contribution to the development of the CSG "*almost tripled in ten years, going from 2.9% to 8.2% while the total costs of the programs have decreased*."[53]

On another level, the implementation of a new European Space Policy requires a rigorous coordination and governance between the EU, ESA, and the Member states. The idea to avoid duplication between different programmes is therefore present in both strategies. But France pronounces itself for the integration of ESA into the EU as a long-term objective, stages by stages.

Second, France has the strategic objective to maintain the technological independence and the access to space. Indeed, independence must be one of the major strategic objectives of the French but also the European space policy. It is justified by the fact that the sensitivity of space systems, particularly those relating to defence, affects the corresponding technologies.

[52] Convention for the establishment of a European Space Agency, 30 May 1975.
[53] B.TREVIDIC, " La Cour des comptes éreinte l'Agence spatiale européenne », *lesechos.fr*, 2 October 2014.

As an example, many space technologies are subject to export control in producer countries, which make their availability to foreign suppliers not always assured. As a consequence, only the technological independence of Europe can relieve it of the risk of being banned from benefiting from a particular type of space system. If the question of the lowest possible cost is both addressed by France and Germany in their documents, the French country explicitly commits itself to a European preference in the procurement of products and technologies critical for the realization of space systems, in order to ensure a sufficient level of production to make them economically viable. Moreover, this European preference must be fully applied by all public contractors in Europe, and thus by European industrialists as well.

Regarding the access to space, Europe must be committed to the European launchers. Indeed, European preference must be given to each and every institutional mission carried out in Europe. Moreover, Europeans must collectively provide the necessary financial effort to this field because Europe can not take the risk of a restricted access to space while other countries such as Russia, the United States, China, India and Japan all have access to space on their own means. The importance of this independent access to space therefore seems crucial for France, which has constantly, throughout its history, pushed for the creation of European launchers, including by being at the initiative of the creation of Ariane in 1973.

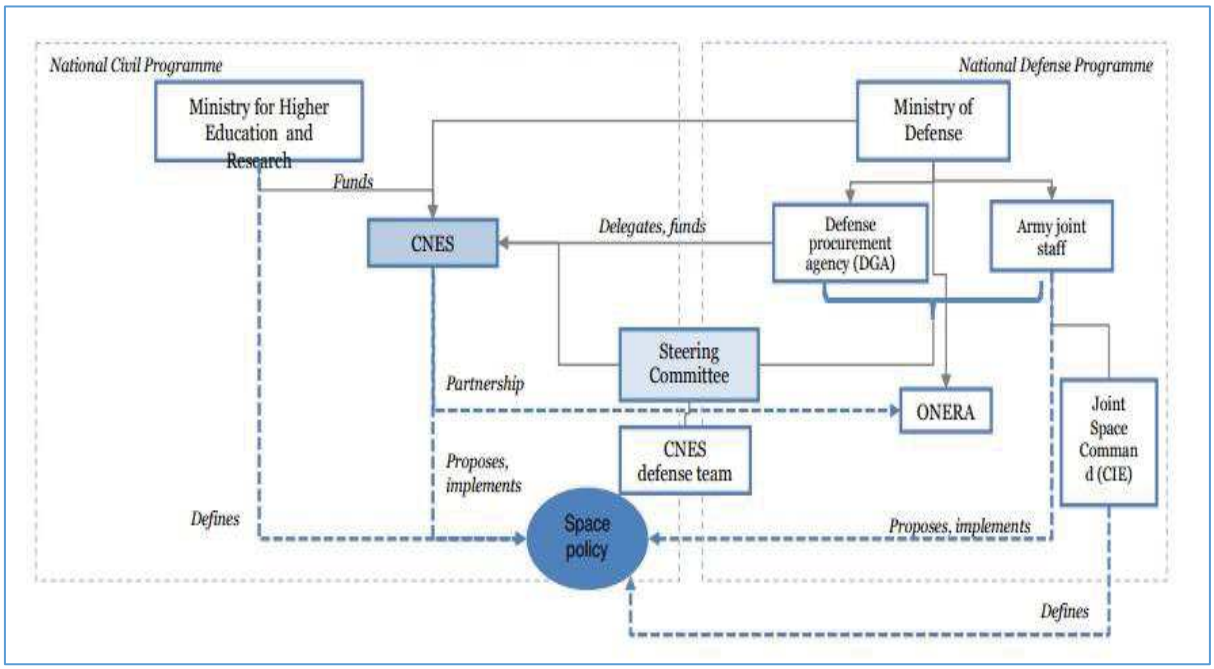
1.2.2.3 Implementation by the CNES of the French space strategy.

The *Centre National d'Etudes Spatiales (CNES)*, the French space agency, has the double function of advising the French government on the development of the country's space policy and implementing it. Indeed, it is placed under the joint supervision of the Ministry of Higher Education and Research and the Ministry of Defence. Therefore, its mission is to provide its technical expertise to the Government on space issues and to ensure the management of the space programmes. In short, the French government decides, then the CNES leads the decided policy.[54] In addition, the CNES represents France in international space bodies and manages the French contribution to the European Space Agency. The DLR is close to the role of CNES in many aspects but its weight in the definition of a German space policy has historically been much lower than that of CNES.

[54] B.SIDO, C. PROCACCIA, « RAPPORT sur les enjeux et perspectives de la politique spatiale européenne », French Senate, 7 November 2012, p. 13.

Moreover, France can rely on its dual competence as an agency and as a technical centre. The objective of its three technical centres (located in Toulouse for satellites, Evry near Paris for launchers and Kourou for the space base) is to ensure, in partnership with researchers and manufacturers, the innovative loop (R&D, demonstrators, probation programs, new methods and tools, etc.), the project management of the priority programs decided by the government and finally the transfer to the users and the industrial sector. The CNES is therefore responsible for several national and international programmes covering both upstream (launchers and hardware) and downstream activities (applications), in addition to industry development and science.[55]

CNES puts its expertise at the disposal of users of spatial data, as well as that of the European Space Agency and the European Union. In addition, the Space Operations Act of 2008 entrusts CNES with the task of assisting the State in the definition of technical regulations and, at the request of the Minister responsible for Space issues, exercises control over the conformity of the systems and procedures implemented by space operators to the technical regulations and operating regulations of the installations.[56]



[55] OECD, "France", in The Space Economy at a Glance, *OECD Publishing*, 2014.
[56] Y. D'ESCATHA, « La politique spatiale de la France », *Annales des Mines - Réalités industrielles*, May 2012, pp. 16-24.

Source: EUROCONSULT, "International overview of space governance and policies for the Canadian Aerospace Review", 27 June 2012

1.3 France and Germany's cooperation inside the European space institutional triangle.

As rightly underlined in the 2012 French Senate report on the stakes and prospects of the European space policy, "*it is impossible to identify "one" European space policy gathering every programme put in place throughout the continent*" [57]. Indeed, governance in Europe in space has been built in successive stages and outside the Community institutions. First, the European Space Agency, created in 1957, funded on the experience of its member states (today at the number of twenty-two), has positioned Europe among the major space powers. It is indeed the first institution which have incarnated space in Europe. Finally, followed the European Union which began to play a growing role in this area with the satellite navigation system Galileo, the Global Monitoring for Environment and Security (GMES) programme, and soon GovSatCom. Indeed, the Treaty of Lisbon has made space a shared competence between the European Union and its Member States. The new governance of space Europe is thus based on the three major public owners, the Member States, the European Union and the European Space Agency, the so-called Space European Triangle. It is within this complex institutional triangle that the Franco-German partnership evolves.

[57] B.SIDO, C. PROCACCIA, *Op. Cit*., p. 7.

1.3.1 At the intergovernmental level: within the European Space Agency (ESA)

1.3.1.1 Political framework of the European Space Agency

European institutional cooperation started in 1963 with the creation of ESRO, ELDO, and the CETS. ESRO was based on the European Organization for Nuclear Research (CERN) model and had a scientific vocation. It was regrouping ten European countries: Belgium, France, Germany, Italy, Denmark, Spain, Sweden, Switzerland, the Netherlands, and the United Kingdom. Their contributions to the common budget of the organisation were fixed according to the national net income of these states, considering that none of these contributions should exceed 25% of the total. Germany, the United Kingdom, Italy and France were holding a little more of 75% of budget accounting of 200 million dollars.[58]

The organization's task was to design and build satellites in cooperation with the industrial companies to which it entrusts the actual work of the construction of it. ESRO was also responsible for payloads loaded on rockets or satellites and designed according to the experiments requested by the scientific institutes of the Member States. It dealt with the launching of rockets and satellites, but was not competent for the development of rocket-launchers. The organization was headed by a Council composed of Member States' representatives, which set out the broad lines of its scientific policy, adopted the annual programmes and work plans, appointed the Director General, set the level of resources for a period of three years, and adopted the budget. Moreover, the board was assisted by a scientific and technical committee and an administrative and financial committee. Making the link between astronomy and spatial research, ESRO was quite successful since between 1964 and 1975 the agency developed eight scientific satellites launched by the United States and initiated five others. But the organization faced budgetary difficulties and above all it failed to remain focused on scientific interest but slipped into the field of applications. Another common difficulty was here also the lack of cooperation among contributors.

On the other side, ELDO had an innovative dimension because it integrated scientific and strategic interests, particularly because the launchers' technology also made it possible to

[58] F.GERARD, M.GOLAY Marcel, *Op. Cit*., p. 122

work on the ballistic missiles' technology. Because of the ELDO's double dimension, France, Germany and the United Kingdom were especially at the forefront. The organization managed to capitalize on ballistics in France and the UK to develop a first European launcher system, "EUROPA" (the UK was building the first stage, France the second and Germany the third). At its beginning, it was still not certain that the construction of the "EUROPA" launcher had to be continued. Some competent authorities of the ELDO Member States thought that Europe had the choice between participate to the US post-Apollo program and the construction of its own launcher capable of placing high-orbiting satellites in space. Indeed, opinions were divided: some preferred to participate to the post-Apollo programme, which could offer important future development opportunities to the aerospace industries in Europe while others feared that the US could one day refuse its cooperation for the launch of European satellites. Finally launched, the project appeared to be too ambitious, too expensive and lacking coordination between the associate countries. As a result, it was dissolved in 1973.

The failure of the "EUROPA" launcher was at the origin of the creation of the ESA. Indeed, while ESRO and ELDO operations were ending, their activities were merged into a brand-new institution, the European Space Agency (ESA), created in 1975 with the signature by the European ministers on April 15th at the European Space Conference in Brussels of the ESA Convention. Later signed by the representatives of ESRO and ELDO at the European Space Conference in Paris on May 30th 1975, it came into force on October 30th 1980.

The European Space Agency gathers today twenty-two Member States from Europe and beyond in order to intensify cooperation in space. Indeed, apart from the ten original Member States from ESRO and ELDO, Ireland, Austria, Norway, Finland, Portugal, Greece, Luxembourg, Czech Republic, Poland, Estonia and Hungary all joined the organization since its creation. Moreover Canada, pursuant to Article XIV of the Convention, is an associate member of ESA.

Source: "ESA Member States and Cooperating States", ESA, 14 February 2013

The Convention of the Agency states in the Article X that the agency is run by two organs: The Council and the Director General who is, since 2015 the former director of the DLR Johann-Dietrich Wörner in replacement of Jean-Jacques Dordain.[59] The Council is composed of the representatives of the Member States and meet as and when required at Ministerial, every two of three years, or delegate level, on a more regular basis. Central organ of the ESA, because its function as governing body, it provides the basic policy guidelines within which ESA develops the European space programme. Moreover, it has several

[59] Convention for the establishment of a European Space Agency, 30 May 1975.

prerogatives. Indeed, according to Article XI of the Convention, during ministerial meetings, Ministers of ESA Member States responsible for space issues define the policy to be followed in pursuit of ESA purpose and approve the activities and programme. Moreover, decisions are taken on the main orientations for the upcoming years and the level of resources to be made available to the Agency for the coming five-year period. They also agree to start new programmes or eventually to terminate them and elect the Director General for a period of four years. Finally, each Member State is represented in the Council and has one vote and the rule of procedure is generally made by a two-thirds majority of all Member States. However, it is possible for a Member State not to have the right to vote on certain issues. Indeed, according to paragraph 6 of the Article XI of the Convention, "*a Member State shall not have the right to vote on matters concerning exclusively an accepted programme in which it does not take part […] if the amount of its arrears of contributions to the Agency in respect of all activities and programmes covered by Article V in which it participates exceeds the assessed amount of its contributions for the current financial year. Moreover, if the amount of a Member State's arrears of contributions to any one of the programmes under Article V in which it participates exceeds the assessed amount of its contributions to that programme for the current financial year, then that Member State shall have no vote in the Council on questions relating exclusively to that programme".*

On another level and on a more regular basis, the Council also meets at delegate level. Delegations for every Member States are directly nominated by the MS itself, and meet during the Council. During these sessions, they review each programme, prioritise them and determine the course of their implementation. But they also adopt the budgets, the financial and staff regulations. More generally, they take all measures necessary for the fulfilment of the goals of the Agency.

According to Article XI of the Convention, the Council is assisted in its duties by subordinate bodies for which "*the establishment and terms of reference of such bodies, and the cases in which they have powers of decision, shall be determined by the Council by a two-thirds majority of all Member States*". Indeed, each of the Committees and Boards take decisions, make recommendations or are kept informed of the Agency activities. There are five plenary subordinate bodies (Administrative and Finance Committee; Industrial Policy Committee; International Relations Committee; Security Committee; Science Programme Committee), six programme boards (Joint Board on Communication Satellite Programme; Launchers Programme Board; Programme Board for Earth Observation; Programme Board

for Human Spaceflight, Microgravity and Exploration; Programme Board on Satellite Navigation; Programme Board on Space Situational Awareness) and two committees outside the Convention (Programme Advisory Committee; Coordination Committee for the implementation of the Inter-governmental Agreement on the International Space Station).[60]

The ESA Council meets as and when required and at least twice a year at delegate level and regularly at ministerial level. Once a year, joint and concomitant meetings of the ESA Council and the European Union Council are organised, and are referred to as "Space Council".

One of the main elements of the ESA Convention is linked to the institution's industrial policy and geographical distribution: the so-called fair return rule. According to Article VII of the Convention, which is dedicated to industrial policy, the fair-return rule aims "*to increase the competitiveness of European industry on the international market by maintaining and developing space technology and by encouraging the rationalisation and development of an industrial structure appropriate to market requirements, making use in the first place of the existing industrial potential of all Member States*". Indeed, it will "*ensure that all Member States participate in an equitable manner, having regard to their financial contribution, in implementing the European space programme and in the associated development of space technology; in particular the Agency shall for the execution of the programmes grant preference to the fullest extent possible to industry in all Member States, which shall be given the maximum opportunity to participate in the work of technological interest undertaken for the Agency*"

This principle, adopted by the Agency since its Council at Ministerial level in March 1997 is that the ratio between the share of a country in the weighted value of contracts, and its share in the contribution paid to the Agency, must be of x per cent by the end of a given period. That ratio is called the industrial return coefficient. Therefore, the principle encourages national contributions in voluntary programmes and promotes the distribution of space activities for its Member States.

Finally, the budget of the organisation, which amounts to 5.75 billion euros in 2017, is divided between two income sources. Indeed, the Agency's mandatory activities (space science programmes and the general budget) are financed by financial contributions paid by all Member States and calculated based on their gross national product. The European Space

[60] ESA, « ESA's Organs and Functionning », *esa.int.*

Agency also conducts several voluntary programmes. For them, each Member State decides on the voluntary programmes to which it wishes to participate and on the amount of its contributions to each of these programmes, knowing that the fair return rule allows them quite a certain return on investment.

1.3.1.2 Franco-German disparities and achievements.

As already seen, at the intergovernmental level, that of ESA, the strategy and organisation of Germany are significantly different compared to France. The interest of the German country is rather focused on the production of high-technology components and systems, their automatization, miniaturization for the exploration of the solar system, construction of application satellites, and manned flights for which she is the main promoter. It is also the first contributor to the International Space Station (ISS) in Europe justified by the fact the ISS is seen as the symbol of peaceful international cooperation in earth orbit and is to be used intensively as a unique laboratory for research. Therefore, the European contribution to the International Space Station comes from ten members of the European Space Agency, and amounts to 8 billion euros of the programme, over a period of thirty years. Germany, as the ESA's most important ISS partner in Europe and largest contributor finances 41 percent of the European infrastructure and contributes significantly to the scientific use of the International Space Station. [61]

But unlike France, Germany does not show a high priority given to the objectives of independence of access to space, as shown by its choices in terms of institutional launches. Indeed, its military satellites are thus launched by Russian or American launchers, particularly the Falcon 9 launcher, developed by the American society SpaceX with the help of NASA. SpaceX, representative of the so-called “New Space” wave with Elon Musk to its head, aims to the development of low-cost and public access to space exploration. In this regard, it is one of the most serious competitor to European launchers, Ariane, Soyuz and Vega.

[61] DLR, « Die Internationale Raumstation ISS », *dlr.de*, 24 March 2011

In 2013, the choice of the German Federal Ministry of Defence (*Bundesministerium der Verteidigung, BMVg*) to entrust the launch of a three-government observation satellites constellation, named SARah, to the new American launcher Falcon 9 has been the subject of controversy and has been strongly criticized by France and ESA which promotes the European preference for the launch of governmental and institutional satellites. [62]

More than that, German relations with the United States are generally the subject of tensions. Indeed, as already mentioned, the European launcher "EUROPA" mainly owes its failure to the fact that three countries, France, the United Kingdom, and Germany, were building one piece of it, without project manager. The difficulties were such that the British and especially the Germans were ready to abandon everything in favour of an easier and less costly cooperation with the United States. But, with the support of the French government, the French Space Agency found its way to save the idea of a common European space launcher to replace "EUROPA". The idea finally triumphed in July 1973, under the pressure of the French and the Belgians: the birth certificate of the Ariane programme was acted. The European launcher took off for the first time successfully on December 24th, 1979 making Europe a totally independent space power.[63]

Another example of this close relation from Germany to the United States, due to historic reasons (Marshall Plan, NATO, Berlin Blockade), and which had an influence in European space can be related to the organisation in 1995 of the ESA's Ministerial Council in Toulouse. On this occasion, the CNES employees expressed their dissatisfaction towards German's will to deeply support the implementation of the International Space Station. The motivation of the employees of the French Agency was to stay outside the ISS project which was seen as a trap coming from the United States and which intended to weaken the European resources for other projects such as telecommunications satellites.[64] Today, among all industrial countries, the United States is Germany's leading science and technology partner and more than fifty research partnerships have been signed between the DLR and NASA, the US Space Agency. Moreover, Germany is the first European contributor to the International Space Station (ISS), project initiated by the United States, and maintains a personal report on the subject. Both countries also cooperate very closely in the extra-terrestrial space, in the field of Earth observation and return to atmosphere technologies.

[62] M.CABIROL, « Europe spatiale : la trahison allemande », *latribune.fr*, 19 September 2013
[63] P. VARNOTEAUX, *Op. Cit.*

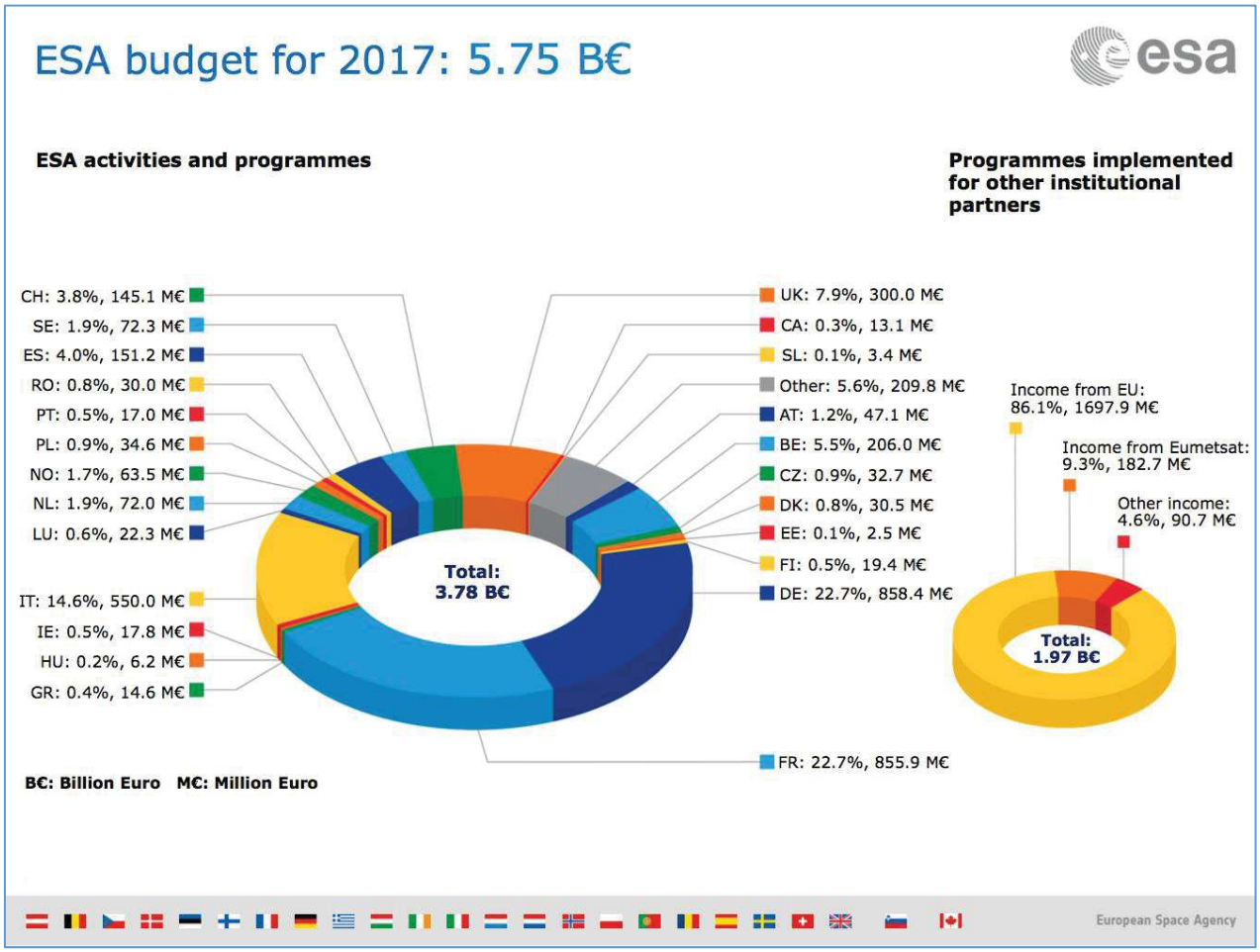
[64] P. DE SELDING, "Thanks to Trump, Germans now speak French", *spaceintelreport.com*, 28 January 2017

However, despite the inner differences between the two European neighbours, there was a Franco-German convergence on the European Space Agency's flagship programmes, which were set up with a significant contribution from both France and Germany. Thus, without the Franco-German joint commitment, it would not have been possible to realize the project of autonomy of access to space by the European Ariane launcher programme. Moreover, in the Franco-German Agenda 2020, which was unveiled by Angela Merkel and Nicolas Sarkozy on the occasion of the 12th Franco-German Council of Ministers on February 4th 2010 in Paris, the Franco-German cooperation in space was strengthened: "*we will continue the already established Franco-German cooperation in the field of the European space policy. Our common objective is to guarantee Europe's access to space. For this reason, we remain committed to improve the Ariane 5 launcher. However, we are also aware of the need to address the issue of a new generation of launchers*".[65]

On another level, the European space laboratory Columbus and the space cargo ATV (Automated Transfer Vehicle) are other examples of Franco-German convergence within the ESA on subjects ranging from the propulsion of launchers to exploration from the solar system to the observation of the Earth.

But for several years now, the German Space Agency has endeavoured to have greater influence in the European space and to successfully carry out its own research and development activities. Germany increasingly sees its participation to ESA activities as a key tool to develop the capabilities and competitiveness of its national industry, as shown by its growing contributions. This is symbolized by the reversal of the weight of Germany and France in the financial contributions made to ESA since 2012. In 2017, the global budget accounted to 5.75 billion euros, among which 858.4 million euros were provided by Germany (22.7% of the share) and 855.9 million euros provided by France (22.7% of the share). As a comparison, in 2009, the ESA budget amounted to 2.818 billion euros, among which 648.3 million were provided by Germany (23% of the share) and 716.3 million euros provided by France (25.41% of the share).

[65] Agenda franco-allemand 2020 - 12ème Conseil des ministres franco-allemand, 4 February 2010



Source: "ESA Budget 2017", www.esa.int, 16/01/2017

1.3.2 At the European institutional level: within the European Union (EU)

1.3.2.1 Political framework of the European Union

The increasing power of the European Union's competence in space is achieved by means of a roundabout way. Thus, if the Single European Act, which was ratified on February 28th 1986 by twelve European States, does not make explicit mention of space, it devotes several of its provisions to technological research. For the Parliamentary Assembly of the Council of Europe (CoE) which met on February 6th 1992 to discuss the European space policy, "*the long-term European space plan is the cornerstone of the European technological community*

mentioned in the Single European Act"[66]. Thus, Article 130f (1) of the European Single Act recognizes that "*The Community's aim shall be to strengthen the scientific and technological basis of European industry and to encourage it to become more competitive at international level."* To this end, the implementation of the programmes must be carried out by the Member States themselves: *"Member States shall, in liaison with the Commission, co-ordinate among themselves the policies and programmes carried out at national level. In close contact with the Member States, the Commission may take any useful initiative to promote such co-ordination."*[67] At a time when the European community had no competence to adopt acts on this technological field, cooperation with the European Space Agency became essential, as implied in Article 130f (2): "*it [the Community] shall encourage undertakings including small and medium-sized undertakings, research centres and universities in their research and technological development activities; it shall support their efforts to co-operate with one another, aiming, notably, at enabling undertakings to exploit the Community's internal market potential to the full, in particular through the opening up of national public contracts, the definition of common standards and the removal of legal and fiscal barriers to that co-operation."* [68]

During the 1980s and 1990s, Europe underwent a fast development of the communications sector, particularly through satellites. With a view to avoid any anti-competitive practices in this sector and the emergence of a dominant market position, the European legislation has positioned itself in this sector by putting in place a few directives (notably Directive 94/46 / EC of The Commission of October 13th 1994 amending Directives 88/301 / EEC and 90/388 / EEC as regards satellite communications in particular). Finally, through this first involvement of the EU in a roundabout way, the institution continued to develop propitious conditions for the space actors to be able to implement successful spatial policies without any direct involvement. Subsequently, on the other hand, the EU has positioned itself as a full player. Indeed, in 1994 the Union took the decision to play a role in the implementation of the global navigation satellite system (GNSS).

The rise of the EU in space is both late and informal. In 2003, a framework agreement between the EU and ESA was drawn up. It thus clarifies the conditions for cooperation between both organizations to develop a European space policy. It recognizes the mission of

[66] Resolution 978 of the Parliamentary Assembly of the Council of Europe, 6 February 2012.
[67] Single European Act, 17 February 1986.
[68] Single European Act, 17 February 1986.

both sides, stressing that they have complementary strengths from which they can derive mutual benefit and that they are resolved to cooperate effectively and for their mutual benefit, avoiding any unnecessarily duplication. The objective of this framework agreement is twofold: firstly, it aims at the harmonious and gradual definition of an overall European space policy. More specifically, it aimed at matching the demand for space services and applications in support of the Community policies, with ESA's space infrastructure and systems required to meet this demand. Second, it also aims to establish a framework providing a common basis and practical arrangements for an effective and mutually beneficial cooperation between ESA and the European Union, fully respecting the institutional and operational framework of each of them.[69] It shows that even before the Lisbon Treaty, the real leadership role of the EU is achieved through framework agreements.

Indeed, the EU reflected about the possibility of a genuine space competence for the EU, mainly due to the inability of ESA to regulate and publish standards for the space sector, but also the difficulty in releasing budgets by MS ministers. In 2003, the White Paper of the European Commission entitled "White Paper. Space: a new European frontier for an expanding Union. Action Plan for the implementation of a European space policy" encourages a reform of the space policy and gives the Union new powers to finance and co-ordinate new activities under a new European space policy, which is being overseen by the Commission. Its main objective is to review the institutional environment of the space policy after the experience with the application of the current space policy of the European Union and in the light of the new Constitutional Treaty.[70]

Indeed, in this Constitutional Treaty the article III-254 (later being also used in the Lisbon Treaty) relates to the EU's space competence. It provides in its first paragraph that "*to promote scientific and technical progress, industrial competitiveness and the implementation of its policies, the Union shall draw up a European space policy. To this end, it may promote joint initiatives, support research and technological development and coordinate the efforts needed for the exploration and exploitation of space*."[71] In addition, the second paragraph excludes the harmonization of national policies from the scope of EU action. This lack of possibilities for harmonization places EU's competence in space from a shared competence to a supporting competence. A few EU member states, including France and Germany, already

[69] ESA, « Prémices d'un nouveau partenariat entre l'ESA et l'UE », *esa.int,* 12 November 2003.
[70] European Commission, "White Paper. Space: a new European frontier for an expanding Union. Action Plan for the implementation of a European space policy", 2003.
[71] Treaty establishing a Constitution for Europe, 2004.

having a regulatory framework in the field of space law, they were not keen to concede a competence in this matter to the EU. The article is interesting insofar as it sets itself the objective of a space policy, source of legitimation for the launching of legislative material by the European institutions. Moreover, it breaks with the past because there is no reference to the application of the internal market: the concerns are scientific and industrial. In addition, there is some vagueness in the governance of ESA.

Finally, with the failure of the implementation of the Constitutional Treaty, is only with the Treaty of Lisbon that the European Union has become a full-fledged player in the space field in Europe. Indeed, the EU has today a direct, full and complete competence, although shared with its Member States. Before the adoption of the Treaty, there was no explicit reference to this technological field in in the EU's legal basis[72].

Article 189 of the Treaty on the Functioning of the European Union (TFEU), which employs for the first time the word "space" in an official document states that "*to promote scientific and technical progress, industrial competitiveness and the implementation of its policies, the Union shall draw up a European space policy. To this end, it may promote joint initiatives, support research and technological development and coordinate the efforts needed for the exploration and exploitation of space*."[73] Therefore, the European Union is politically empowered with dealing with all issues relating to space activities (whether launchers, satellites, spaceflight, exploration and international cooperation). To this end, the ordinary legislative procedure is required, as it is mentioned in paragraph II of the article 189, "*the European Parliament and the Council, acting in accordance with the ordinary legislative procedure, shall establish the necessary measures, which may take the form of a European space programme, excluding any harmonisation of the laws and regulations of the Member States.*" Furthermore, the European Council of September 16th 2010, on the basis of the provisions of Article 189, amended the list of Council formations, adding the space component to the three strands of the internal market, industry and research covered by the Competitiveness Council. Consequently, it is now up to the Council's Research Group, set up following the decision of the European Council, to prepare the work of the Space Council. [74] The European Commission has therefore developed its space policy in four main areas: The Earth observation system programme Copernicus; Galileo/EGNOS satellite navigation

[72] J. BECLARD, "The Lisbon Treaty and the Evolution of European Space Governance", *ifri.org*, p.2.
[73] Article 189 of the Lisbon Treaty, 2007.
[74] J.PUEYO, B.DEFLESSELLES, "Communication sur la politique spatiale européenne", *Commission des affaires européennes de l'Assemblée nationale*, 4 November 2014, p.6.

systems; Space exploration; and research in the field of space. In addition, Member States are at the origin of space initiatives taken up at EU level.

1.3.2.2 Franco-German disparities and achievements

Regarding France and Germany's involvement in the space policy of the European Union, both countries ensure optimal implementation of the Lisbon Treaty as stated in their respective national space strategies. By adopting the Franco-German Agenda 2020 in 2010, the two countries are ensuring that the EU is effectively implementing the Galileo satellite positioning system and Copernicus/EGNOS programmes.

However, if today the Galileo program is rapidly deployed with the signature on June, 22nd of this year of a new 800 million euros contract for the supply of eight additional satellites signed by the European Space Agency, on behalf of the European Commission, and by the German industrial OHB-System (*Orbitale Hochtechnologie Bremen*), which will enable the constellation to be complete, the programme has far from been a uniform process.[75] Indeed, based on an idea initiated in 1998 by France, the European Commission presented one year later to its Member States a satellite positioning project to compete with the American Global Positioning System. However, some countries such as Germany, the United Kingdom, the Netherlands, Sweden, Denmark and Austria did not see the added value of Galileo, whose most innovative services would be costly, while the American GPS was free of charge. Consequently, at a European Transport Ministers Council at the end of 2001, these six countries vetoed the European funding of the project. France, by the voice of its President Jacques Chirac strongly condemned this veto for a programme seen as a way of escaping a scientific, technical, industrial and economic subservience from the United States.

A few days later, the European Commission discovered that the Americans, through Paul Wolfowitz, the United States Deputy Secretary of Defense, wrote to the most Atlantics countries on the European continent to warn them of the supposed dangers of Galileo for the American security. He also discredited in a four-page report, a study by

[75] Sciences et Avenir, « Contrat : 8 nouveaux satellites pour le GPS européen Galileo », *sciencesetavenir.fr*, 23 June 2017

PriceWaterhouseCoopers (PwC), a British audit firm, which concluded Galileo's feasibility and profitability at the request of the European Commission[76]. According to Wolfowitz, Galileo would allow enemy forces to have access to the military applications of the third-generation GPS scheduled for 2011. In response to this, the Commission proposed to financially help countries which would participate to the programme. As a result, Germany decided in February 2002 to join the European project, soon followed by Austria, Sweden, Denmark, and finally the United Kingdom and the Netherlands. But the British, supported by the Netherlands and Germany, demanded that the private sector finance the largest part of the project. Therefore, the European Commission decided to develop a public-private partnership project which will prove to be a failure due to lack of profitability for the private European space industries and internal struggles between them.

In May 2007, the European Commission decided to put an end to the public-private partnership and proposed to finance the Galileo infrastructure from Community funds, and then only allowed the exploitation to the private sector in return for payment of a fee. Germany opposed the idea and rather preferred national contributions, to obtain the return on investment provided in the fair return rule of the ESA. Indeed, in the architecture proposed by the Commission, the European executive would be in charge and would entrust the European Space Agency to launch calls for tenders from the private sector. But Germany feared that French industry would be the big winner because the French were present in the two major satellite manufacturers, “European Aeronautic Defence and Space company” (EADS), now “Airbus Group”, and the French-Italian group “Thales-Alenia Space”. Indeed, it is this question of sharing the division of industrial contracts in compliance with competition rules which is debated. In this sense, the European Commission proposed to the share the industrial contracts into six pieces (satellites, launchers, software, ground relays, control centres and general management). The objective was to involve as many European companies in the space sector as possible and to ensure an equitable share of the benefits for German industrialists.

Finally, in December 2007, after hard negotiations, the Galileo project really took shape. Indeed, the European Transport Ministers Council made it possible to allocate future industrial tenders. Notably, Germany, has managed to host an operational centre for satellite data monitoring. As of today, the full operational capability phase of the Galileo programme

[76] J.QUATREMER, « Galiléo, le GPS va bientôt tourner », *liberation.fr*, 25 October 2011

is fully funded by the EU and managed by the European Commission and expected to be fully optimised by 2020. Moreover, the Commission and the European Space Agency have signed a delegation agreement by which ESA acts as the design and procurement agent on behalf of the Commission.

Besides taking part to the success of Galileo, France and Germany also take part to EU funded space projects through the Horizon 2020 programme, a EU Research and Innovation programme with about 80 billion euros available over on the period 2014 to 2020. More specifically, they both participate to programmes aiming at monitoring the sustainability of agriculture. They are particularly involved in the SIGMA project which "*aims to create tools and methods that will enable farmers, researchers and other stakeholders to gain an unprecedented long-term and worldwide perspective on how land is being used, what is being farmed, how yields and production are evolving, and how agricultural activities are impacting the environment.*"[77]

Regarding the observation of the ocean, France was the coordinator of the OSS2015 EU funded project which aimed to deliver methodology, data and insights that could help to further improve the marine data products and services offered by Copernicus.[78] With the support of Germany, the project lasted from 2011 to 2014 after big improvements were made.

As far as the European Union is concerned, France and Germany have taken part to the most important projects in Europe in space. France and Germany are also particularly present in the European Commission's Directorate General for Space Affairs, which is the DG GROW (Internal Market, Industry, Entrepreneurship and SMEs). Indeed, the most important posts in the space affairs branch of the DG, are occupied by European civil servants of French and German nationality. As an example, the French Christine Hernot oversees the financial management of space programmes and Phillipe Brunet, Head of unit for Space Policy, Copernicus and Defence. On the other hand, the German Matthias Petschke is Head of unit for EU Satellite Navigation Programmes.[79]

[77] European Commission, "Monitoring agriculture for sustainability", *ec.europa.eu*, 16 October 2015
[78] European Commission, "Catching the tide for marine observation", *ec.europa.eu*, 13 May 2016
[79] Organigram from the DG Internal Market, Industry, Entrepreneurship and SMEs

1.3.3 At a bilateral level: between both national agencies.

Even if the Member States of the ESA and the European Union are involved both in the functioning of the institutions (ESA and EU) and in their space programmes and capacities, they also have their own political will, budgets and programmes. France and Germany can therefore rely on their own institutional, scientific, industrial and technical facilities.

However, in order to develop these capacities, Member States develop governmental agreements or inter-agency agreements. For France and Germany, the implementation of these agreements is to the responsibility of the CNES, the French Space Agency, and the DLR, the German Space Agency, both responsible for implementing the institutional aspects of their space policy. Thus, the commitment of France and Germany to Europe in space has also been doubled by bilateral collaboration on a technical as well as on a political level. For the CNES and the DLR, this type of cooperation allows different skills to be used, to confront working methods, to explore new avenues of use of space technologies and techniques as well as to carry out more missions while sharing their costs.

This collaboration is symbolized by framework agreements for bilateral collaboration between the CNES and the DLR, which were launched in 2002, while it was renewed in June 2016 at the ILA Berlin Air Show (*Internationale Luft- und Raumfahrtausstellung Berlin)* in Berlin by Jean-Yves Le Gall, President of the CNES and Pascale Ehrenfreund, Chairman of the Management Board of the DLR.

The first framework agreement between the CNES and the DLR was signed on February 2nd 2002 by Alain Bensoussan and Gérard Brachet, President and Directorate General of the CNES, and Achim Bachem, Chairman of the Management Board of the DLR, on the occasion of the French-German Cooperation Forum in Research[80]. It provided an enhanced cooperation in space by creating favourable conditions for the development of the cooperation between the two agencies. More specifically, it allowed, beyond already existing projects (the Netlander programme, a space mission on Mars replaced by the MetNet programme; the space observatory mission CoRoT which operated from 2006 and 2012; Cardiolab, a French-German contribution to the European Columbus science laboratory on the International Space Station (ISS) since 2008), to concretise current projects such as:

[80] CNES, « Signature d'un accord-cadre entre le CNES et le DLR », 14 February 2002

- Developing bilateral demonstration projects within the framework of the European Global Monitoring for Environment and Security (GMES) programme on the management, distribution and modelling of environmental data as well as on atmospheric pollution chemistry research;
- Developing of simulation tools application within the framework of the European Galileo programme;
- To inform themselves on about projects related to new space activities and to consult on activities carried out within the framework of the European Space Agency.

While this first framework agreement testifies from a new strategy of the CNES and the DLR to institutionalise their relations, the cooperation at the institutional level between both organisations, will rapidly deepen. Indeed, one year later, on July 3rd 2003 in Cologne, took place the first meeting of the joint Executive Committee supervised by Professor Sigmar Wittig, Chairman of the Executive Board of the DLR and Yannick d'Escatha, President of CNES, and in the view to lay plans for closer cooperation and to define a strategic programme for a strong European space industry. More specifically, it was decided for the year to come (2003-2004) to:

- "Pursue the close existing cooperation in Earth observation;
- Exploit the complementarity between optical and radar data, and undertake actions to prepare for Europe's independent GMES programme (Global Monitoring for Environment and Security)-the next major challenge on the horizon after the Galileo satellite navigation programme;
- Cooperate on the next generation of launch systems decided at the ESA Council meeting in May;
- Develop joint positions aimed at establishing a European space strategy and space policy, including the role of space in the future European Constitution and preparation of the White Paper that will lay the framework for Europe's future space policy;
- Craft proposals regarding the necessary reform of ESA's decision-making and funding processes, as part of European Union enlargement;

- Strengthen cooperation on research and technology, in particular by capitalizing on the agencies' complementary areas of expertise."[81]

In 2016, the first framework agreement was renewed and re-actualised in order to take into account the new institutional triangle ruling Europe in space. By this new agreement, signed in presence both of Brigitte Zypries, Federal Minister for Economics and Thierry Mandon, former State Secretary in charge of Higher Education and Research, the French and the German Space Agencies undertake to continue to cooperate and coordinate research and development, and on projects at national level, at the ESA and within the EU. Moreover, it engages itself for cooperation in satellite missions and within the International Space Station (ISS). According to the press release written by the CNES, the agreement will allow regular working meetings between CNES and DLR directors and agents but also provide for the possibility of staff exchanges. It is also to be implemented for a period of five years and will be renewed automatically.[82]

On the occasion of the signature, the Federal Minister for Economics, Brigitte Zypries, which is deeply involved in Germany on space-related questions; declared that "*with this agreement, the DLR and the CNES reinforce the long-lasting and excellent cooperation of France and Germany in the space field*". It proves that cooperation between both countries is not only technical but also political. The fact that space was an issue in the Franco-German Agenda 2020 is also a good illustration of it. Indeed, in the Agenda, two major points were related to space and cooperation between both countries. The first point concerns France and Germany's involvement in European Space Policy (*see Part 1.3.1.2*) while the second point directly deals with bilateral cooperation. Indeed, it provides for the implementation of a *"close cooperation in terms of innovations in science and space technologies that will be strengthened through the implementation of a joint mission on the launch of climate observation satellite. The joint construction of a methane detection satellite - one of the main greenhouse gases - to be launched in 2013-2014, is an example of bilateral cooperation that will significantly strengthen the aspects of climate protection in Europe*"[83] As a result, in the wake of the 2015 United Nations Climate Change Conference held in Paris (COP 21), France and Germany affirmed their joint desire to develop the small Merlin satellite programme

[81] CNES, "Germany and France to pursue closer cooperation toward a strong European space industry", 29 July 2003.
[82] CNES, « Coopération spatiale entre la France et l'Allemagne : le CNES et le DLR renouvellent à ILA Berlin leur accord-cadre de coopération bilatérale », 2 June 2016.
[83] Agenda Franco-Allemand 2020, 4 February 2010, p. 6.

which will measure the concentration of methane in the atmosphere, including in areas with little or no coverage to date, and expected to launch in 2020. It shows that the fight against global warming is one of the priorities of both agencies

This example is one of the many Franco-German projects realised throughout history. On a technical level, as already seen, this commitment for a partnership was very quickly realized by a governmental agreement which led to the creation of two telecommunications satellites in 1967, Symphonie A and Symphonie B. The programme included the construction of four satellites (two study models and two flight satellites) and the purchase of "EUROPA II" rockets for launches and the commissioning of two experimental earth stations for a total of 600 million dollars. Twelve years later, in 1979, the TVSAT-1 and TVSAT-2 programme was concretized by the launch of two television satellites, constructed by the French industry, and destined for the West-Germany television market. Today, there are no less than fifteen cooperation agreements programmes that unite both France and Germany.[84]

Beyond institutional cooperation, cooperation between the two countries can also be accompanied by an industrial component. In such cases, if the intergovernmental agreement covers all the cooperation with a partner, a clear distinction is made, within the intergovernmental agreement, between what is within the framework of the institutional cooperation and one is within the framework of the industrial one.

[84] BMBF, "50 Jahre Deutsch-Französische Zusammenarbeit in Forschung, Technologie und Innovation", March 2013, p. 170.

2. The Franco-German couple regarding Europe in space: an indisputable and undisputed engine

2.1. The Franco-German couple as an engine of European integration: theory and mechanics.

2.1.2 The "assumed" engine dimension of the Franco-German couple.

France and Germany, both by their scientific, economic and diplomatic strength, appear to be the two countries that count on the European and international space scene. Back in 1965 already, France acquired the status of the third space power, behind the United States and the USSR, since it managed to place by its own means a satellite in orbit around the Earth, "*Asterix"*. Four years later, "*Azur"*, the first German satellite developed in cooperation with the United States was launched to analyse the interactions between the solar wind and the Earth's magnetic field in the Van Allen belts. Today, France and Germany are the two biggest contributors to the European Space Agency, far ahead of Italy and the United Kingdom, the two other countries that count on the European space scene (*See Part 1.3.1.2*). This quasi-monopoly position on the space field in Europe is reminiscent of the common myth of a Franco-German engine for Europe, where both countries together path the way for the other countries on the way forward. Thus, the challenge of Franco-German cooperation goes beyond the bilateral cooperation and deals with a larger project which is the European integration. Indeed, many European projects have been consolidated around efforts to reconcile both French and German positions, often initially distant.

This idea of the role that should be played by France and Germany in Europe can be found in the various official texts devoted to the Franco-German cooperation. The *Elysée* Treaty of January 22nd 1963, signed both by Charles de Gaulle and the German Chancellor Konrad Adenauer, which intended to seal the reconciliation between France and the Federal Republic of Germany, planned that "*the two Governments shall consult, before any decision is taken, on all important questions of foreign policy, and in the first place on matters of common interest, with a view to achieve as far as possible a similar position. This*

consultation will focus on the following subjects: problems related to the European Communities and the European political cooperation".[85] In the joint declaration that followed, the *Elysée* Treaty is justified by the two heads of State, who recognized that a "*closer cooperation between the two countries is an indispensable step towards a united Europe*".[86]

Forty years later, the Franco-German joint declaration of January 22nd January 2003, on the 40th anniversary of the *Elysée* Treaty, recalled the achievements of the past in order to better look to the future of this cooperation. Indeed, "*France and Germany, founding members of the European Communities, have played a leading role in giving impetus to the great advances in European integration, particularly over the past twenty years: The Single European Act, the Maastricht Treaty, The Euro, the Schengen area. Most recently, Germany and France were keen to contribute to the successful accession negotiations of ten candidate countries in Copenhagen. France and Germany are conscious of exercising a common historical responsibility in the service of Europe. Their ambition is to continue to represent a force of proposal that could, without imposing anything, lead their partners*." The declaration also recalls that "*France and Germany are linked by a common destiny. Our common future is inseparable from that of a deep and enlarged European Union. We therefore want to propose to our partners a common vision of the Europe of tomorrow and we are determined to do everything possible to promote the strengthening of this Union."*

Shortly before the anniversary of the Treaty, this assumed engine dimension was taken over in front of the German Parliamentary Assembly, the "*Bundestag*", on January 16th 2003 by Joschka Fischer, then Federal Minister for Foreign Affairs. Speaking before the deputies, he had thus declared in a long speech all his attachment to the Franco-German cooperation, engine of the European Union. Indeed, *"Franco-German cooperation has been the nucleus and driving force behind the development of Europe and I maintain that it will remain so even in a Europe of 25 Member States. In four years, I have noticed one thing: when Germany and France agree, they never do so by excluding others or by facing them; On the contrary, they always involve the others."* Finally, the introductory text of Agenda 2020 presented on February 4th 2010 allowed Franco-German cooperation to be placed in an European context: "*for the last sixty years, Franco-German reconciliation has made it possible to establish a unique and exemplary cooperation between our two countries, based*

[85] « Elysée Treaty », 22 January 1963
[86] « Déclaration commune sur la coopération franco-allemande », 22 January 1963

on our awareness of the shared responsibility of our two countries vis-à-vis Europe and inspired by the will to act as engine of the European construction."

From the institutional point of view, and as illustrated in the extracts of these official texts and declarations, Franco-German cooperation, put into perspective in a European context, would be the driving force that would have enabled Europe to be built and achieved. Indeed, both countries would not only be at the heart of Europe by their geographical position, but also by their economic and political weight and their ability to influence decisions taken within the European Union.

2.1.2 A deep cooperation that can be found at all levels of government.

This idea of a Franco-German rapprochement that would lead to a union of Europe is not new and its force of impulse on the European construction was demonstrated throughout the twentieth century[87]. Some of the important non-exhaustive steps to which France and Germany have largely contributed include the establishment of the European Coal and Steel Community (ECSC) in 1952, the European Monetary System (EMS) in 1979 and the 1987 Single Act which has paved the way for the single European market.

When talking about the Franco-German couple, we should also refer to the duo formed by the Federal Chancellor and the President of the Republic. Thus, over the decades, several couples of Franco-German leaders have marked by their commitment these bilateral relations, especially trough common positions found during the *Blasheim* meetings or at European summits. From Konrad Adenauer and Charles de Gaulle, Helmut Schmidt and Valéry Giscard d'Estaing, François Mitterrand and Helmut Kohl, Jacques Chirac and Gerhard Schröder, to Angela Merkel and Nicolas Sarkozy, then François Hollande and finally Emmanuel Macron, the common action of these actors will often allow the Franco-German engine to impregnate the destiny of Europe by its impulse.

In addition, the Franco-German couple relies on cooperation between multiple actors, beyond the President of the Republic and the Chancellor, the public image of this relationship. Indeed, the *Elysée* Treaty had already put in place a binding calendar of bilateral

[87] For an input on the Franco-German myth, see : H. MIARD-DELACROIX, « Le mythe et sa fonction : l'exemple de l'efficacité franco-allemande en Europe », AFRI, VOLUME XII, 2011

meetings (*i.e* Part I of the Treaty entitled "Organisation") and organised consultation in three priority areas: foreign affairs, defence, education and youth. Today, this reflex of cooperation at all levels is based on a multitude of instruments that facilitate discussions between the two countries. Thus, to the great bilateral summits, which brought together many ministers around very broad agendas, progressively succeeded a thematic and more operational coordination. The amendment of the *Elysée* Treaty in 1988 was part of this dynamic by creating three new structures to strengthen the existing system: the Franco-German Economic and Financial Council (CEFFA), which aims to bring as close as possible the French and German positions on European but also international economic and financial issues; the Franco-German Defense and Security Council (CFADS), which aims to consolidate relations between the two countries on defence and security issues and to coordinate their action; the Franco-German Cultural High Council (HCCFA), which promotes joint cultural projects and provides a forum for reflection and proposals; and finally the Franco-German Council for the Environment (CFAE), which was set up in 1989 to harmonize positions and launch joint initiatives.

In order to coordinate and follow these initiatives, a Secretary-General for Franco-German cooperation in each country was set up on the occasion of the forty years of the *Elysée* Treaty. Together with all the ministries concerned, they contribute to the definition of the bilateral policies adopted at the Franco-German Councils of Ministers (CMFA) organized twice a year to anchor the concertation on topical issues, particularly regarding Europe, and to progress on several chosen issues. The rapprochement of political positions also involves deepening relations between national parliaments, trough annual meeting to discuss the main European themes and the national subjects on their respective agendas. Relations between French and German politicians are therefore carried out at all political levels, but also within civil society, as underlined by the notion of "*parapublic underpinning*", defined as "*cross-border interactions that belong neither to the public world of states nor to the private world of societies*" [88] and characteristic of the Franco-German relationship. This proves a real will of both parties to gather around the same values and ideas. Indeed, "*exchanges of information and interactions are the natural starting point for attempts to promote integration*". Furthermore, the relation between both countries has become natural since "*Germany is*

[88] U. KROTZ, "Parapublic Underpinnings of International Relations: The Franco-German Construction of Europeanization of a Particular Kind", 1 September 2007.

number one on the French list of most frequently mentioned cooperation partners, and France is number one on the German list".[89]

2.1.3 Mechanics of the Franco-German engine in the European Union.

Nevertheless, and despite these continuous exchanges, the impetus of the Franco-German couple in Europe was built based on two different visions of Europe. The image of the Franco-German engine, which is defined as permanent and perennial according to official speeches and texts, is in fact also marked by downtimes. Hélène Miard-Delacroix, a French specialist on German issues, emphasizes the economic and conceptual disparity between the two countries. These divergences can sometimes be profound, for example on the way in which military issues are dealt with, particularly regarding nuclear armaments and conflict management; relations with Eastern European countries; or the economic crisis and monetary instability. This partnership has been tested on several occasions, particularly following enlargements to the East of the EU, or even more so when France rejected the Constitutional Treaty establishing a Constitution for the European Union. In order to overcome these differences of conceptions and thus have a common voice, Hélène Miard-Delacroix characterizes the Franco-German dialectic as "*based on the need to find compromises to move forward*." Indeed, there would be a Franco-German cooperation based on a well-defined method, put in place empirically to manage specificities and seek compromises in order to satisfy the general interest and play this leading role for Europe. According to the author, the Franco-German compromise would then be deconstructed into three main stages.

A first step would consist into an analysis of the issues that neither France nor Germany could give up, namely the non-negotiable points defended by the two countries on a certain issue at the European level. In this case, this analysis of the stakes is done by exchanges of information and interactions between the two countries through the various points of contact already described above. If the Franco-German positions are similar then it is legitimate to speak of a Franco-German agreement on this policy. Consequently, this agreement will be transposed into a common initiative proposed at the EU level. According to Dirk Leuffen, Hanno Degner and Kerstin Radke, this common initiative "*can relate to a situation in which*

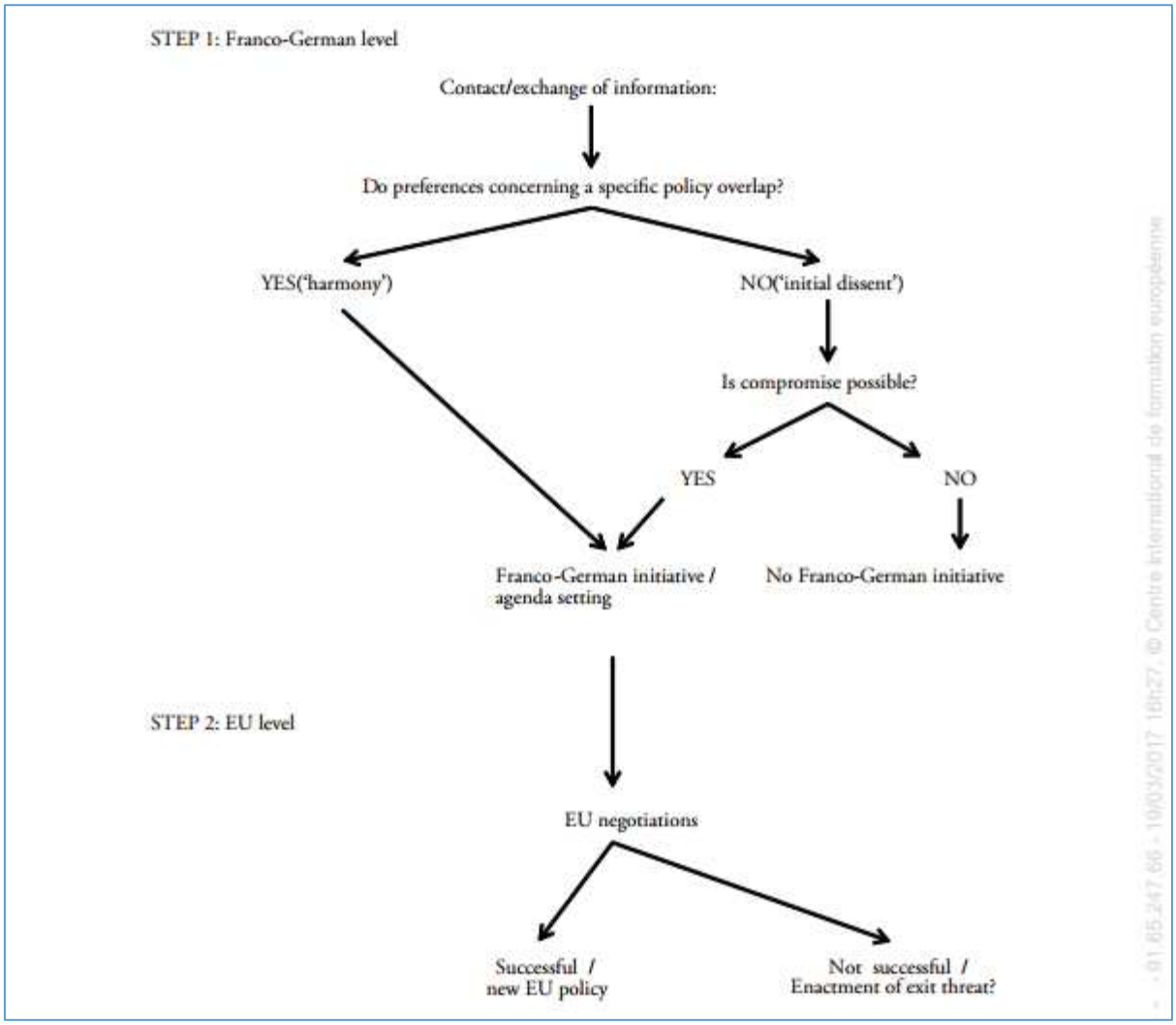
[89] D. NAURIN, R. LINDAHL, "East-North-South: Coalition-Building in the Council before and after Enlargement," in *Unveiling the Council of the European Union. Games Governments Play in Brussels*, 2008, pp. 64-78.

gridlock amongst EU states prevails, or can relate to a new issue, not discussed at the European level before. In both cases, we can speak of 'agenda-setting'".[90] On the other hand, if the positions are not similar and far from each other because of political, historical, economical or cultural issues, the possibility of finding a common ground that will satisfy both parties will be discussed among them. Indeed, "*Franco-German contact is often the strongest in areas where the two states are in disagreement*."[91] Two options are therefore possible: in the first case, Franco-German positions seems to be too far away from each other to obtain a common position. Consequently, a joint Franco-German initiative will not be feasible. As indicated, this situation will "*significantly decreases the chances for a European agreement on integration policies for which support from both France and Germany is generally considered a necessary condition*"; in the second case, both France and Germany, reach a compromise, after an identification of different interests and approaches and fruit of negotiations and concessions on both sides to define common practical ways to follow. Consequently, this agreement can also be transposed into a common initiative at the European Union level.

Once a bilateral compromise has been reached, or if the Franco-German positions are similar from the outset, the initiative is therefore moving into the European arena where the other Member States will discuss it and where "*sufficient support of the MS is crucial for the successful transition of the Franco-German initiative into a European integration step*". On the other hand, and paradoxically, the support given by the other Member States for the Franco-German position would be even more important if the initial positions were very far apart. Indeed, "*the greater the divergence between French and German preferences on a given issue is, the more likely it is that, if a common Franco-German position is developed, this will be "multilateralized" and taken over by the EU as a whole. This hypothesis predicts that support on the EU level should be higher in the Franco-German 'compromise' scenario as compared to the 'harmony' scenario.* This can be explained by the fact that the positions of other countries are more likely to be concentrated within the spectrum of French and German positions: their interests would then necessarily be taken into account. Moreover, since already negotiated by the two countries, the other EU countries can expect a faster implementation of this initiative. Moreover, the so-called exit option, a theory popularized by the economist Albert O. Hirschman, can also come into effect if the other Member States do

[90] D. LEUFFEN, « Which Mechanics Drive the 'Franco-German Engine'? An Analysis of How and Why France and Germany Have Managed to Shape Much of Today's EU », *L'Europe en Formation*, 2012, p. 45-83.
[91] A. COLE, "Franco-German Relations", 2014, p.69.

not support the initiative at the outset, before retracting thereafter. Indeed, as reported, "*the credible threat of a Franco-German 'going it alone' might 'discipline' those states that are reluctant towards a new integration step but that are even more reluctant towards France and Germany circumventing the EU. Against the backdrop of the institutionalized enhanced cooperation procedure, the exit option card can also be played inside the EU by creating a subgroup of countries that is willing to pursue a common policy without all nations on board*." Thus, by the threat posed by the two driving countries of the European Union, the other Member States would have no choice but to side with France and Germany with the "fear" to be put aside. Finally, in order to summarize my remarks, the mechanics of the Franco-German engine in Europe can be schematized as follows:



Source : D. LEUFFEN, « Which Mechanics Drive the 'Franco-German Engine'? An Analysis of How and Why France and Germany Have Managed to Shape Much of Today's EU »

However, the Franco-German couple has not continuously played its role as engine for the European integration as former French President Nicolas Sarkozy underlined it during an interview for *Le Figaro* in March 2008: "*When General de Gaulle and Konrad Adenauer agreed, all Europe agreed. In a way, when Valéry Giscard d'Estaing and Helmut Schmidt agreed, the whole of Europe followed. But we are no longer in this Europe*"[92] Indeed, disagreements within the executives, diverging interests or cultural differences sometimes impossible to overstep, fear of the other member states of a French-German "*directoire*"[93] had the effect to make the Franco-German couple losing its efficiency and it is historically marked by periods of stopover.

To conclude, this idea of the Franco-German engine for Europe seems to have regained its importance, particularly when one look to the recent German and French press coverage. Indeed, the French presidential elections of May 2017 aroused a strong interest among the German population. In recent months, many German daily newspapers have devoted many political pages to the enthusiasm of Emmanuel Macron and the upheaval of the French political landscape. The way it went beyond the left-right divide has done much for its popularity. Moreover, the outcome of the French elections was seen in Germany as a decision on the future of Europe. Thus, the Germans are rejoicing over the return of the Franco-German engine on the European scene. An engine which seems to be starting again after years of purr, as the press believes after the conclusions of 19th Franco-German Council of Ministers held in Paris on July 13th 2017, a Council marked by the announcement of a plan of common fight aircraft. Thus, the *Frankfurter Allgemeine Zeitung* titles "*full-throttle towards more cooperation*" [94], while the TV channel ARD talks about "*a howling engine and the European idea takes on the height*". Beyond the will to intensify material cooperation, with the prospect of having in common the same new-generation combat aircraft, but also troops, tanks or drones, this major boost is very symbolic and political. It echoed Angela Merkel's remarks after the Sicilian G7, according to which the United States with Donald Trump as President was no longer a reliable partner, she had invited the Europeans to take their destiny into their own hands.

[92] *Le Figaro*, 6 March 2003
[93] J. FAVIN LEVEQUE, « France-Allemagne : l'heure de vérité. Moteur, directoire ou nouveau partenariat ? », 2012
[94] *Frankfurter Allgemeine Zeitung*, 13 March 2017 and 8 May 2017

2.2. The Franco-German space engine: between progresses and compromises.

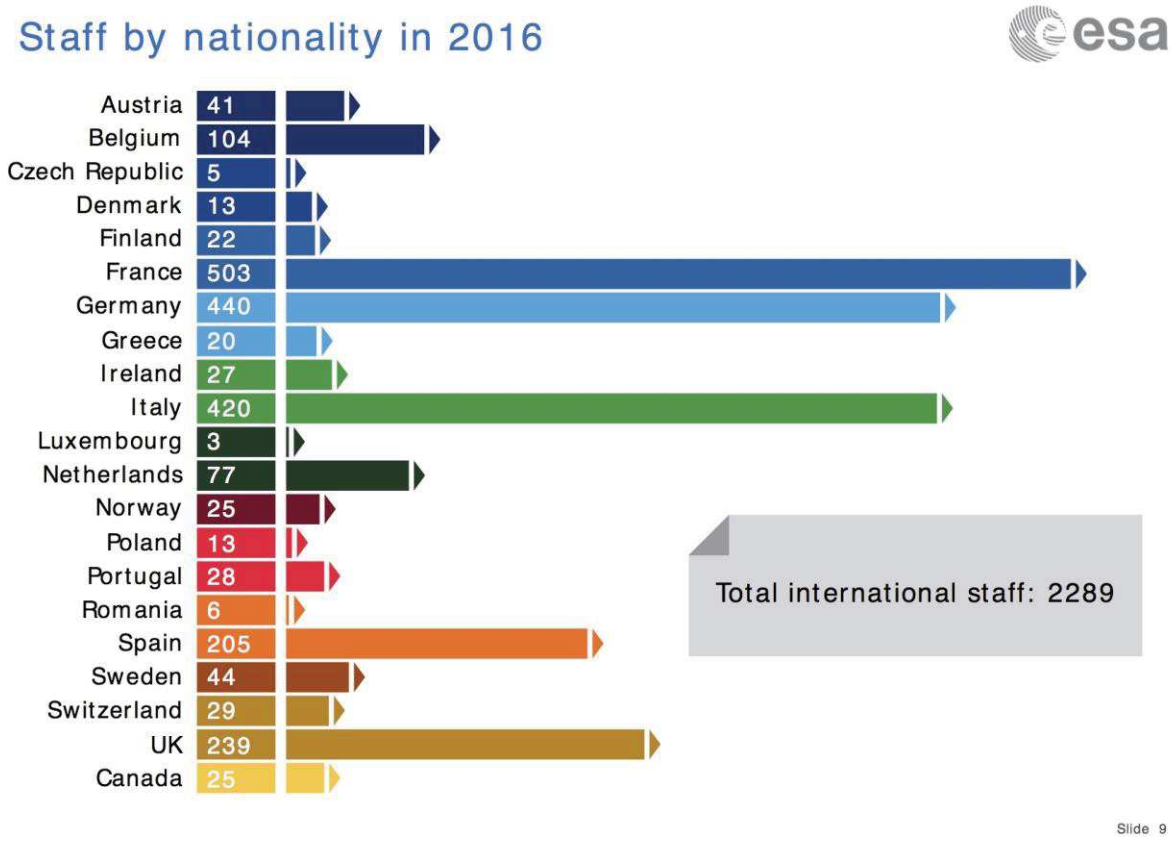
2.2.1 An role of engine expressed within the European Space Agency but negotiated bilaterally.

The space cooperation between France and Germany appeared very early on as evidence and within the global framework of the Franco-German scientific cooperation undertaken after the signing of the *Elysée Treaty* in 1963. If the Treaty planned in 1967 that "*research organizations and scientific institutes of the both countries will develop their contacts, starting with more reciprocal information, and where programs of concerted research will be established in the disciplines where this will be proven possible*"[95], one has to wait 1967 to see the first intergovernmental agreements on two major scientific projects: first, the Construction and the commissioning at the Max von Laue-Paul Langevin Institute (ILL) in Grenoble of the world's first high-flux research reactor; second, the common development of the "*Symphonie*" programme whose importance for the creation of a Europe of space was decisive.

Moreover, France and Germany have participated directly or indirectly to the major programmes that have made Europe a global space power. This participation was made possible on the one hand by a common will of the two countries to make space a major area of collaboration. This can obviously be illustrated first by the financial contribution of these two countries both within their respective programs but also in favour of the European Space Agency and second with the presence of a Franco-German couple at the Head of the Agency: the German Johann-Dietrich Wörner former President of the DLR and now General of the ESA and the French Jean-Yves le Gall, President of the CNES but also chair of the ESA Council since July 1st 2017. In this case, it is interesting to know that Germany spontaneously asked Jean-Yves Le Gall to be the chair of the Agency's Council. The fact that this request was made directly, without the influence of France, testifies from the importance of the Franco-German relationship, on both sides, in the European space sector. This can also be expressed when one look at ESA's staff by nationality in 2016. On a total of 2289 people employed by the Agency, 503 were French and 440 were German. Only Italian citizens, from

[95] "Elysée Treaty", 23 January 1968.

a country which is the third most powerful European country in space issues after France and Germany, were employed on numbers close to the two big giants.



Source: "ESA Corporate Presentation", esamultimedia.esa.int

As a reminder, the two countries are the two biggest contributors to the Agency, far ahead of the other countries, which are members of the ESA. As a matter of fact, only the European Union has a superior contribution, which can particularly be explained by the importance in terms of cost of programmes like Galileo, Copernicus and GMES. Moreover, according to Jean-François Dupuis, Counsellor for space issues at the French Embassy in Berlin, France and Germany have a share in every space programme undertaken by the European Space Agency, and in most of the cases, with the leader position in the programme. As a consequence, both countries are deeply involved whether in mandatory and/or optional programmes. One of the most recent examples of these Franco-German successes, for which the ESA has particularly communicated in order to interest a non-initiated large audience and for which it has received NASA's congratulations, is the success of the Rosetta mission. After its launch by an Ariane 5 rocket on March, 2nd 2004, the Rosetta probe has travelled more than six billion kilometres before ten years later, on November 12th 2014, the landing

gear Philae landed on the Churyoumov-Gerassimenko comet. France and Germany's role in the success of the mission has been essential. Indeed, they were the biggest contributors to the realization of the Philae gear, with a propulsion capacity resulting from a Franco-German industrial cooperation. In addition, while the German Space Agency was responsible for the control centre of the mission, the French Space Agency took the direct responsibility of the science mission centre.[96]

If, in view of the visible results of Europe in space, the relevance of speaking of a Franco-German engine in Europe seems obvious, one must nevertheless put into perspective the idea that there would have been a full agreement of both countries on all major programmes, at every level. Indeed, the culture of compromise, characteristic of the Franco-German couple and demonstrated throughout the history of European integration, has also been more than present in the space field. In this regard, a speech delivered in 2012 by Laurent Fabius, former French Minister for Foreign Affairs, at a Franco-German conference, which had as theme the Philosophers of Enlightenment, can effectively account for all the complexity of the Franco-German relationship. If the meaning of the latter is "*to carry projects*", it is also "*a vocation to be a driving force for Europe, not a directory*" while bearing in mind that "*we Frenchmen (sic) sometimes are struggling to accept the idea that Germans are not Frenchmen who speak German - and vice versa*."[97] In order to be the judge of this dimension of the two countries being the driving forces on the space institutional scene, it is first necessary to reconsider the decision-making process that characterises space in Europe. In this technical field, France and Germany evolve in the same unique institutional context: within the European Space Agency and within the European Union.

As a reminder, there are two types of legal commitments for France, Germany and the twenty other Member States that compose the European Space Agency. First, recurring commitment which correspond to the mandatory programs, periodically validated at the Ministerial Councils (compulsory scientific program and general budget of the ESA; Second, those relating to optional programmes to which each country chooses to subscribe or not, and for which the percentage of participation to the given programme is freely decided by the subscribing Member State. Although each country has one vote, decisions are not always made in the same way. Indeed, according to the programmes, either unanimity (mainly used

[96] French Embassy in Germany, « Espace: Succès de la mission Rosetta avec une forte contribution franco-allemande », 26 January 2015
[97] Speech of Laurent Fabius, French Minister for Foreign Affairs, 7 February 2012

for mandatory programs), a two-thirds majority, a full majority or a qualified majority (based on the investment made by each country) are the legislative rules within the European Space Agency's Council.

For its part, the European Union is a new player in space programmes. In this regard, the European Institution has set up a special body, the Space Council, which has already met several times. This body regroups at the same time both the members of the ESA Ministerial Council and of the EU but also the Ministers in charge of space affairs of the EU Member States, which are at the same time outside of the European Space Agency. However, this Space Council doesn't have a decision-making power. Indeed, it can be more apprehended as a forum for public users of space in which the approach is essentially oriented towards space systems and applications and not so much the launcher field and the guaranteed access to space.[98]

It is therefore at the European institutional level, within the ESA that France and Germany have been able to wield their influence on the other Member States to lead Europe in space. In this sense, Ministerial Councils of the European Space Agency seem to play a fundamental role in being the institutional platform for space issues in Europe since it is the decision-making body. Indeed, at the end of each councils, conclusions of the conference are publicized by the European Agency. As an example, after the ESA Council meeting at ministerial level in Luxemburg on December 2nd 2014, the Agency reported that ministers in charge of space issues adopted three resolutions on Europe's access to space, space exploration strategy and on ESA evolution.[99] However, according to Jean-François Dupuis, France and Germany are actually doing the European Space Agency's job to push forward projects and programmes.

Indeed, there are permanent exchanges between France and Germany both at the institutional and at the technical level. The position of the Space Counsellor to the French Embassy is in this regard so decisive because it makes it possible to make the link between the two countries. As a matter of fact, more than just reporting French space policies to the Germans, the role is eminently political and is akin to representing the interests of the country, in this case France. The presence of a space advisor at the French Embassy in

[98] French Court of Auditors, « Les engagements du CNES dans les programmes de l'Agence Spatiale Européenne (ASE) », June 2008, p.9.

[99] ESA, "Successful conclusion of ESA Council at Ministerial level", *esa.int*, 2 December 2014.

Germany is somewhat unusual and still testifies to the importance given to the Franco-German couple from the French point of view. Indeed, Indeed, there is no space adviser in embassies in London, Rome or The Hague, but in countries that are of great importance to France regarding space issues (United States of America, Russia, India, Japan and one post expected to be created in China). At the European level, there is a space advisor at the "Permanent Representation of France to the European Union" (*Représentation permanente de la France auprès de l'Union européenne, RPUE*). However, he is in permanent contact with Berlin. On the German side, the DLR office in Paris is not part of the diplomatic network and can testify at first, from the industrial and commercial dimension awarded to space issues by Germany. On the contrary, the strong geostrategic dimension that France grants to this technical field, and which tends to be absent from the German side, could be illustrated by the diplomatic aspect given to the function of counsellor for space issues. However, if the daily function of Isabelle Reutzel, Head of the DLR Paris Office, differs on the form, the idea is the same: increase the visibility of the German Space Agency by being close to the French partners but even more to the European Space Agency. Indeed, the Head of the DLR office in Paris is more interested to the various issues developed within the European Space Agency, headquartered in the French capital. On the contrary, the French space advisor in Berlin doesn't take up these issues in his daily job and rather focus on political issues and try to convince the various German representatives (ministers, deputies, industry representatives) that France's position would also benefit them. These constant exchanges, which characterize the Franco-German relationship like any other areas of competence, enable both countries to exchange views on the different positions defended within sight of the negotiations at the Ministerial Councils of the European Space Agency.

However, the negotiations begin well before the Ministerial Councils of the ESA. Indeed, the preparations of these summits always begin only between France and Germany, in order to arrive at the Council with a convergent position. This phase of exchanges, negotiations and taking into account the interests of the two countries is often quite difficult, as reported by Jean-François Dupuis. Thus, the different historical heritages of the two countries, but also the different conceptions of space in the two countries - France favouring the geostrategic aspect of the latter, while Germany attaching a great importance to the industrial aspects and to science - result in common positions which must be found through step by step compromises. As a matter of fact, these compromises always concern the launchers, on the French side, and the International Space Station on the German side.

Thus, the preparation of the Ministerial Councils always begins between France and Germany before Italy is included to the table, but only when Germany and France have previously agreed on a common position. However, the relationship between Germany and Italy is often difficult and France frequently has to act as intermediary between both countries, as it was the case during the ESA's Ministerial Council in Lucerne in 2014. The European Space Agency is then associated with these three countries, but, again, only when a common position has been found between France, Germany and Italy. On another note, the actual Director General of the European Space Agency tends to be vexed with this mode of operation. As a reminder, before taking up his duties at the ESA on July 1st 2015, he was Director of the DLR for 8 years, from 2007 to 2015. In these duties, he was therefore at the very beginning of the negotiation's process with France, while carried out at a bilateral level. As an aside, within the ESA, we can find countries with positions that are closer than others, in the way that Daniel Naurin and Rutger Lindahlest have demonstrated in their study on the Council of the European Union that France is much closer than Germany to the countries geographically located in Southern Europe. On the contrary, Germany has more ties with Northern Europe's countries. [100] Within the European Space Agency, the theory is quite similar since Germany is closer to the Nordic countries, while France is closer to the countries of the South, but also with Belgium, Switzerland and the Netherlands. Curiously also, Austria shares more links with France than with its German neighbour.

According to Jean-François Dupuis, France and Germany, by this common preparation and in the position as the two most important countries, is in a way replacing ESA's work by doing its job. However, the European Space Agency seem to be quite satisfied with this situation because it allows European space to advance much more quickly and efficiently on the various programmes. On the other hand, when a third country is going to challenge a Franco-German position, a phenomenon that happens for every programme, the Agency will play a real role of conciliation. As an example, Italy had shown in the past reluctance to a provision related to the Ariane 6 launcher. But the overlaps between the Ariane programme and Vega, the lightweight launcher developed under control of Italian work, has resulted in the fact that Italy finally stayed on the side of the two engine countries. As a general rule, ESA member countries expressly know that Germany and France do finance at least 50% of each programme. In addition, if there is no agreement, there will then be no programme. As a

[100] D. NAURIN, R. LINDAHL*, Op. Cit*., p. 64.

result, these member countries of the Agency will lack economic spinoffs. As a reminder, the fair return rule is very important as it can act as a constraint capacity.

As a conclusion, while the Franco-German engine in the European Union is based on an incessant relationship at all levels of government, also symbolised by framework agreements between the national agencies, it can be demonstrated that the Franco-German engine in space shares the same characteristics. Indeed, France and Germany maintain the most developed bilateral partnership at European level in the space field, both technically and politically. The couple is the bearer of the programmes decided by European Space Agency since without the agreement and the financial contribution of these two leading countries, no programme could be implemented. In this sense, it is a real proposal and driving force for all the other Member States of the Agency. While it is generally understood that for one euro invested in space, it would result in twenty euros economic spinoffs, the Franco-German couple thus allows Europe to assert itself on the international scene. On the other hand, in the same way that the Franco-German engine in the European Union has sometimes lost its efficiency which resulted in periods of stopover, the Franco-German positions in space are sometimes at a great distance from one another.

2.2.2 The launchers and the International Space Station issues: a necessity to find compromises.

Reasons which can explain French and German spatial positions are essentially to be found around political, historical and economic considerations. As a reminder, the legacy of General Charles de Gaulle had the effect of giving a geostrategic and military dimension to the development of space in France. It should not be forgotten that, in the beginning, space was made by and for the military. This geostrategic dimension is less present in Germany, for obvious historical reasons and a certain taboo linked to the legacy of the Nazi past and the development of the V1 and the V2 ballistic missiles. While the industrial and research dimension is privileged by the Germans, with the country being the biggest financial contributor within the ESA for the International Space Station as a best example, in recent years there has been a “rapprochement” between civil and military research. Indeed, the *“Zentrum Luftoperationen”* in Kalkar in Ukraine is both managed by the German army and by the DLR and aims at observing the space climate. But due to these differences, France and

Germany will always initially be opposed on the launcher issue and on the International Space Station, before reaching compromises in order to justify their role as engines in the European field of space.

As far as the launchers are concerned, the German blockage on the issue would be therefore linked to historical and affective reasons. For the Space Counsellor to the French Embassy in Germany, which is located at the heart of the exchanges between the two countries, the Franco-German compromises are, in this sense, always a "game of bluff". Indeed, if the Germans do not publicly claim to be the pioneer country in the launchers' technology, the duty of remembrance being very present in the country, they would like the other countries to become aware of it. Moreover, the fact that a number of German engineers have joined the scientific capacities of the Second World War winning countries is, in this sense, more difficult to accept. In fact, the Germans would agree with France that there would be no great space power without launchers. This German strategy is justified by the fact that, as long as they do not claim this innovative role their country had, it is France which continues to play the leader role in the field of launchers and thus, to financially support most of the programmes. In return, the Germans could thus enhance the International Space Station (ISS). As a result, the example of the difficult adoption of the Ariane 6 programme, which will become a reality by 2020, can testify to the singularity of the Franco-German relationship in the space field.

In a recent interview given to the French newspaper "*La Tribune*", on December 2nd 2014, one day before the European Space Agency's Ministerial Council in Luxembourg which have seen the Ariane 6 programme finally being adopted, Geneviève Fioraso, former French Minister of Higher Education and Research, declared that "*France could not have done Ariane 6 without the Germans*".[101] However, it all began in the early 2010s with the progressive appearance of the "New Space", which came to compete with the established order within the different international and European space powers. On November 29th 2013, when the Space X Falcon-9 rocket succeeded in putting a telecommunications satellite in orbit, it resonated like a wake-up call for the space powers. Not only did Space X weaken the near-monopoly of the Ariane 5 launcher, but it also broke prices by offering launch rates 30% cheaper than its European competitor, bringing them to about 60 million dollars. This paradigm shift has forced Europeans to rethink their strategy and consider a more competitive

[101] M.CABIROL, « La France ne pouvait pas faire Ariane 6 sans les Allemands" (Geneviève Fioraso) », *La Tribune*, 2 December 2014.

and available successor to Ariane 5, one of the greatest successes of the European space. However, this desire to change the European launcher, pushed by France, has long been hampered by German reticence.

At the European Space Agency's Ministerial Council in Naples in 2012, France arrived with the ambition to start the development of the Ariane 6 programme by 2021. On the German side, the ambition was to continue the modernization of the enhanced version of Ariane 5, with the objective of managing the transition without abrupt technological breakthrough and maintaining Ariane 5's leadership during the development period of the new launcher. The "Ariane 5 Midlife Evolution" programme (Ariane 5 ME) was launched in 2008 in The Hague at the previous ESA ministerial meeting and aimed to give an additional 20% to the throw-weight capacity of the launcher thanks to a "restartable" upper floor which should also equip the Ariane 6 launcher. This solution was therefore favoured by the Germans because of the stakes for the country's industry. On the basis of these different claims, a three-stage agreement was reached: first, the launch of the advanced version of Ariane 5 ME in 2017-2018; second, the development of a joint propulsion floor; and finally, the launch of specific activities linked to Ariane 6, the objective being to optimize the studies before the final choice, at the ESA Ministerial Council of 2014, of the launcher which will take over from Ariane 5. However, this compromise was difficult to obtain, both before and after the Ministerial Council. Indeed, Jan Wörner in his blog on the website of the DLR, the German Space Agency, underlined the difficult preparation of this Council where the countries had "buried themselves in fixed positions, which seemed irreconcilable". [102] Indeed, during the council, the positions did not immediately come together. The French newspaper "*Le Figaro*" reported that "*the discussions continued late into the night in the frescoed lounges of the Royal Continental, the grand hotel located on the seafront in Naples. French, Germans, and Italians, were still multiplying contacts this morning to make interests and views that were hitherto incompatible converge*"[103]. If a compromise has been found, it tends to favour German positions more than French ones. Indeed, the development of the version of Ariane 5 ME has been acted, contrary to the final confirmation the Ariane 6 programme. Indeed, at this stage, the idea was still to study the feasibility of the project.

[102] J. WÖRNER, "ESA-Ministerratskonferenz - eine persönliche Betrachtung", *dlr.de*, 26 November 2012.
[103] M. MENESSIER, « Feu vert de l'Europe pour un lancement d'Ariane 6 en 2021 », *Le Figaro*, 21 November 2011.

A second step in the construction of the Ariane 6 launcher was completed in 2014. Regarding space issues, the year 2014 was marked by the preparation and the organisation of the ESA Ministerial Council in Luxembourg of really high importance after the difficult compromise of the 2012 Ministerial Council of Naples. The main objective of the German government for this reunion was to enhance its political and economic positioning in support of the competitiveness of its space industry. Among the issues addressed at the Luxembourg Council, the launchers and the International Space Station (ISS) were the two important major programmes in their eyes. Regarding the access to space, the German Government wanted to give priority to the realization of the advanced version of Ariane 5 ME, of which it was the main contractor for the construction of the upper floor with a strong industrial activity especially in Bremen, located in the north-west of Germany. As already seen, the idea of developing a new launcher was not rejected by the German government and was the subject of a first agreement at the Naples Council in November 2012, but this was to be carried out after the qualification of Ariane 5 ME and after a more in-depth reflection on the needs of the market for a new launcher.

The German government also wished to confirm the extension of the use of the International Space Station to 2020 and go back to the financial sharing conditions negotiated at the 1995 ESA Ministerial Council of Toulouse[104], in order to optimize the investments already made on the ISS. While France also favoured extending the use of the International Space Station until 2020, it highly supported the need to launch the Ariane 6 programme directly, without the Ariane 5 ME intermediate step, in order to create a more flexible launcher against international competition and particularly enterprises from the "New Space" such as Space X. Finally, the Luxembourg Ministerial Council unanimously decided to launch the Ariane 6 programme with a first flight in 2020. The budget for the programme as it was voted at the Council amounted to around three billion euros, of which France contributed to 52% and Germany 24%. However, an appointment at the next ESA Ministerial Council to come in 2016 was decided in order to confirm the pursuit of the Ariane 6 development programme. In return for the German approval to Ariane 6, the demand was that France, and in lesser extent Italy, should again become more involved in the financial contribution to the International Space Station. While Germany contributed to more than 50%

[104] On October, 18th and 20th 2005, in Toulouse, Ministers agreed on the funding of Europe's contribution to the ISS. They subscribed, with immediate effect, to the declaration covering the development of the Columbus orbital laboratory and the Automated Transfer Vehicle (ATV) to be launched by Ariane 5.

of the programme, the country managed to reduce its financial contribution to 36% for the period 2015-2017. France, for its part, increased its share to 27%.

According to Jean-François Dupuis, the most difficult issue of this Luxemburg ESA Council was to get an agreement with Germany for the launch of the Ariane 6 programme. As a result, the commitment to the new European launcher is the main result of this ESA Council of Ministers and, in this sense, is considered as a very important Council. Furthermore, it perfectly illustrates the processes of the Franco-German compromise in the space field where each ESA Council of Ministers is characterized by a negotiation of the launchers, on the French side, against the ISS, on the German side. This "game of bluff", as Jean-François Dupuis calls it, is above all synonymous with a real background problem, both in terms of prestige, ego and money. Indeed, if France has institutionalised space before the Germans, they also have historically always invested more than their neighbours, and logically been leader in all fields. In 1985, Germany became the European driving force for the International Space Station, where the development of scientific activities was prioritized and enabled it to assert itself from France by giving the German an important element of negotiation. In this sense, a rather paradoxical negotiation makes it possible to verify the prestige dimension that Germany grants to the ISS.

At the beginning of 2016, the argument developed by the Germans was that the ISS cost them too much and that the economic benefits are not important enough for its industry. According to Jean-François Dupuis, they were then removing their element of negotiation, which was quite incomprehensible on the French side. Moreover, having invested heavily in the programme, and with a financial contribution from Europe which amounted to 8%, Germany's disengagement was not a feasible solution. This position soon started to reach the Americans, the main contributors to the International Space Station, who did not wish to see their German allies disengage from the ISS. In response, the future of the German participation in the programme was decided at the highest political level. Indeed, when President Barack Obama visited Berlin in November 2016, he spoke directly on this subject with German Chancellor Angela Merkel. As a result of this interview, astronaut Alexander Gerst, who has already in the past spent six months aboard the ISS, will assume command of the station in 2018 for a six-month mission. A decision that convinced the Germans to remain in the programme and, again, to benefit from their negotiating argument in the classic layout which characterizes ESA Ministerial Councils: an increase on each side of the shares in the ISS, for France, and in the launchers, for Germany.

On the other side, France, member of the UN Security Council, gives high priority to launchers, because of its strong strategic dimension in making a country a nuclear power. Indeed, Ariane is more than a launcher because it has a dual capacity: it is a launcher but at the same time it can be used for its ballistic capability. If France has strongly supported the EU Galileo programme, it is also because of its geostrategic value since the satellite constellation allows the production of essential encrypted information in the case of external operations, an area on which Germany is less invested.

However, the negotiations leading up to the Lucerne Ministerial Council in 2016, which converged only a month before the Council, can show an interesting paradigm shift regarding Germany. Indeed, the French Ministry of Economy has pushed for Germany to be financially more present in the Ariane 6 programme plan. Indeed, France wanted Germany to increase its share from 12% to 23%. In return, Germany has managed to negotiate two important points for its industry and the development of its military technology. Indeed, as a reminder, Germany is above all an economic power based on an export capacity. In this sense, the whole German economic strategy lies in supporting its export capacity. If space is regarded as just another tool for exporting and making profits, ESA's fair return's rule, which requires a country to receive industrial contracts for its own industries up to the level of financing invested in the programme, has all its importance to the eyes of the Germans. In this sense, Germany wanted, and obtained, a part of the manufacture of the solid-fuel boosters of the future launcher for its industry, domain that was normally managed by Italy. But this technology also gives them the dual ability to make a small launcher themselves, something they could not do before.

The difficult realization of the Ariane 6 programme is symbolic of the Franco-German couple, as engine of the European space. Without one or the other, the programme would not have been possible. In the present case, Germany was during all the negotiations in a position of strength. Indeed, it was mainly France, driven by its geostrategic interests particularly, which worked mainly for the concretization of the programme intended to endow Europe with a new launcher. In return, Germany could serve its own interests by negotiating the launchers against a greater participation of France to the International Space Station. Although the Ariane 6 programme was finally finalised after the signature in November 2016 of a contract between the European Space Agency and "Airbus Safran Launchers", it highlighted the major differences of paradigms between the two countries. Nevertheless, through intense phases of meetings and negotiations, positions have finally converged.

Finally, if this difficult adoption of the new European launcher is a relevant example to show the issues that can divide both countries, one must not generalise it to every programme where France and Germany are involved. For example, the Merlin programme is an example of a successful Franco-German space cooperation with full complementarity between the two countries. The fact that it is a bilateral programme and not one located at the ESA or at the European Union level is perhaps an explanation to it.

2.3. The increasing responsibilities of the EU: The arrival of a new actor ready to supplant the Franco-German engine in Europe in space?

The Franco-German engine of Europe in space expresses itself within the European Space Agency, and more precisely within the ESA Ministerial Councils. However, since the Treaty of Lisbon, the European Union has asserted itself as a full-fledged player regarding space issues in Europe. While France and Germany have historically always played the leading roles in Europe, will the arrival of this new actor supplant this historic engine or, on the contrary, allow an even greater step forward in this technological field? An answer to this question can be given when considering the future of the ESA-EU relations but also on the question of what is to put under the wing of the European Union.

Since the Treaty of Lisbon, the governance of space Europe has been characterized by its plural nature. Moreover, this space institutional triangle is divided between intricacies and fragmentation. The first strong tie between the European Space Agency and the European Union is financial. Indeed, almost seventy percent of the EU's space budget is delegated to the ESA for the implementation of its programmes, which amounts to about twelve billion euros for the EU. As a result of this budget delegation, the EU is the largest contributor to ESA and exceeds the amount of all individual contributions from the ESA Member States. In addition, these financial intakes are combined with operational asymmetries.

Indeed, these functioning asymmetries are primarily related to the nature of these organisations. While the European Union is a unique organisation, *sui generis*, ESA is an intergovernmental organisation where all states that wish to join can apply to be a member. In other words, ESA is a kind of club. In 2012, in a communication to the Council and the

European Parliament, the European Commission put forward limits to the coexistence of these two organisations.[105] In the document, there were four such limitations:

1. An incompatibility of the financial rules between both organisations, which are characterised by difficulties linked to the fact that the programmes are financed jointly by both the ESA and the European Union Member States. Moreover, the importance of the ESA's fair return rule is contrary to the financial principles of the European Union;
2. The issue of ESA member states is rather a conflicting one. Indeed, while Norway and Switzerland are member states of the European Space Agency, they are not, at the same time, members of the EU. The reciprocal is also true where countries are members of the EU but not of the ESA. The question of the "disproportionate" influence that these non-EU states may have on EU-led political programmes makes *de facto* sense;
3. A third limitation to the coexistence of these two organisations concerns an asymmetry in security and defence. While the Lisbon Treaty has strengthened the EU's competence in these areas, space infrastructures offer valuable potential that can be used by relevant defence actors. Thus, in theory, cooperation with the ESA should be a facilitator. However, considering this asymmetry of membership explained above, cooperation between the EU and ESA and its member states becomes more problematic when security and defence issues are at stake;
4. The last limitation which is developed in the EU Commission document notes the lack of political responsibility for the ESA stemming from its status as an intergovernmental organisation and which has no organic link with the EU, particularly with the European Parliament, which is the direct link between EU citizens and the European institution.

Indeed, the future of the relations between the European Union and the European Space Agency can be questioned. From this question arises the role that Germany and France can play in this new institutional architecture. As it was recalled by the 5th Space Council (which brings together the Ministers both from the Member States of the European Union and from the European Space Agency) in November 2008 under the French Presidency[106],

[105] Communication from the Commission to the Council and the European Parliament Establishing appropriate relations between the EU and the European Space Agency /* COM/2012/0671 final */, 14 November 2011
[106] CNES, "7ème Conseil Espace", *Latitude 5 n°91*, January 2011.

Europe in space is based on three major public actors: the Member States, the EU and the ESA. These three actors each have space policies, budgets, own programmes and in-orbit and ground capacities (satellites, launch systems, ground segments, antennas, project management capabilities, industries, research centres, etc.). Europe in space is made up of all the capacities of its three pillars; the main challenge being to put in place a space governance in Europe in order to bring together and make full use of all these capacities and to coordinate programmes.

In this sense, the Galileo programme, the European satellite navigation system, is a perfect example of this governance issue and the resulting potential problems it can have. In the early 2000s, this program was innovative. Indeed, it was the first time that the ESA and the European Commission had to work together to set up such an audacious system and that the European Commission was in direct possession of a space programme. In order to set up Galileo, the European Commission and ESA drew up in 2003 a common endeavour, which consisted in a public/private partnership, and which was also the first time that the European Commission participated in such a partnership. In 2009, a report by the European Court of Auditors on the management of the development and the validation phase of the Galileo programme highlighted this innovative governance framework, which has had mixed effects[107]. The report, which is quite critical of the European Commission, shows that the Commission has not given the necessary impetus and that the negotiation and implementation of the public-private partnership has proved to be inadequate. Moreover, problems of governance characterized by weak leadership from the European Commission, a lack of consequent budget, and an "oligopolistic" industrial organization were clearly highlighted by the European Court of Auditors and largely contributed to Galileo's delays and additional costs. The report also considered that the Member States played a bad role and sought their commercial interests. This has subsequently led to problems in terms of implementation of the Galileo programme.

Following these conclusions, in 2011, the European Commission considered several options for assessing the governance between the European Space Agency and the

[107] European Court of Auditors, « Rapport spécial n° 7/2009 (présenté en vertu de l'article 248, paragraphe 4, deuxième alinéa, CE) La gestion de la phase de développement et de validation du programme Galileo accompagné des réponses de la Commission », 2009.

European Union and thus facilitating the operational efficiency of the different programmes[108]. Four options were highlighted:

1. *Keep the same existing architecture*: the EU and the ESA remain separate entities without effective mechanisms for greater cooperation. In this case, we remain in a system where the ESA and the EU retain their own institutional framework to define objectives and missions;
2. *An improved cooperation under the status quo*: in this framework, the EU and the ESA would remain two separate entities but with an improved interface between the two organizations on the basis of modifications made to the 2004 EU-ESA framework agreement. The tasks and objectives would be set jointly, indicating the definition of specific cooperation mechanisms;
3. *Establishing an EU pillar within ESA*: this option aims at bringing the financial rules of the organisations closer. Indeed, since we are dealing with two distinct organisations, we do not necessarily want to have separate operating rules;
4. *The ESA becomes an EU agency while retaining its intergovernmental nature*: it would consist in a European legal basis for the ESA that would be governed by the European Union rules. But this option is not at all on the agenda.

While European spatial governance is still characterized by the ESA, EU and Member States institutional triangle, a new stage has been reached by the joint publication on October 26th 2016 of the new European Space Strategy. Entitled "Space Strategy for Europe", this document is a small revolution in itself, as this area has so far been reserved to the European Space Agency. Through this document, the European Commission proposes a series of actions to enable Europeans to take full advantage of what space can create, put in place an ideal ecosystem for the growth of start-ups in the space field and increase its share in global space markets. Above all, this document is a weapon with a view to "*promote its position as a leading actor of Europe in space*". As a global actor, Europe claims its place at the table of the greatest space nations. Indeed, the strategy responds to the competition from the "New Space" coming from the United States and the arrival of new emerging powers like India and China. On the same day, the ESA Director General Jan Woerner and the European Commissioner Elżbieta Bieńkowska have signed a "Joint Statement on Shared Vision and

[108] Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the regions towards a space strategy for the European Union that benefits its citizens/* COM(2011) 152 final */, 4 April 2011.

Goals for the Future of European Space" to be implemented by a closer cooperation between both institutions.

With this recent and progressive takeover of the European Union, it can be noted that space is not only a matter for the ESA but also for the European communities. In this sense, Germany and France, which are also the driving forces of the European Union, have pushed for a European space strategy that carries major projects like GMES, Galileo and Copernicus, with the common rule that the European Commission is interested in services. In an interview with the French magazine "*Géoéconomie*" in 2012, Yannick d'Escatha, former Director-General of CNES, stressed France's role in the emergence of the European Union's role in the space sector: "*France has largely contributed to the involvement of the EU in space programmes, through the EGNOS programme, followed by Galileo and then GMES. It has also actively contributed to the recognition, in the Treaty of Lisbon, of the EU's shared competence with its Member States in space matters. Until recently, it has been the driving force behind an ambitious implementation of the Lisbon Treaty, notably through the creation of the space dimension in the Competitiveness Council of the EU. France, therefore, contributing very largely to the implementation of the European space policy, the latter cannot be considered as a threat to France's sovereignty and role in this field."*[109]

On the other hand, Germany seems to be more reluctant and it has for origins the French positions that push for the creation of space infrastructures under the European flag. Indeed, France is convinced that the European Union must be equipped with space infrastructures. In this sense, the Guiana Space Centre (*Centre Spatial Guyanais, CSG*), financed by two-thirds by the ESA, a large part of which by France, and by one third by the French state, could pass under the European Union flag. In addition, all European countries are benefiting from the CSG and agree that the Centre is a great and efficient space infrastructure. However, Germany refuses because they do not want it to be financed on EU money, more difficult to justify in front of the "*Bundestag"* than funds where the return on investment will be guaranteed by the rule of fair return of the ESA.

To conclude, the arrival of a new actor in space Europe has reshuffled the cards distributed since 1957 and the creation of the European Space Agency. Relations between the ESA and the European Commission, although they have recently agreed on common visions and objectives, tend to be difficult, for financial reasons and because of the lack of clarity on

[109] Y. D'ESCATHA, *op.cit*, p. 33.

what task each of the actors which constitute the European space triangle should set up. In this sense, the next ESA Ministerial Council in 2019 in Spain will give a first response to this new architecture.

CONCLUSION

Nowadays, in the European medias, the idea of a Franco-German couple leading the way for the European Union has become increasingly used. It can be due to the fact that, after the shock of the Brexit results and the Presidential election in the United States of America, the election of the French President Emmanuel Macron has revived the hope for a historic refounding of Europe, as it has been declared by the German Chancellor Angela Merkel on the first trip to Berlin of the new French President. France and Germany have, since 1963 and the ratification of the *Elysée* Treaty, put the means to a relation based on deep and all-levels interactions. This new framework for cooperation has had especially the effect to increase France and Germany's influence within the European Union. As a result, The Franco-German tandem has always played an engine role in the history of European construction. To mention some of the most important steps to which France and Germany have made a major contribution, we can recall the establishment of the European Coal and Steel Community in 1952, the European Monetary System in 1979 and the establishment of the Single European Act in 1987 which paved the way for the single market.

If we look at the European space, the idea that France and Germany could play the roles as engines in the institutional sphere is even more striking. Indeed, France and Germany, despite differences of visions and goals, have been at the origins of the institutional implementation of Europe in space; from ESRO and ELDO, to the European Space Agency and the European Union. Throughout the years, they have led the way to be today the two biggest contributor countries to the European Space Agency, far ahead from the third most influential country, Italy. Thanks to their complementary nature, symbolised by the projects undertaken by their national agencies and thanks to a real dialogue, France and Germany play the main roles in each programme implemented by the European Space Agency, the institutional platform regarding space issues in Europe. As a result, if France or Germany decides to put a veto on a programme, the latter will never happen.

The possibility that a programme would not be carried out has often been overcome, notably on the launchers and the International Space Station issues. This situation is mainly due to the differences of paradigms in the way both countries consider space issues.

However, by a continual search for compromises, essential characteristic of the Franco-German couple, Europe has been able to maintain its status as a relevant international space actor.

The European institutional architecture is made up of three poles: the European Union, the European Space Agency and the Member States. If the role and the influence of the European Union has been increased since the Treaty of Lisbon, it is still unclear how the European space architecture will evolve in a near future. One of the sources of uncertainty lays in the future of the EU-ESA relationship and in the capacity for the EU to develop its own capacities. Moreover, it is still unclear if the European Member States, who are free to choose to which ESA programme they participate, are ready to give some of their sovereignty in a technological field which affects many others.

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APPENDICES

1) Interview with Jean-François, French Counsellor for Space Affairs at the French Embassy in Berlin – 10 April 2017 – 01:05:32

During this interview, I asked Mr. Dupuis if France and Germany were engines of Europe in space. As a result, he went on talking on a lot of themes…

« En effet le spatial, en fait en Europe est déjà tiré par la France. La grande puissance spatiale en Europe, c'est la France, c'est même la troisième puissance mondiale. Et pas uniquement en termes de budget, aussi en termes d'activité et de savoir-faire... on a des compétences que ni les américains ni les russes ni les chinois n'ont. Il y a vraiment des domaines ou la France mais aussi le CNES a vraiment un savoir-faire.

Pourquoi un savoir-faire ? Quand il y a eu la création du spatial... c'est vrai qu'il y a deux grands moteurs au départ. Le premier de tous les moteurs c'est l'Allemagne avec les V1 V2. On n'est pas en encore dans le spatial mais ça commence à faire des missiles balistiques. Et après tu as la guerre froide, et là, le combat russo-américain, et la France va aussi, après la guerre, sous l'impulsion du Général de Gaulle, qui a voulu être à la fois une puissance nucléaire mais aussi une puissance spatiale.

Alors pourquoi une puissance spatiale ? Lorsqu'on a commencé à faire des satellites, on s'est tourné vers les américains car on n'avait pas de lanceur, on a commencé à faire des lanceurs ce qu'on appelle les Pierres Précieuses, qui n'étaient pas encore un vrai lanceur. Et on s'est tourné vers les américains pour lancer notre satellite de communication. Ils ont dit oui, on vous le lance mais comme c'est un satellite qui va rentrer en concurrence avec le nôtre, on refuse que vous l'utilisiez. Donc De Gaulle s'y est opposé et a déclaré vouloir le faire tout seul. C'est ça qui a donné la vraie impulsion du spatial en France : c'est le refus américain de lancer notre propre satellite. Et comme De Gaulle était un homme qui avait une grande ambition pour la France, il a beaucoup investi dans tout ce qui est science (création du CNRS, du CEA…) et un peu plus tard le CNES. Et depuis, le CNES a créé l'industrie, ce n'est pas le contraire. C'était une impulsion politique de ce grand homme.

Ensuite, il y a aussi un problème, c'est que le spatial est quand même un outil qui coute cher donc on s'est associé ; c'est le CNES qui a créé l'ESA notamment, on s'est associé avec l'Europe, pas tout de suite l'Allemagne d'ailleurs. Un des premiers programmes a été le programme Ariane, pas facile à faire, représentant dix ans de projets dont le premier lancement était le 24 décembre 1979. Et à travers Ariane, cela a été la vraie création de l'Europe spatiale.

Depuis cela n'a pas changé. C'est à dire que le moteur franco-allemand, pour parler à l'allemande, a été l'initiateur et surtout encore aujourd'hui ce qui fait que le spatial marche.

Lorsqu'on a un conseil des ministres, tous les deux ans à peu près, ça ne marche que si la France et l'Allemagne sont d'accords. A Naples, en 2012, cela a été un échec complet car on avait un problème de stratégie sur la suite d'Ariane 5 entre l'Allemagne et la France. A Luxembourg en 2014 on a trouvé un vrai compromis qu'on a confirmé en 2016 à Lucerne.

Alors le point dur a toujours été les lanceurs mais ce n'est pas surprenant pour deux raisons :

D'abord il y a un problème affectif, un non-dit entre la France et l'Allemagne. Ceux qui ont vraiment créé les lanceurs ce sont les allemands. Et après la guerre, on leur supprime l'accès à la technologie de propulsion. On va récupérer une dizaine d'ingénieurs qui vont aller à Vernon chez Snecma et vont créer le centre d'essai moteur de Vernon. Et encore aujourd'hui, ce sont les français qui sont leader en propulsion mais les allemands savent très bien que c'est eux. Mais comme c'est un sujet un peu sensible, c'est quand même V1 V2, alors ils ne le réclament pas mais aimeraient bien qu'on leur rappelle qu'ils sont à l'origine. Deuxième souci c'est que tu ne peux faire de façon autonome et indépendante du spatial que si tu as accès à l'espace… les allemands feignent de ne pas le comprendre : ils disent on peut acheter un lanceur chinois, russe, ce n'est pas vrai. La preuve c'est que tu n'as aucune puissance spatiale qui n'est pas son lanceur, au moins un. Donc l'idée de dire qu'on va acheter un lanceur ce n'est pas vrai, car le spatial n'est pas un marché commercial, c'est un outil géostratégique et donc si tu as pas ton lanceur, comme tu envoies souvent ton satellite en duo, civil et militaire, tu imagines bien que si tu t'adresses à la Chine, aux USA ou à la Russie, ils vont être plus ou moins d'accord, plutôt moins que plus. Donc la stratégie de la France a toujours été de dire, on fera du spatial que si on maitrise déjà au moins l'accès à l'espace.

Alors les allemands s'opposent à ça mais la vérité c'est qu'ils sont d'accord avec nous, ils ne veulent pas le dire car du moment qu'ils le disent pas, c'est la France qui est leader et donc c'est la France qui paye. Ils peuvent alors mettre leur argent sur d'autres thématiques, notamment des thématiques d'application plus rentables. C'est un jeu de poker menteur que l'on a avec eux sachant très bien le pourquoi du comment. C'est surtout un moyen pour les allemands de valoriser une autre thématique ou là ils ont pu mettre leur drapeau, qui est l'ISS. Jusqu'à présent le spatial, dans tous les domaines, c'était la France, parce qu'on a commencé avant eux, parce qu'on a plus d'argent, parce qu'on a une industrie qui est performante. S'ils investissaient comme nous ils seraient aussi forts que nous, c'est une question de motivation et d'investissement. Et la seule fois où ils ont pu mettre leur petit drapeau c'est pour l'ISS, et là les allemands vont être moteurs, la France sera en deuxième position. Et en fait cela correspondait à l'Allemagne car l'ISS c'est quelque chose ou tu fais de la science. Et en Allemagne, le professeur et la science, c'est plus important que chez nous.

C'est un jeu habituel, à chaque Conseil des Ministres, on négocie les lanceurs contre l'ISS. Mais dans tous les cas, c'est toujours la même chose, tu n'as pas l'Allemagne sans la France, tu n'auras pas l'ISS, tu n'auras pas de lanceurs, tu n'auras rien. Plus que les budgets, il y a l'industrie derrière, la capacité de recherche : ce sont les deux pays qui ont le plus investi en Europe sur ces sujets-là.

Le couple franco-allemand comme moteur est surtout vrai dans deux domaines : l'aéronautique et l'espace : on n'aurait pas fait Airbus sans la France et l'Allemagne, on n'aurait pas fait Ariane. Les chefs de missions sont ou français ou allemands en règle générale. Oui, sur tous les plans sans l'impulsion des deux pays il n'y aurait pas d'Europe spatiale.

[Anecdote sur la nomination de Jean-Yves le Gall pour être le Président du Conseil de surveillance.]

Justement mon travail ici est de faire en sorte qu'avant les Conseils des Ministres, on trouve des points de convergences pour arriver en Conseil avec des positions communes.

Souvent les points durs concernent Ariane, qui est plus qu'un lanceur, qui possède la technologie duale. Lors du Conseil de l'ESA, on a demandé à l'Allemagne d'être plus présente pour monter à 23% et donc ils ont fini par accepter après de très longues négociations avec des points positifs de leur côté : outre faire travailler leur industrie, car l'Allemagne a une stratégie spatiale de politique industrielle au contraire de la France qui y ajoute une dimension géostratégique, on lui a donné accès à des technologies duales permettant à l'Allemagne d'avoir la capacité de faire un mini-lanceur, chose que l'Allemagne ne peut plus faire aujourd'hui.

Avant les conseils, on commence toujours à deux, puis selon les problématiques on ouvre à trois avec l'Italie, puis avec l'ESA et après on ouvre aux partenaires avec des liens plus ou moins forts entre l'Allemagne et les pays du Nord et de la France avec les pays du Sud. Pour autant, à chaque programme, un pays tiers va contester la position franco-allemande mais ensuite c'est au tour de l'ESA de régler le problème. Mais ils savent très bien que s'il n'y a pas d'accord, il n'y aura pas de programmes.

[Anecdote négociation paradoxale sur l'ISS. Et sur la nomination de l'astronaute allemand pour être chef de mission en 2018]

A part les lanceurs et l'ISS, sur le reste ça marche bien comme l'exemple de Rosetta et de son lanceur franco-allemand qui est un vrai succès. C'est l'exemple même de scientifiques allemands et français venant de deux organismes, le CNES et le DLR, parfaitement complémentaires. Le couple franco-allemand est un couple, qui lorsque tu enlèves les egos, l'histoire, est foncièrement complémentaire avec un vrai dialogue.

Il n'y a pas un projet de l'ESA sans qu'il y ait la France ou l'Allemagne dedans. Après, le vrai problème de fond, il est à la frontière de l'ego et de l'argent. Pour illustrer mon propos, je vais prendre l'exemple de la Commission européenne. Et là les soucis qu'on a eu au niveau communautaire sont : qu'est-ce que l'on met sous le chapeau de la communauté européenne ? quelle est la partie du spatial comme étant de responsabilité de l'UE plus que de ce club qu'est l'ESA ? La France est convaincue qu'il y a des outils pour l'UE comme le Centre spatial guyanais. Et le CNES s'est longtemps battu pour le triangle européen, mais cela est difficile car il y a un problème Commission-ESA. La France est plus ouverte car l'Allemagne ne veut pas payer plus et est très attachée au principe du juste retour industriel de l'ESA. »

2) Interview with Isabelle Reutzel, Head of the DLR Paris Office – 31 May 2017 – 26:57

Quelles sont vos fonctions exactes et tâches au DLR ?

« Je suis la directrice du bureau de liaison du DLR en France et nos fonctions, en particulier c'est d'être proche de l'ESA, dont le siège est à Paris, et en même temps d'entretenir des contacts avec nos partenaires en France non seulement dans le spatial mais également dans les autres domaines de recherche du DLR. Cela nous permet d'accentuer et d'augmenter la visibilité du DLR. En même temps, nous n'avons pas seulement la casquette « spatial ».

Pourriez vous décrire votre fonction comme équivalente à celle du Conseiller spatial ici en Allemagne ?

Sur la forme oui et non. Car il est établi dans une Ambassade. Ici, nous sommes complètement détachés de la machinerie du gouvernement. Avec ce changement de paradigme, on n'a pas forcément cette relation privilégiée d'un point de vue gouvernemental même si les fonctions sont identiques. Mais l'idée est que l'on est l'interlocuteur unique sur les questions franco-allemandes.

Le fait que vous ne soyez pas à l'Ambassade témoigne-t-il d'une différence de stratégie de l'Allemagne en ce qui concerne la priorité donnée au caractère économique du spatial plus qu'un caractère géostratégique comme en France ?

Je ne pense pas que cela ait un rapport même si la conception que vous avez soulignée est vraie, mais cela n'a pas d'influence directe sur la façon dont le bureau est organisé comme il l'est. En effet, le DLR a une dimension privée.

Quelle a été la priorité, hier et aujourd'hui, pour l'Allemagne en ce qui concerne le spatial ?

Pour des raisons historiques, tout ce qui est question de missiles, fusées balistiques, après la guerre ont été retirés d'Allemagne, beaucoup de chercheurs sont partis aux Etats-Unis. Cette question était après la guerre un gros tabou en Allemagne. Après, pour le lanceur européen, l'Allemagne faisait partie de l'équipe de fondatrice, membre des organisations avant l'ESA (ESRO et ELDO). Tout ce qui a été recherche civile a été repris assez rapidement par l'Allemagne dans un esprit européen. Pour tout ce qui est recherche militaire, les choses ont été pendant longtemps très encadrées, séparées de la recherche civile. Depuis quelques années, on observe un rapprochement de la recherche militaire et de la recherche civile dans le spatial, car on considère que pour des questions économiques il est nécessaire de ne pas avoir de doublons. J'en prend pour exemple le *Zentrum Luftoperationen de Kalkar* en Ukraine, qui est à la fois géré par la Bundeswehr et le DLR et qui a pour but l'observation du climat spatial. Le spatial aujourd'hui est inscrit dans le portefeuille du Ministère de l'économie et de l'énergie alors qu'avant c'était la recherche, ce qui prouve un changement de paradigme vers des priorités industrielles et commerciales : l'Allemagne joue sur la qualité made in Germany et n'a pas vocation à avoir la maitrise de toute la chaine de production.

L'engagement a la recherche a fait que l'Allemagne avait un engagement très fort sur l'ISS, et le côté recherche était beaucoup mis en avant même si cela a tendance à moins être le cas aujourd'hui.

Le souvenir de Peenemünde a-t-il eu l'effet d'un traumatisme sur la politique spatiale allemande ?

[Mrs Reutzel told me she does not want to be quoted on this theme]

A l'image du General de Gaulle, une personnalité politique allemande a-t-elle aussi impulsé le spatial en Allemagne ?

On a des Ministres aujourd'hui qui sont très engagés pour le spatial. Une personnalité de tel type il faut plus aller chercher du côté du DLR comme M. Wörner.

Confirmez-vous que la France est le partenaire privilégié de l'Allemagne en matière spatiale ?

Bien sûr, dans le spatial mais dans tous les autres domaines. Les réactions après l'élection de Macron montrent à quel point les relations franco-allemandes sont importantes.

Cela pose la question de qui doit avoir le lead entre l'ESA et l'UE. Mais l'ESA n'a pas la capacité politique de rédiger des documents contraignants pour ces Etats membres. De l'autre côté, l'ESA n'a pas la capacité d'harmonisation.

Ensuite lorsqu'on parle de triangle, les Etats membres restent au final les chefs de ligne et surtout la France et l'Allemagne. Sans le franco-allemand, cela ne pourrait pas marcher. Au niveau de l'UE cela reste encore à écrire, car aucun Etat n'est en faveur d'un dédoublement des capacités.

Y-a-t-il des points de rupture entre l'Allemagne et la France ?

Non, je pense qu'il y a des domaines qui intéressent plus un pays que l'autre : l'Allemagne avec l'ISS et la France avec les lanceurs. Mais la réalité c'est que l'Allemagne ne peut financer les lanceurs tout seul et réciproquement

De toute façon c'est un mariage qui est fait pour la vie et fait de compromis.

En marge de chaque conseil de l'ESA, on a des préparations ou la France et l'Allemagne se retrouvent régulièrement. On est en discussions permanentes.