CHAPTER 8

# The Absence of the East: International Influences on Science Policy in Western Europe during the Cold War

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One of the problems of analyzing science in the context of something as large and complex as the Cold War is the difficulty of differentiating Cold War influences from other political or cultural factors. What distinguishes Cold War science from science that happened to happen during the Cold War? The politicization of trust and the efforts to gather intelligence or manage flows of information is one specific Cold War influence that has been convincingly identified, not least in several of the contributions to this volume. This article will focus on science policy and funding.

Throughout the Cold War, national governments were the dominant sponsors of scientific research. Science funding was, therefore, fundamentally a political issue. Decisions about the allocation of funds to specific areas were mostly made by scientists and government officials, but the overall level of funding, the structure of the funding institutions, the approval of specific large projects and decisions to join international efforts such as CERN, were decided at the highest political level. At this level, international politics was not just part of the context in which science policy developed: it was the central force. Any Cold War influence on science policy should be discernible at this level.

In recent scholarship, the story of Cold War science has become ever more complex and varied. It now investigates many disciplines beside the physical sciences, a variety of actors, and several different types of Cold War influences.[1] This diversity has enriched our understanding of the period, but it has also created an impression of the Cold War as an omnipresent influence on all aspects of scholarship, which reduces the analytical value of the 'Cold War' as a historical concept. In this article, I will look more closely at the role of Cold War politics in European science policy, with special focus on two aspects: firstly, in Western Europe, Cold War issues manifested themselves primarily in the relationship with the United States. This relationship was

1 Hunter Heyck and David Kaiser, "Focus: New Perspectives on Science and the Cold War, Introduction," *Isis* 101 (2010), 362–6.

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actively shaped by American and European politics at various levels, and only indirectly in reaction to Soviet actions.[2] Western European countries took the West, not the East, as point of orientation. Secondly, the Cold War was not the only international context that shaped European science and science policy in the post-war era. The global clash between an American-led Western bloc and an Eastern bloc dominated by the Soviet Union deeply influenced many aspects of science, but at the same time, European countries had to deal with, for example, the complex web of international relations within Europe, and with problems caused by decolonization. These issues also influenced each other: for example, the United States stimulated European cooperation. I will analyze the entanglement of global, regional and national politics, and assess their impact on Western European science policy, in order to present an analysis of Cold War era science policy which considers the Cold War as one part of a more complex political context.

## Europe's American Focus and the Absence of the East

It is remarkable that in much of the literature about Cold War science in Western Europe, including many of the papers in this volume, the Soviet Union and the Eastern Bloc are nearly invisible. They are present in the background, but their actions do not seem to influence the main narrative in any direct way.[3] It may seem strange that one can write about a war, even a cold one, without looking at one of its main participants, but on second thought, there are good reasons for the absence of the East from Cold War narratives. From the perspective of many of the smaller countries on either side of the Iron Curtain, only the actions of 'their' superpower mattered in each

2 Much literature focuses on American policy, and considers Europe a relatively passive actor. Several authors of a recent *Centaurus* issue on Cold War Science commented on this bias, including John Krige, "Building the Arsenal of Knowledge," *Centaurus* 52 (2010), 280–96, although Krige still focuses mostly on the American side in that article. Friso Hoeneveld and Jeroen van Dongen, "Out of a Clear Blue Sky? FOM, the Bomb and the Boost in Dutch Physics Funding after World War II," *Centaurus* 55 (2013), 264–93, present an interesting case from a European perspective.

3 David Caute, "Foreword," in Hans Krabbendam and Giles Scott-Smith (eds.), *The Cultural Cold War in Western Europe 1945–1960* (London, 2003), pp. vii–ix, commented on the 'vanishing' of the Soviet Union from Cold War cultural studies, attributing this phenomenon to revisionist, New Left interpretations of the Cold War, as instigated by the aggressive, almost imperialist policy of the United States.

country's daily politics and practice. For Western Europe, that superpower was the United States.

The resulting picture is well-known in political history. By 1950, when NATO had been founded, the most immediate communist threats in France and Italy had been avoided and a stable status quo had been established in Germany, defense against a Soviet invasion was no longer the most urgent problem for European politicians, even though the fear of the Soviets was still real. Once the nuclear arms race escalated in the 1950s, most European countries had to conclude that they could not significantly contribute to any actual military confrontation between the superpowers: their most likely role would simply be that of battlefield. Even Britain and France could not hope to compare their capabilities to the arsenals of the United States or the Soviet Union in any serious manner.

The powerlessness of Europe may have seemed desperate, but that was not how it was perceived by the Europeans, especially after the 1960s. Psychologically, fighting the Cold War was increasingly viewed as an American affair. One might say that Europe had outsourced its protection against the East to the United States. Several historians have pointed out that the very powerlessness of Europe was advantageous in a way. Tony Judt finds that the growing emphasis on nuclear weapons and intercontinental missiles released European states from the requirement to compete in an arena in which they could not match the superpowers' resources. "So they cultivated their gardens instead."[4] For most Western European countries, the post-war decades were a period of social stability, fast economic growth and increasing prosperity. It was the age of the German *Wirtschaftswunder*, the French *trente glorieuses* (despite the turbulent politics of the Fourth Republic) and the Italian *miracolo economico*. Even Franco's Spain experienced *el milagro español* in the 1960s.

The 'cultivation of European gardens' was not necessarily as quiet and pastoral as this metaphor may suggest. The post-war period was also a period of complex international politics on many levels. Three important issues were summarized by Lord Ismay, the first Secretary General of NATO, who famously defined the goals of NATO as "keeping the Russians out, the Americans in and the Germans down." Initially, the third of those goals was the most urgent for many European countries. The repercussions of World War II continued to shape European politics for many years. Even after a stable equilibrium had been established on the European continent, intra-European relations remained complex and dynamic. European countries were constantly trying to find new ways to compete and to cooperate. Soon an intricate network of

4 Tony Judt, *Postwar* (London, 2005), pp. 247, 256.

international associations and organizations came into existence, at times with overlapping mandates. Many of these organizations were directly or indirectly sponsored by the United States.

In the meantime, the second goal, of keeping America involved in Europe, was also a pressing one. One reason for the urgency was that the Americans' involvement would, in turn, take care of the first goal, of keeping out the Russians, by providing a serious deterrent against the Soviet Union. Europe could not provide that deterrent itself, while fear of the Communist threat was real. For that reason, it was important to maintain a sizeable military force: in order to combat the Russians directly, but even more so in order to show America that Europe was doing its part. It was crucial to keep the United States interested in protecting Europe. But there were other, additional reasons for cultivating connections with the United States. The most significant among them was the desire to be granted access to American scientific, technological and advanced project management knowledge, as well as American currency and funds. Finally, the smaller European countries needed America to remind France and Germany that they were not the most intimidating presences in European politics—a slightly modified version of the third goal of NATO. All reasons remained valid throughout the Cold War, even though many aspects of transatlantic relations changed in the 1970s and 1980s.

America's role as protector of Western Europe and its security provided it with both an enormous influence in, and an interest in influencing, Europe. America desired to keep Western Europe firmly on its side in the global struggle. Thus, the USA and Western Europe were mutually dependent, albeit in a rather asymmetrical way. As John Krige has shown in *American Hegemony*, this relationship had direct consequences for science.[5] In the first few postwar years, American policy shaped European science, creating an institutional infrastructure based on American models. After the establishment of this infrastructure, American influence remained strong.

Lord Ismay's pithy summary of NATO's goals may be supplemented with another fundamental international issue of note, in which NATO did not have a direct role: several European countries struggled with the deconstruction of their colonial empires. Decolonization was a long and painful process, first and foremost for the newly-independent people, but also for the former colonial powers. This struggle influenced the relations between European countries and the United States, since the US supported independence in several cases (not least because of Cold War rationales, as the US wanted the new countries

5 John Krige, *American Hegemony and the Postwar Reconstruction of Science in Europe* (Cambridge, MA, 2006).

to become its allies). Moreover, European countries were able to spend substantial resources on military causes in their colonies because it was assumed that European security was guaranteed by the US. When the Netherlands sent almost its entire army to Indonesia in 1946–1949, the country was left nearly defenseless. The United States objected, insisting that European countries should contribute more to their own protection.[6]

Overall, European politicians and diplomats had to simultaneously act on several international playing fields, addressing the Communist threat, maintaining good relations with America, dealing with decolonization, and navigating a complex intra-European political web in which both cooperation and competition were essential. These elements all influenced each other in complex ways. To understand European science policy, therefore, this political big picture is essential.[7]

## Scientific Manpower: The Technology Gap

Paul Forman and David Kaiser, among others, have analysed the enormous increase of science spending in the United States in the 1950s and 1960s. They convincingly explain this surge in terms of Cold War developments: the expenses were intended to maintain world leadership in terms of scientific knowledge, technological capability, and manpower in science-related fields. The political discourse surrounding research funding was dominated by real or perceived 'gaps' in relation to the Soviet Union, including a shortage of manpower.[8]

Science departments at Dutch universities, too, enjoyed years of abundance in the 1950s and 1960s. Money was plenty, talented students abounded,

6 Wim Klinkert and Gerke Teitler, "Nederland van neutraliteit naar bondgenootschap," in Bob de Graaf, Duco A. Hellema and Bert van der Zwan (eds.), *De Nederlandse buitenlandse politiek in de twintigste eeuw* (Amsterdam, 2003), pp. 9–36, especially p. 24; Duco A. Hellema, *Dutch Foreign Policy: The Role of the Netherlands in World Politics* (Dordrecht, 2009), especially pp. 142–3.

7 Cf. Gérard Bossuat, "Les coopérations européennes pour la recherche scientifique et technique," *Journal of European Integration History* 12 (2006), 5–10.

8 Paul Forman, "Behind Quantum Electronics: National Security as Basis for Physical Research in the United States, 1940–1960," *Historical Studies in the Physical and Biological Sciences* 18 (1987), 149–229; David Kaiser, "Cold War Requisitions, Scientific Manpower, and the Production of American Physicists after World War II," *Historical Studies in the Physical and Biological Sciences* 33 (2002), 131–59; David Kaiser, "The Physics of Spin: Sputnik Politics and American Physicists in the 1950s," *Social Research* 73 (2006), 1225–52.

and staff numbers were increased every year. Scientists from that period still remember with some amazement the time when nearly every funding application was granted. Historical accounts of the funding boom often refer to a report of the 'Casimir committee.' Chaired by the influential physicist and research director of Philips Electronics, Hendrik Casimir, this committee recommended a significant increase in research funding. Casimir presented his report in October 1958, exactly one year after Sputnik, as is often noted. Even those who note that the creation of the committee was not directly motivated by Sputnik—because the preparations had started earlier—still argue that Sputnik scared politicians into implementing all the recommendations without any hesitation.[9]

Remarkably, however, none of the relevant documents referred to Sputnik or a 'manpower gap', and neither did any of the reports on discussions in politics and university boards concerning the need for increased science funding, which took place shortly after the publication of the report.[10] The Soviet Union or Eastern European countries were not mentioned, except for one reference in passing to the fact that there was some concern in NATO about the number of excellent students in Eastern Europe; the committee reported this without endorsing it as an argument for their recommendations.[11] In all of these documents, economic considerations and comparisons with other Western countries dominated the argumentation (it is obviously impossible to know what was said off the written record). But it is significant that 'Sputnik' (or 'Spoetnik' in the Dutch spelling) was only mentioned 19 times in the proceedings of Dutch parliament (*Tweede Kamer*) before 1980. Most of those references were made by members of the Communist party; several others by politicians who downplayed the significance of the satellite.[12] As one member of parliament belonging to the Catholic People's Party said during the debate on the 1958

9 For example: Albert Kersten, *Een organisatie van en voor onderzoekers: ZWO 1947–1988* (Assen, 1996), p. 158; Ernst Homburg, *Speuren op de tast: een historische kijk op industriële en universitaire research* (Maastricht, 2003), p. 43; Ton van Helvoort, *De KNAW tussen wetenschap en politiek: de positie van de scheikunde in de Akademie in naoorlogs Nederland* (Amsterdam, 2005), pp. 81–2, 92; Klaas van Berkel, *De stem van de wetenschap: geschiedenis van de Koninklijke Nederlandse Akademie van Wetenschappen*, vol. 2 (Amsterdam, 2011), pp. 311–3.

10 David Baneke, "De vette jaren: de Commissie-Casimir en het Nederlandse wetenschapsbeleid 1957–1970," *Studium* 5 (2012), 110–27.

11 [Hendrik B.G. Casimir], *Voorzieningen ten behoeve van de research binnen de faculteiten der wis- en natuurkunde der Nederlandse universiteiten* (The Hague, 1958), p. 10.

12 The Proceedings can be searched online at www.statengeneraaldigitaal.nl [accessed 16 June 2014].

defense budget, "the strategic balance between East and West had been maintained without major change, even after the launch of a [sic] sputnik."[13] Clearly, there was no 'Sputnik shock,' at least not on the political level.

The Casimir report had been triggered in December 1956 by a joint complaint, by the heads of the science departments of the universities of Leiden, Groningen and Utrecht, about the consequences of a government-wide hiring freeze. The protest was initiated by the astronomer Jan Oort, then dean of the science department in Leiden, and was well-timed, as it coincided with debates within the education ministry about the future of the Dutch higher education system. Education minister Jo Cals was working on a fundamental overhaul of the entire education system, and the national bureau of statistics had just issued a report predicting an exponential increase of student numbers at the universities up to 1970; their numbers had been growing steadily since World War II. This increase was not caused by a GI bill or a campaign to educate and recruit future scientists for military research, but mainly by a socio-economic development: an increasing number of middle class youths attended university. Furthermore, the population of the Netherlands was growing fast, and especially the children of the post-war baby boom were expected to enter university in large numbers by 1970. This caused a favorable political climate for the increase of university budgets.[14]

Might the Cold War have been the reason why so many of the new students, and so much of the funding, went to the science departments instead of, say, law or economic science departments?[15] There were obvious reasons why science and technology were favored, but direct competition with the Eastern Bloc was rarely mentioned. The Cold War may still have played a role, then, but apparently in an indirect way, within broader economic and diplomatic concerns. In the 1950s, some of the primary concerns of Dutch policy makers—scientists, politicians, university administrators and representatives of industry—were the economic reconstruction of the Netherlands and a perceived technological gap, not with the Eastern Bloc, but with other Western countries, especially America and Britain. After World War II there was a strong sense that those countries had leapt ahead in science and technology,

13 Eddy Visch (KVP): "het strategisch evenwicht tussen Oost en West [is] ongeschokt gehandhaafd gebleven, ook na het oplaten van een spoetnik," Handelingen van de Tweede Kamer, 11 February 1958, available at www.statengeneraaldigitaal.nl [accessed 16 June 2014].

14 Jan Willem Brouwer and Peter van der Heiden (eds.), *Het kabinet-Drees IV en het kabinet-Beel II, 1956–1959: het einde van de rooms-rode coalitie* (The Hague, 2004); Peter Baggen, *Vorming door wetenschap: universitair onderwijs in Nederland 1815–1960* (Delft, 1998).

15 Patricia Faasse, *De Utrechtse bètawetenschappen 1815–2011* (Hilversum, 2012).

while innovation and research in the Netherlands had stagnated during the German occupation.

The desire to keep up with the leading Western nations was motivated by economic as well as political and military considerations. After the War, Dutch economists concluded that heavy industry and agriculture provided few opportunities for such a small country with such few natural resources as the Netherlands. Post-war reconstruction of the Dutch economy therefore needed to focus on industry based on knowledge which added value in expertise rather than resources, especially high tech industry as represented by Philips, airplane manufacturer Fokker, and the chemical industry. For this purpose the country needed to train more scientists and engineers. The fear of falling behind internationally persisted for several decades.[16] The sentiment also had a political aspect, which was expressed, for example, by Gerard Kuiper, a Dutch astronomer who had emigrated to the US in the 1930s. When he returned to Europe in 1945 as a member of the Alsos mission, he advised Willem Schermerhorn, who had recently been appointed Dutch prime minister and was an engineer himself, of the need for immediate action. America and Britain had monopolized large parts of science and technology, Kuiper wrote. If the Netherlands were not to establish connections with them soon, "I'm afraid the US will think of Holland as of Portugal or Romania [...]. The US already tends to think of Europe as a 'quantité négligeable'."[17] Investing in science would positively affect national morale and the Dutch economy, and was necessary for the general relationship with the United States, and thus ultimately for the Dutch position in international politics and the country's national security.

It was no coincidence that the committee on research funding was chaired by H.B.G. Casimir, the director of Philips' impressive research establishments. The company was then the prime example of national economic achievement, and it was an arsenal of strategic knowledge. Notably, and at the same time, Casimir was also involved in NATO's attempts to create a science policy. Another member of the Casimir committee was H.W. Slotboom, the director of the Shell Laboratories in Amsterdam. Together, Casimir and Slotboom

16 Kees Schuyt and Ed Taverne (eds.), *1950. Welvaart in zwart-wit* (The Hague, 2000), pp. 120–5; Peter Baggen, Jasper Faber and Ernst Homburg, "The Rise of a Knowledge Society," in Johan Schot, Harry Lintsen and Arie Rip (eds.), *Technology and the Making of the Netherlands: The Age of Contested Modernization, 1890–1970* (Zutphen, 2009), pp. 253–323.

17 Gerard Kuiper to Jan Hendrik Oort, 15 August 1945, Leiden University Library, J.H. Oort Papers, inventory number 155b.

represented the largest and most powerful companies, and their institutions were by far the largest employers of physicists and chemists in the country. The other four members of the committee were university professors: J.H. Oort (astronomy, Leiden), C.J. Gorter (physics, Leiden), J.Th.G. Overbeek (physical chemistry, Utrecht), and W.H. Arisz (plant physiology, Groningen). All committee members had established strong American connections. The committee solicited advice from prominent Dutch scientists abroad, including Gerard Kuiper (astronomy, Tucson), Nicolaas Bloembergen (physics, Harvard) and Nikolaas Tinbergen (ethology, Oxford). Their advice on research management clearly influenced the final report, for example, it lead to the inclusion of the recommendation that academic institutions should have professional managers, instead of being managed by the professors.

The Casimir committee's report mainly addressed the questions of how the economic potential represented by talented students might be used in an optimal manner, and of how one might close the technology gap between the Netherlands and the leading Western countries. Almost all of the report's recommendations were implemented. In the 1960s, science departments became the largest departments of their respective universities in terms of student numbers and funding. After 1970 the growth rates leveled off, and other departments, especially Social Sciences, grew relatively larger.[18]

Direct competition with America was naturally out of the question, but the aim was to 'catch up and keep up' as much as possible. There was some uncertainty about the merit and feasibility of competition with large European countries such as Britain, France and Germany, but it was tried nonetheless. In America, political arguments for increased science funding were mostly based on comparisons with the Soviet Union. In the Netherlands, it was more effective to point at the danger of being left behind by the United States.

## Limits and Gifts

The soft power of American technological primacy was combined with its more overt political power. In practice, America was able to define boundaries to Europe's freedom of action. For example, in their monumental history of CERN, Krige and Pestre describe how CERN could only be founded after the American government gave its permission. Permission was granted after the Soviet nuclear bomb was tested in 1949: it was obvious then that America's

18 Faasse, *De Utrechtse bètawetenschappen*.

nuclear monopoly was untenable.[19] This sequence of events was characteristic of the era: Soviet actions provoked an American reaction, and the subsequent American action, in turn, influenced European actions. This two-stage structure illustrates the nations' different perspectives on international politics. America monitored the choices of the Soviet Union, while Europe watched the United States.

CERN was not an American project, but America was a constant presence, limiting the spectrum of possible actions, including the choice of research topics and the flow of information. From the European perspective, one of the main goals of CERN was to elevate European science to a higher level, in order to be able to compete with America. Competitors were not imagined in the East, but rather across the Atlantic, such as Brookhaven and, later, Fermilab.[20] The same holds true for the European Southern Observatory, which was also founded in the 1950s. The structure of this organization was explicitly modeled after CERN, and the two organizations' officials coincided in part. The foundation of ESO was expedited by a large grant from the American Ford Foundation, but its explicit goal was to compete with the large American telescopes in California.[21]

Eric Hobsbawm points out that the European Community was, "like so many other things in post-1945 Europe, created both by and against the USA."[22] The same was the case for CERN and ESO, as well as that for European space organizations. As Robert Smith writes, space science was "a gift of the Cold War."[23] It started with upper atmosphere research with sounding rockets, an activity which, in most countries, was conducted by the military.[24] Much space technology was developed for military and intelligence purposes, and all launch

19 Armin Hermann, John Krige, Ulrike Mersits and Dominique Pestre, *History of* CERN, vol. 1: *Launching the European Organization for Nuclear Research* (Amsterdam, 1987), esp. pp. 71–2, 89.

20 Hermann et al., *History of* CERN, vol. 1, pp. 529, 537; Armin Hermann, John Krige, Ulrike Mersits, Dominique Pestre and Laura Weiss, *History of* CERN, vol. 2: *Building and Running the Laboratory* (Amsterdam, 1990), pp. 719, 789–91.

21 Adriaan Blaauw, *ESO's Early History: the European Southern Observatory from Concept to Reality* (Garching, 1991); Claus Madsen, *The Jewel on the Mountaintop: The European Southern Observatory through Fifty Years* (Garching, 2012).

22 Eric Hobsbawm, *The Age of Extremes 1914–1991* (London, 1994), p. 240.

23 Robert W. Smith, "The Making of Space Astronomy: A Gift of the Cold War," in Alison D. Morrison-Low, Sven Dupré, Stephen Johnston and Giorgio Strano (eds.), *Earth-Bound to Satellite: Telescopes, Skills and Networks* (Leiden, 2011), pp. 235–49.

24 David DeVorkin, *Science with a Vengeance: How the Military Created the US Space Sciences after World War I* (New York, 1992).

vehicles were based on ballistic missile designs. But the most significant gift of the Cold War was the American creation of NASA as a civilian space agency with a sizeable science mandate. This was a direct reaction to Sputnik, shaped by Cold War considerations.[25]

While in Europe, space science also started after Sputnik, European actions were not shaped by the Soviet actions, but by the American reaction to them, as had been the case for CERN. In his book about the German space program, Niklas Reinke accuses the Adenauer administration of failing to grasp the implications of the flight of Sputnik and of acting too slowly: Adenauer's mistake, according to Reinke, was the reason why German space policy was fairly passive, following in the footsteps of international developments rather than being directed forward by well-defined German policy aims.[26] However, the same developments could be observed in several other Western European countries. European military men, politicians, intellectuals, and certainly also scientists were impressed by the Soviet satellite.[27] But in most European countries, setting up a national space program was not a realistic option. Spaceflight was the domain of the superpowers. Only France and Britain were working on launchers, with varying success, in an attempt to claim superpower status.

Outer space only came within the reach of smaller countries as a result of international political developments, more specifically because of American actions that, in turn, were guided by the American desire to regain momentum after the humiliating blow of Sputnik, and the even more embarrassing failure to launch the Vanguard rocket a few months later. The United States government took the initiative to establish two international forums to discuss space politics: the United Nations Committee on Peaceful Use of Outer Space, and the Committee on Space Research (COSPAR). These organizations invited countries and scientists to report on their plans and actions. The UN committee mostly focused on legal issues related to space flight, while COSPAR was a scientific organization.

At the second meeting of COSPAR, in March 1959 in The Hague, the American representative Richard Porter told the surprised assembly that his government offered to launch foreign scientific satellites on American rockets for free. The

25 Walter MacDougall, *The Heavens and the Earth: A Political History of the Space Age* (New York, 1986); Roger D. Launius, John M. Logsdon and Robert W. Smith, *Reconsidering Sputnik: Forty Years Since the Soviet Satellite* (Newark, NJ, 2000).

26 Niklas Reinke, *The History of German Space Policy: Ideas, Influences, and Interdependence 1923–2002* (Paris, 2007), pp. 134–5.

27 Igor J. Polianski, Matthias Schwartz (eds.), *Die Spur des Sputnik: Kulturhistorische Expeditionen ins Kosmische Zeitalter* (Frankfurt a.M., 2009).

offer was made possible by the newly founded NASA. This offer was a classic case of using science as a diplomatic tool. America aimed to present itself as a benign and benevolent hegemon that made its technology available for the benefit of mankind, in contrast to the secretive and militaristic Soviet Union. Less openly, it also wished to exert as much influence as possible on foreign space programs, preferably without appearing to interfere.[28] The American offer enabled European countries to develop a space science program without having to wait for the development of a European launcher. For national, intra-European as well as transatlantic political reasons, European countries accepted the offer and used it to create both national space programs as well as a European space research organization.

Initial ideas for European cooperation in space were discussed during COSPAR meetings. These discussions involved many of the founders of CERN. Eventually, this led to the foundation of the European Space Research Organization (ESRO), modeled after CERN. Just as in the case of CERN, it was American Cold War politics that made European action possible.

Around the same time, Britain decided to convert its military missile ('Blue Streak') into a civilian launcher. More specifically, it was suggested that the missile might be used by a future European space organization as the basis for a new launch vehicle.[29] The decision was made by British politicians, but it would not have been possible without approval of the US, which had supported the British missile program, and which also developed a missile that rendered the British one redundant for military use. It was certainly in America's interest that foreign space programs be civilian, not military, in nature.[30] Lorenza Sebesta has argued that the British offer to Europeanize its missile program was shaped by a complex interplay between the United States, Britain and France, each of which had different ideas about European cooperation in launcher technology. This was related, among other things, to the French ambition to

28 John Logsdon, "The Development of International Cooperation," in John Logsdon (ed.), *Exploring the unknown*, vol. 2 (Washington D.C., 1996), pp. 1–16; John Krige, "Technology, Foreign Policy, and International Cooperation in Space," in Steven J. Dick and Roger D. Launius (eds.), *Critical Issues in the History of Spaceflight* (Washington D.C., 2006), pp. 239–60.

29 Lorenza Sebesta, "Choosing Its Own Way: European Cooperation in Space, Europe as a Third Way between Science's Universalism and US hegemony?" *Journal of European Integration History* 12 (2006), 27–55; Sir Harry S.W. Massey and Malcolm O. Robins, *History of British Space Science* (Cambridge, 1986); John Krige, Arturo Russo and Lorenza Sebesta, *A History of the European Space Agency 1958–1987* (Noordwijk, 2000).

30 Krige, "Technology, Foreign Policy;" cf. Arnold Frutkin, *International Cooperation in Space* (Englewood Cliffs, NJ, 1965).

develop an independent European launcher; Britain's ambition to firm up relations with the European continent while retaining its 'special relationship' with America, and the US policy concerning knowledge transfer to France via Britain.[31] The final outcome of these negotiations was the foundation of ELDO, the European Launch Development Organization, with significant British and French contributions, and with America's blessing.

The American offer to launch foreign satellites and the British offer to Europeanize its missile project prepared the way for the two European space organizations, ESRO and ELDO. The organization of launcher development and space science in separate institutions was, of course, a direct consequence of Cold War constraints. Rockets were politically too sensitive to mix with supposedly neutral science—in Europe, at least. It was only in 1975, after a series of political and financial crises which especially affected ELDO, that the two organizations were merged into the new European Space Agency (ESA).[32]

## National Space Programs in Europe

In Germany, the Netherlands, and most other European countries that developed a space program, discussions about European organizations initiated the start of national space programs as well.[33] Each country had its own reasons to join or not join ESRO and ELDO. A brief survey of several countries' motivations will provide an illustration of the complex web of national and international interests that shaped national space policies. They also executed much influence on the development of disciplines such as astronomy, geophysical science and aerospace technology in their individual national manifestations.

For Germany, ESRO and ELDO provided opportunities for involvement in a sensitive but significant technological field, and for supporting German aerospace industry, without violating the restrictions that were imposed by the victors of World War II.[34] On a political level, Germany also sought to break out of

31 Sebesta, "Choosing its own way."

32 Krige and Russo, *A History of the ESA*.

33 Reinke, *The History of German Space Policy*; David Baneke, "Space for Ambitions: The Dutch Space Program in Changing European and Transatlantic Context," *Minerva* 52 (2014), 119–40; Stephan Zellmayer, *A Place in Space: The History of Swiss Participation in European Space Programmes, 1960–1987* (Paris, 2008), pp. 23–30, provides an overview of the literature about European space programs.

34 Anke Marei Ludwig, "Platz gefunden.—Ziele klar? Die Politik der europäischen Mitgliedstaaten im NATO-Wissenschaftsausschuss (1957–1967)," *Journal of European Integration History* 12 (2006), 91–105.

its post-war isolation: the country tried to establish itself as a 'broker' between French and American interests in the European continent, and between large and small countries within Europe.[35] The Swiss showed somewhat similar interests, except that their restrictions were self-imposed. Supporting ESRO, like joining CERN, offered Switzerland a way to demonstrate its willingness to cooperate internationally and to contribute to international projects without violating its strict policy of neutrality.[36] For both Germany and Switzerland, the apolitical and non-military nature of the involved organizations was crucial, just as it was important for NASA to be perceived as a civilian organization.

In Norway, however, nearly all space activities were military in nature. Norwegian space research focused on investigating the upper atmosphere, with the goal of improving communications in the polar region. John Collett describes Norwegian policy in this matter as fairly passive: America took the lead in Norwegian space research, and so much so, that Norway even declined to join the European space organizations. The US had already provided it with all necessary materials. Norway later applied for ESA membership in the 1970s, when it became clear that a much-needed American sea surveillance system would not be made available.[37] Altogether, American policy shaped Norwegian actions directly.

France was, once more, a special case. France was perhaps the only European country with an active space policy in the early years of space flight. It aimed to claim great power status in its own right, independent from America, and it attempted to enlist other European countries in space projects in order to gain their support for European independence in spaceflight. France did not wish to be reliant on America for the launch of satellites.[38] Commercial interests were also significant, since France boasted a substantial aerospace industry.

These examples illustrate that in many European countries, local and regional considerations shaped science policy as much as global politics, even with regard to international scientific cooperation. The developments in Italy, Belgium, and Sweden lend themselves to similar analyses. Anke Marei Ludwig

35 Reinke, *The History of German Space Policy*.

36 Zellmayer, *A Place in Space*; Bruno J. Strasser, "The Coproduction of Neutral Science and Neutral State in Cold War Europe: Switzerland and International Scientific Cooperation," 1951–69', *Osiris* 24 (2009), 165–187.

37 John P. Collett (ed.), *Making Sense of Space: The History of Norwegian Space Activities* (Oslo, 1995), p. 285.

38 Lorenza Sebesta, *The Availability of American Launchers and Europe's Decision To Go It Alone* (Noordwijk, 1996).

has argued that even the discussions in NATO about large scientific projects were shaped by inter-European politics.[39]

In the following section I will briefly discuss one last example, the Netherlands, which is the case with which I am most familiar. For the Netherlands, one major reason to join ESRO and ELDO was that it followed the lead of France, Germany and Britain in order to keep up with them, especially since this was such a highly visible and prestigious field of research. The Netherlands never fully accepted its role as a small country, instead preferring to act as a rather small large country.[40] Similar considerations motivated Dutch efforts in fields such as nuclear science and advanced communications technology. In each case, the effort needed to be substantial enough to be taken seriously on the international stage, and to win a seat in critical international meetings.[41] Similarly, the Dutch defense budget was in part intended to secure its position within NATO.

The fact that Britain was involved in the European space organizations made the situation especially interesting. The Netherlands was always urging Britain to become more involved in European affairs, as a counterweight to France. In this sense, Britain had a similar role to that of America: the role of an outsider who could keep the larger European countries in check. Another important motivation for a Dutch space program was the presence of powerful electronics (Philips) and aircraft (Fokker) industries that hoped to enter this new and potentially lucrative field.

The American offer to launch satellites not only kick-started European space programs, both nationally and internationally, but it also played an important role in inter-European competition. ESRO happily accepted the American offer to launch its satellites, but individual countries did the same, so that they could launch satellites that were built outside of the European framework. These national programs were partly used to compete for contracts and positions of influence within ESRO.

39 Ludwig, "Platz Gefunden;" cf. Sebesta, "Choosing Its Own Way."

40 Alfred E. Pijpers, "Dekolonisatie, compensatiedrang en normalisering van de Nederlandse buitenlandse politiek," in Nicolaas C.F. van Sas (ed.), *De kracht van Nederland: Internationale positie en buitenlands beleid in historisch perspectief* (Haarlem, 1991), pp. 204–18; Joris J.C. Voorhoeve, *Peace, Profits and Principles: A Study of Dutch Foreign Policy* (Leiden, 1985), pp. 10–1.

41 Cf. Jaap van Splunter, *Kernsplijting en diplomatie: de Nederlandse politiek ten aanzien van de vreedzame toepassing van kernenergie, 1939–1957* (Amsterdam, 1993); Hoeneveld and Van Dongen, "Out of a clear blue sky?"

The Netherlands took up the American offer, in the 1960s to launch the Astronomical Netherlands Satellite, and in the 1970s to launch the Infrared Astronomical Satellite. These bilateral Dutch-American projects were intended to strengthen the position of the Netherlands in the European context. Economic competitiveness of the Netherlands was the main motive of these projects. Philips and Fokker, two national flagship companies, wished to demonstrate their capabilities, in order to be able to compete seriously for ESRO and ELDO contracts. Interestingly, acquiring advanced project management knowledge was also an important motive. The companies wished to acquire the necessary skills for managing extensive development projects, a field in which NASA excelled. The acquisition of these skills would be achieved in direct cooperation with NASA. The Ministry of Economic Affairs supported these ambitions, and provided funding for two successive Dutch-built satellites.[42]

These considerations were of little relevance to astronomy, but for various reasons an astronomical satellite was considered the best vehicle for realizing the mentioned ambitions. Science was a convenient vehicle for economic policy: it was considered politically neutral and carried a large public appeal. More specifically, Dutch astronomy was a well-organized community with an excellent international reputation.[43] The Dutch government and industry approached astronomers directly to ask if they could find use for a satellite—as indeed they did. As a result, the Astronomical Netherlands Satellite was built (ANS, launched in 1974), followed by the American-Dutch Infrared Astronomical Satellite (IRAS, launched 1983).

In this case, American Cold War policy facilitated a course of action that would otherwise have been impossible. Indirectly, the scientific satellites were 'gifts of the Cold War,' because the NASA offer which had made these projects conceivable was motivated by Cold War considerations. At the same time, Cold War politics defined clear boundaries between achievable goals and plans that were impossible to translate into practice. But regional politics and economic strategy were the most direct motives for the Dutch government to support satellite projects.

42 Baneke, "Space for Ambitions;" Niek de Kort, *Ruimteonderzoek: de horizon voorbij* (Amsterdam, 2008).

43 David Baneke, *De ontdekkers van de hemel. De Nederlandse sterrenkunde in de twintigste eeuw* (Amsterdam, 2015).

## Europe as a Third Power?

If the smaller European countries did not play a significant role in the great global power struggle in the 1950s and 60s, their situation could be turned into their advantage. The trope of small countries acting as mediators between great powers—a role that seemed natural since they posed no military threat on their own—was well-established in the early twentieth century. Belgium, the Netherlands, Switzerland, and the Scandinavian countries all tried to establish an international significance in this way. Science played an important role in the image they projected, as witnessed by the creation of Nobel Prizes and the Solvay Conferences.[44]

This dynamic did not disappear after World War II. As we have seen, Switzerland used international scientific organizations to underline its politics of 'neutrality and solidarity.' But even in NATO-member countries a sense of neutrality could remain. When asked about the relative prominence of Dutch officials in international astronomical organizations such as COSPAR, ESO and the International Astronomical Union, several leading Dutch astronomers mentioned Dutch 'neutrality' during the Cold War, which marked them as suitable candidates for positions which the superpowers did not want to concede to each other.[45] They clearly knew that the Netherlands was not a neutral power in any political sense, but statements of neutrality illustrate that they considered the Cold War a matter beyond their immediate concern—even though, as astronomers and space scientists, they benefitted from the Cold War more than anyone else.

The relationship between European countries and the United States changed in the 1970s and 1980s. While America was increasingly preoccupied with domestic problems and the Cold War entered a phase of détente, Europeans became increasingly critical of American policy, and transatlantic relations grew to be more complicated. European students and intellectuals started questioning American hegemony, even while they adopted American popular culture. At the same time, NATO's change from 'massive retaliation' to 'flexibility in response' as its guiding strategy required a more active role for

44 Rebecka Lettevall, Geert Somsen and Sven Widmalm (eds.), *Neutrality in Twentieth-Century Europe. Intersections of Science, Culture, and Politics after the First World War* (London and New York, 2012); Willem Otterspeer and J. Schuller tot Peursum-Meijer, *Wetenschap en wereldvrede. De Koninklijke Akademie van Wetenschappen en het herstel van de internationale wetenschap in het Interbellum* (Amsterdam, 1997).

45 Interviews by the author with astronomers Cornelis de Jager (May 2010), Harry van der Laan (January 2012), and Hugo van Woerden (February 2012).

Europe in military matters, while the West-German *Ostpolitik* led to a détente in German-German relations.[46]

In the 1980s, European confidence in national science and technology increased, even though American primacy was still uncontested in most fields. For the first time since World War II, Europe was able to claim a serious part in international competition in some highly visible scientific fields and technologies. The most dramatic example was the Ariane launcher, which provided Europe with a credible launch capability for the first time. Especially after the Space Shuttle Challenger disaster of 1986, Ariane became a true alternative to American launchers. Other examples of successful European science include the discovery of the W and Z bosons and the inauguration of the Large Electron–Positron Collider at CERN. Around the same time, European organizations decided to build the largest telescope in the world (ESO's Very Large Telescope, VLT), and an even more powerful accelerator (CERN's Large Hadron Collider, LHC). With Spacelab (1983–1988), Europe even developed a manned space program, the pinnacle of showcase technology.

Remarkably, even when Europe started to challenge American hegemony in this way, America kept sponsoring European efforts in science. Spacelab, for example, was still completely dependent on an American infrastructure (the Space Shuttle). Naturally, American primacy was still recognized in Europe. In their recent book on NASA's international cooperation, Krige, A.L. Callahan and A. Maharaj refer to a British official's evaluation of the European participation in the American (later: International) space station, according to whom the question was not whether it made sense to build a space station, but, "[g]iven that the US has decided to build one, and has invited us to join, can we afford not to?"[47]

## Conclusion

Many considerations shaped European science policies during the Cold War. The great power struggle with the East was one of them, but not always the most urgent one. To understand the impact of the Cold War on science, we have to assess its importance carefully and in comparison with other factors. It would be incorrect to ascribe the post-war surge in science funding solely to the Cold War. Even in space research, one of the most iconic Cold War activities, national and regional considerations played a significant role.

46 Klinkert and Teitler, "Nederland van neutraliteit," p. 28.

47 John Krige, Angelina Long Callahan and Ashok Maharaj, *NASA in the World: Fifty Years of International Collaboration in Space* (New York, 2013), p. 251.

Moreover, from a European perspective, the Soviet threat was not a direct concern in this context. In several ways, the Cold War was regarded as an American affair. The Cold War had a cascading effect: Cold War considerations were extremely important in American policy making, which, in turn, defined the limits of European policy options. American policy created opportunities and stimulated specific research in Europe, but it also blocked certain courses of action.[48]

The impact of the focus on the USA in European science policy was varied. America was able to regulate flows of information in several cases, including high-profile scientific projects such as CERN. Certain disciplines certainly benefitted from their symbolic role in the Cold War struggle, and from technologies that had originally been developed for military purposes. Space science was a prime example. America's Cold War diplomacy made it possible for European countries to embark on space projects two decades before a reliable European launcher became available. Apart from its direct influence, cooperation with the United States was also used by European countries in their competition with each other. Finally, the global political struggle, in which nearly every subject was polarized, also created the need for a politics-free, neutral zone, both for diplomatic purposes and for economic and technological competition in isolation from political sensitivities. Science provided such a zone, and this created attractive possibilities for scientists, especially for those from small countries.

Many of the dynamics I have described in this article remained in place after the end of the Cold War. Even when Europe was no longer dependent on America for protection against the Soviet Union, America remained a powerful actor in European politics. America was able to retain its primacy in many fields, including science and technology. It remained the main sponsor of international space activities, and, more generally, it provided the standard by which Europeans assessed their scientific and technological activities.[49]

The picture that I have painted here provides a more complex model of Cold War science and American hegemony than previously established. International relationships were dynamic on all levels: national, regional, and global. The different levels interfered with each other, and all participants were actively trying to shape them according to their own interests. The one actor that was absent from many of the considerations was the Soviet Union.

48 I would like to thank Christian Joas for the term 'cascading influence.'

49 Cf. Joris van Eijnatten, Toine Pieters and Jaap Verheul, "Big Data for Global History: The Transformative Promise of Digital Humanities," *BMGN-Low Countries Historical Review* 128 (2013), 55–77, on 'reference cultures'.