



Science, Culture and National Identity in Francoist Spain, 1939–1959

Edited by
Marició Janué i Miret
Albert Presas i Puig

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Welcome to the Future! Science as a Tool for American Geopolitics in 1950s' Spain

Lorenzo Delgado Gómez-Escalonilla

At its dawn, the Franco regime tried to carry out an autarkic economic policy and industrialization associated with military objectives,¹ which in turn fed the development of a home-grown scientific and technological policy to give them sustenance. Such aspirations, similar to those of other countries at that time, required strong investments, an industry with the capacity to face such challenges, and a firm commitment to training

This work has been carried out within the framework of two research projects, funded by the Junta de Castilla y León [*External assistance and industrial and scientific and technical modernization in Castilla-León: Analysis of local potential and global options, c.1950-present* (SA241P18)] and the Ministry of Science, Innovation and Universities [*Agents of the Spanish Innovation System: Learning strategies and dissemination of knowledge during the economic transition, 1959–1986* (PGC2018-098057-A-I00)].

¹San Román (1999).

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competent scientists and technicians. None of these goals were within the reach of the Spain that came out of a bloody civil war, with its aftermath of infrastructure destruction. In addition, the scientific community that had been developing during the first third of the twentieth century and that still lacked a long-established tradition in terms of knowledge generation and technological development was subjected to the repression and purification of its members carried out by the dictatorship that then governed the destiny of the country.²

The formula to overcome such shortcomings was to resort to an external partner that acted as a catalytic agent, a role assigned at that time to Germany.³ The commitment to having rapport with the Axis countries and with Germany as a necessary collaborator mediated the initiatives undertaken in the Second World War, with the Juan de la Cierva Board of Trustees of the CSIC at the forefront of that orientation.⁴ Since 1944, German support could not be counted upon because Germany had to concentrate all its energies and resources in a war conflagration whose evolution was increasingly adverse.

The post-war period and the international isolation of the Spanish dictatorship predicted a bleak horizon for such projects. They subsisted in an attenuated form by utilizing a group of top German scientists, with whom it was expected to obtain advances in areas such as radar, aircraft, submarines, light weapons, optics, and vehicles. However, the *know-how* of German engineers and technology did not flourish in an environment with a shortage of resources and financial means, poor human capital formation, and an industry weighed down by its backwardness regarding equipment.⁵ In the mid-1950s, achieving modernization of the industrial and scientific fabric became dependent on cooperation with the United States. The Cold War dialectic and the confrontation with the Soviet Union made real what a few years before would have been inconceivable.

Although the key to the Spanish–American relationship was the geographic potential of the Iberian country for the US military deployment in Europe, that link caused a chain reaction that affected other scenarios. The purchase of American technology and the facilities to attract companies and investments of identical origin soon became key factors to revive the

² Claret Miranda (2006); Otero Carvajal et alii (2006).

³ García Pérez (1994).

⁴ López (1999); Íd. (2008):95–98.

⁵ Presas i Puig (2008).

Spanish industrial fabric.⁶ The asymmetric nature of the relationship established with the powerful Americans also meant that this process was more dependent on them than the regime was willing to recognize. In addition to the changes that were introduced in the business world, “Americanization” had its correlate in the scientific field.

STRATEGIC INTERESTS AND SPANISH ACCESS TO US KNOWLEDGE CIRCUITS

The United States made an outstanding contribution in the generation of human capital formation circuits into the post-war period. The *Fulbright Program*, established in 1946, promoted educational exchange abroad using foreign currency that the American government owned due to its loans to Allied countries during the world conflict.⁷ Shortly after, the *Foreign Leader Program* was launched, which allowed groups with influence (politicians, officials, journalists, social leaders, etc.) to make “immersion” stays in the United States.⁸ The *United States Information and Educational Exchange Program* extended, since 1948, the radius of action of those channels. The *European Recovery Program* promoted the technical and managerial training of the leaders of the business world—public and private—through the so-called productivity missions.⁹ The creation of the North Atlantic Treaty Organization (NATO) led to a progressive convergence between the armed forces of the countries that formed it, encouraged by the *Mutual Defense Assistance Program*.¹⁰ All those routes of interrelation forged epistemic communities and future international experts who played key roles in the processes of production and transnational circulation of the “semantics of modernization” with an American stamp. Such experiences, in short, set up a breeding ground of elites favourable towards the United States and its leadership.¹¹

Spain began to have access to those training, information, and knowledge transfer circuits, with some delay, following the bilateral agreements of 1953. Such agreements allowed the United States to establish a set of

⁶ Calvo (2001); Tascón Fernández (2003); Álvaro (2012); Puig and Álvaro (2004).

⁷ Lebovic (2013).

⁸ Scott-Smith (2008).

⁹ Gourvish and Tiratsoo (1998); Barjot (2002).

¹⁰ Mott (2002); Weber (2016).

¹¹ Haas (1992); Adler (1992); Scott-Smith (2006).

military bases in Spain in exchange for economic and military aid. From the American perspective, rapport with a dictatorship set up with the complicity of fascism was only due to security reasons. The importance of having those bases to strengthen the American defensive presence in Western Europe justified that relationship *contra natura*. After all, Francoism was a lesser evil with respect to the communist threat. The US foreign policy planners did not ignore that the association with that political regime eroded its democratic image. However, strategic realism trumped ideological coherence at that time. Francoism, on the other hand, received American support in exchange for subordinating itself to the United States' military interests.¹² Previously, the images that were shown to the Spanish public of the United States were contaminated by the anti-Americanism of the Francoist leaders and of the government-controlled media.¹³ Beginning with those bilateral treaties, in an exercise of political trickery favoured by the Cold War dialectic, those reviled Americans suddenly became “allies”. Geopolitics forged strange travelling companions.

In the following years, the Americans developed a persuasive strategy aimed at convincing the Spaniards of the benefits of bilateral collaboration. The main objective, in its initial phase, was to win wills among the decision-making sectors within the country's elite. Their willingness was crucial to the construction of the military bases and their subsequent operation. Priority attention to the elites was not different from the policy deployed in other Western European countries, with the caveat that Spain was governed by a dictatorship—a characteristic that it only shared with Portugal in that regional framework. On the other hand, given the history of anti-Americanism in the pro-Franco media, more intensive treatment was required. Additionally, it was sought that the majority of the population to welcome foreign forces, which could be achieved by associating the friendship with the Americans with an improvement in Spanish living conditions. The need to maintain a close relationship with the Spanish government to preserve the advantages of its military operation and, at the same time, prevent the United States from being perceived as a supporter of Franco's regime made the objectives of that propaganda machine not easily compatible.¹⁴ The final prospect of that persuasive strategy was to promote a progressive opening of the country that entailed alignment

¹²Viñas (2003).

¹³Fernández de Miguel (2012); Niño Rodríguez (2012).

¹⁴Delgado Gómez-Escalonilla (2009).

with other Western nations, although without rushing to avoid arousing the reluctance of the Spanish authorities or of the most recalcitrant nationalist sectors.

One of the initiatives undertaken to achieve favourable reception in the Iberian country was the resumption of contacts in Research and Development (R&D). The formation of cadres, the transfer of knowledge and methods, and the provision of instruments and updated publications, together with help accessing international organizations, composed a battery of stimuli for scientific and technical development. The improvement of business and professional training favoured the renewal of the economic fabric, and the resources dedicated to military training brought the instruction and operating systems of a sector of the armed forces nearer to NATO standards. Through those channels, the United States promoted the immersion of some of the country's leaders in its "informal empire"¹⁵: military, businessmen, scientists and technicians, political and social leaders, and those in charge of the media, mainly. This was a process similar to that previously undertaken in other Western European countries.

From the perspective of the Spanish government, aid for the formation of human capital was conceived as one of the compensations for military collaboration with the United States. In that sense, they showed their preference for directing that action towards the cadres of the scientific and technical system, rather than to orient it towards candidates from the humanities and social sciences over which their North American counterparts expressed a clear interest.¹⁶ Although the Spanish authorities wished to improve the training of personnel that should contribute to economic and industrial development, the North American authorities emphasized the promotion of knowledge of the society and ideals of the United States and its government.

At the beginning of the 1950s, action guides (*Country Papers*) began to be prepared that outlined the behaviour to be followed by the United States Information Service (USIS), an organization responsible for projecting a positive image of the United States and winning the support of the Spanish elite. By that time, there was still no *Exchange Program*, that is, Spain was not included among the European recipients of human

¹⁵ Scott-Smith (2008): 423.

¹⁶ "Minutes of the Board of Trustees of the JRC", June 26 and October 23, 1956; "Informative note", September 24, 1956. AGA-MAEC, R-11501/6.

capital training programmes in American university and research centres. In the absence of this, newsletters and specialized publications, radio broadcasts, documentaries and activities organized by the libraries of its centres were used to attract these elites.¹⁷

The American interest in integrating Spain into its defensive apparatus made the “leaders of public life” the main *target groups* of American politics and demanded more direct action.¹⁸ On the one hand, it was necessary to reduce Spanish isolation and favour the exchange of ideas, information, and people as well as reach out to the main organizations of the Western bloc. On the other hand, those groups had to be convinced that no one was in a better position than the United States to promote the renewal of methods and knowledge that the country required for development.¹⁹ After the agreements of 1953, the collaboration of those elite was the top priority; therefore, training experiences in the United States were focused on them.²⁰

MILITARY, SCIENTIFIC, AND TECHNICAL TRAINING

The first programmes that were applied in Spain were aimed at attracting “opinion makers” (*Foreign Leader Program*) or had the generic mission of disseminating knowledge of the United States among Spanish society (*Educational Exchange Program*). From the point of view of scientific and technical training, the most relevant were the *Military Assistance Training Program* and the *Technical Exchange Program*, initiated in 1954 and included in the 1953 conventions. Both programmes had their

¹⁷In mid-1953, the American deployment in this area comprised five delegations (in Madrid, Barcelona, Seville, Bilbao, and Valencia), which employed a total of 18 Americans and 69 Spaniards. Most of the members were in the Spanish capital, with Barcelona as the second focus of action. In addition, in 1951, the Institute of North American Studies in Barcelona was founded by a private initiative, but with the support of the Embassy, and somewhat later created the Center for North American Studies in Valencia (1958) and the Hispano-North American Institute of Culture in Madrid (1961).

¹⁸Those leaders of public life included “government, military and religious circles, professionals, world of business and finance, and landowners”. “Country Paper for Spain”, February 1951. NACP, RG 59, Lot Files, Office of Western European Affairs (LF-OWEA), 1942–1958, Spain, box 10.

¹⁹“US Government’s Overseas Information Program in Spain”, August 30, 1952. NACP, RG 59, Decimal Files (DF), 1950–1954, Spain, box 2399, 511.52/8-3052.

²⁰“US Policy toward Spain”, June 1953; “1954–1955 IIA Prospectus for Spain”, April 23, 1953. NACP, RG 59, LF-OWEA, 1942–1958, Spain, box 3 and DF 511.52/4-2353.

predecessors in initiatives developed within the framework of NATO and the Marshall Plan.

In keeping with the centrality of the strategic modernizing link in the bilateral relationship, Francoist leaders sought to use American aid to their armed forces across the board, an aspiration that did not correspond with the purposes of the US government and the resources they were willing to use. The contribution of the United States was much more modest than that expected by the Spanish authorities, but it was vital to take a part of that group out from the obsolescence in which it found itself (a diagnosis with which their North American, French, or British counterparts agreed). The technological backwardness and instructional methods of the Spanish Armed Forces were a problem for guaranteeing the optimal incorporation of the material and armament ceded by the United States. Therefore, one of the priorities was the technical and tactical training of the personnel that would be responsible for their use and maintenance. Simultaneously, these military cadres were familiarized with the operational procedures of the Western bloc, preparing them to guarantee the security of national borders and to cooperate in the defence of the bases established on the Iberian Peninsula.²¹

In the following years, the articulation of a teaching circuit that had as its main target military and technical personnel of the Air Force and Navy, under the supervision of the Military Assistance Advisory Group (MAAG) Spain, was favoured.²² That formative experience was positively valued by both parties, in contrast to the discrepancies that existed regarding the supplied military equipment. The Spanish military considered that part of this equipment was outdated or received late, and had to assume restrictions on its employment as it was confirmed in the Ifni-Sahara War. Thereafter, the US Army became the doctrinal, organic, and operational reference of the Spanish Armed Forces.²³

American aid was essential for the take-off of jet aviation. The Talavera reactor school was nourished by the equipment supplied by the United States, and its professors received their first flight and aeronautical technique courses at the American air base Fürstenfeldbruck in the German Federal Republic. Shortly afterwards, other United States Air Force

²¹ León-Aguinaga and Delgado Gómez-Escalonilla (2021): 55–70.

²² A broader vision of the development of these training programmes in León Aguinaga (2019).

²³ Cardona (2008): 189.

(USAF) installations in the United States and Europe became habitual destinations for Spanish military personnel and technicians. Most of the courses they attended taught specialties such as piloting, maintenance, weaponry, construction, electronics, communications, and meteorology. USAF instructors also trained a crew of jet fighters who would become the wings of Spanish interception.

Similar actions were carried out with the future crews and maintenance rungs of the ships that were to be modernized with American aid (about 30 Navy ships) or to be incorporated into its fleet (several minesweepers and a pair of destroyers). The officers and specialists involved regularly visited specialty schools for sonar, submarines, and minesweepers, as well as arsenals and the Marine Corps school, with the idea of reinforcing the Spanish contribution to the defence of Rota. Another important facet of that process was training Spanish crews in their own territorial waters since the summer of 1955, with the support of the Sixth Fleet, which included them in their tactical exercises in the area.

Actions with the Army proceeded with less haste because their contribution to American strategic designs was not critical. Preference was given to the tactical use of the most technologically advanced incorporated material (battle tanks, towed and self-propelled howitzers, anti-tank guns, etc.) as well as logistics management, maintenance, and repairs. The most common destinations were American Army facilities in the German Federal Republic, with courses focused on cavalry, artillery, and engineering, with the American centres taking over in 1955 and expanding the specialties to infantry, armoured cavalry, transmissions, and logistics.

There were also soldiers, although in a much smaller volume, who participated in the civil technical assistance programme. Its original purpose was to ensure efficient use of the US military apparatus in Spain. To achieve this, the country had to become stable by improving its economic resources and by increasing productivity and operating infrastructure. That would also show to the elites of the regime and, by extension, to society as a whole the positive effects of American aid. The National Industrial Productivity Commission was the agency responsible for selecting the beneficiaries of that programme in the industry and services sectors, which received the bulk of the aid. The Army High Staff was

integrated in its Advisory Council, and MAAG was one of its interlocutors in the North American representation.²⁴

It was therefore about an open channel for military and civilian personnel coming from strategic industrial sectors for Mutual Defence, especially from the Junta de Energía Nuclear (JEN) and Instituto Nacional de Técnica Aeronáutica (INTA), closely linked to the armed forces.²⁵ Both in JEN and in INTA, the military and economic sides mixed with the scientific and technical levels, which favoured the preference given to training candidates in nuclear physics and aeronautical engineering. The American connection was particularly relevant. The United States was at the forefront of such knowledge, and its defence industry became a relevant sector of the domestic economy and a pioneer in innovation,²⁶ a model of conduct for the Francoist leaders.

The Spanish interest in nuclear energy dates back to the first years post-Second World War, when surveys were carried out to study the value of existing uranium deposits in the country and groups of specialists conducting stays abroad began to be favoured. The University of Chicago was a reception centre. JEN stimulated that process, which was reinforced by the signing of the 1953 treaties. After the first world conference on this subject (Geneva, 1955), with a large Spanish contingent, a bilateral agreement was signed with the United States on civil uses of atomic energy and nuclear research reactors under the framework of the “Atoms for Peace” programme. Two years later, a new agreement included the possibility of acquiring experimental reactors—whether by transfer or by collaborating in their construction—together with the fuel necessary for their operation, which allowed the training of personnel in nuclear applications for medicine, agriculture, and industry.²⁷ After that, there was a growing transfer of research to private companies, also facilitating the integration of Spanish

²⁴ “Terms of Reference of Joint US Military Group (Spain) and Military Assistance Advisory Group (Spain)”, January 14, 1954. NACP, RG 218, Joint Secretariat, Central Files, 1959–1976, box 78. The military publications helped to promote management and organizational techniques advertised by the aforementioned commission and by the courses of the National Institute for Rationalization of Labor.

²⁵ Vid. “Technical Assistance Program Annex” in “End of Tour Report of Chief, MAAG Spain for period 1 July 1956–1930 June 1958 (U)”, August 29, 1958. NACP, RG 334, SCC, box 6.

²⁶ Leslie (1993); Reynolds (2010): 380.

²⁷ A succinct description of the bilateral agreements reached in this area in “Note on collaboration in the nuclear field between Spain and the United States”, June 18, 1970. AGA-MAEC, R-12190/4.

scientists and experts in international forums. Somewhat later, nuclear energy was transferred from the laboratory to the market, entering the commercial phase of construction of nuclear power plants in Spain and with direct training of engineers and technicians of Spanish companies in North American centres and industries.²⁸

Also in aeronautical research, as in nuclear energy, North American interests in investments in its own R&D system converged with parallel demand from the Spanish government. Along with this, there was a strategic element derived from the bilateral link: the Iberian Peninsula was conceived by the United States as an air deployment base and, later, as a platform for tracking its space vehicles. Prior to the signing of the bilateral agreement of 1953, the Air Force tried unsuccessfully to acquire American technology and equipment to renew its obsolete material, while INTA probed the possibility of sending some of its technicians there.²⁹ However, it took until the mid-1950s for groups of aeronautical engineers to travel to the United States with some regularity to expand their training, with some linked to INTA and others to companies such as Construcciones Aeronáuticas S.A. Those contacts were branching out, from the receipt of funds from the Air Research and Development Command for the development of projects to the sending of more Spanish engineers to North American centres through grants from the National Aeronautics and Space Administration (NASA)-European Space Research Organisation (ESRO) agreement.³⁰ That mechanism of knowledge transfer had effects on the modernization of Spanish aviation, both military and commercial, and a few years later, it extended to the field of space research. In March 1960, an agreement was signed for the establishment of a station on the island of Gran Canaria for monitoring and communicating space vehicles; notably, this station played a role in the Mercury and Gemini programmes. Both governments delegated the application of this agreement to NASA and INTA. This agreement was followed by others throughout that decade, building new facilities and extending the radius of scientific and technical training received by Spanish staff.³¹

²⁸ Romero de Pablos and Sánchez Ron (2001); Presas i Puig (2005, 2017); Herrán and Roqué (2012); Soler Ferrán (2017); Rubio-Varas and De La Torre (2018).

²⁹ Delgado Gómez-Escalonilla and León Aguinaga (2018): 91–92.

³⁰ Roca Rosell and Sánchez Ron (1993); Sánchez Ron (1997).

³¹ Information on the evolution of these agreements in AGA-MAEC, R-12690/5.

With regard to the primary sector, the management of the technical assistance programme belonged to the Ministry of Agriculture, having smaller funds than in the other two productive sectors. US aid opened new possibilities in the field of agronomic research, which until then had remained in scientific destitution as a result of international isolation. Although the number of scholarships granted was still limited, the stays of engineers and technicians made it possible to resume training and exchange abroad, which, before the end of the decade of the 1950s, was transferred to the organization of the Spanish Agricultural Extension Service. Consequences of that influence were the implantation of the American model and a rupture with the national tradition in the field of research and applied technologies, reaffirmed by the maintenance of that link through the National Institute of Agronomic Research, whose implications became more evident in the decade of the 1960s.³²

In the previously mentioned areas, the relationships of Spanish organizations with their related parties on the other side of the Atlantic were destined to last, marking their subsequent scientific, technological, and, in many cases, economic trajectory. The movement of Spanish professionals to the United States within the framework of that programme resulted in a broader training dynamic, which also included a large presence of technicians and officials from other official institutions related to the transport network, public works, engineering, and cadres of armament, electrical, and steel factories, as well as business leaders of other branches. Another one of the fundamental dimensions of that cooperation was the attention given to the renewal of teaching in business schools, where the leaders of Spanish capitalism began to be trained.³³

In the selection of candidates, preference was given to their contribution to the modernization of the large transport infrastructure—rail, ports, roads, and airports—the development of the energy sector—hydroelectric, thermal, and nuclear energy stations—the increase in industrial productivity—in the mining, steel, or arms sectors—and in agricultural sectors—linked to the importation of fertilizers and machinery. One of the main instruments of that training circuit was the “productivity missions”, among which those dedicated to organization and business management, construction and urban planning, market research and advertising, and

³²Fernández Prieto (2007): 323–326 and 338–344; Díaz-Geda and Lanero Táboas (2015).

³³Puig and Álvaro (2004); Puig (2005).

food and textiles stood out. Technical assistance was, in short, an instrument for the training of cadres that, in addition, was fundamental in the professionalization of business management.³⁴

The figures on the volume of personnel who participated in these circuits during the 1950s are still incomplete. Military instruction was by far the most numerous: the Air Force alone accounted for more than 1500 beneficiaries until 1963,³⁵ and the Navy was possibly on par; the numbers for the Army were somewhat lower. The technical assistance programme mobilized almost another 1000 people until 1962. More imprecise is the calculation of other circuits that contributed to that training, bilateral programmes (educational exchange), and Spanish (CSIC, JRC, Institute of Hispanic Culture, etc.) as well as North American channels (American Field Service, the Amo and Doctor Castroviejo Foundations, along with several universities and centres in that country). The number of those who expanded their knowledge in the United States by such means could be several hundred more, on whose specialties we have insufficient data,³⁶ and all this without counting the courses taught in Spain by Americans or by Spaniards who had received training in the United States. The *Fulbright Program* joined that catalogue of training opportunities at the end of the decade; however, its actual operation began in the 1960s.

SCIENTIFIC LEADERSHIP AS A PROPAGANDA INSTRUMENT

The cooperation programmes were a privileged means to transfer to the Spanish people, especially their leading cadres, the North American commitment to the modernization of the country and the improvement in their standard of living. Throughout a series of monographs that appeared from 1954 until the early 1960s in *Noticias de Actualidad (NA)*—the reference magazine of the USIS in Spain and the main information channel of the Embassy—the adoption of American scientific and production methods was extolled as the formula for the development of the country.

³⁴ Álvaro Moya (2011): 19; Íd. (2012): 67–69.

³⁵ “List of courses and orientation visits made abroad from 1954–1963”. AHEA, A10869.

³⁶ An incomplete list is available, covering from 1946 to the end of 1956, which computes a total of 523 scholarships for Spaniards in the United States (not including the military training programme or the technical assistance programme). Among the main receiving centres were the University of California, Columbia University, Harvard University, New York University, University of Chicago, and Stanford University, and the Massachusetts Institute of Technology. Ruiz Fornells (1956).

The advances made in the numerous sectors that benefited from American aid were repeatedly alluded to while mentioning the Spanish specialists who went to the United States “to see how factories are run there, how mines are exploited, how they cultivate the fields, and how the railroads work”.³⁷

In that campaign to show the Spaniards, especially to those with greater decision-making power, the multiple advantages of bilateral collaboration and of the American presence in Spain, the dissemination of the scientific leadership of the United States occupied a relevant role. Its prestige had increased considerably following the Allied victory in the world conflict. The images of American scientific and technical advances, often applied to the military sector, created a remarkable fascination in a society struck by poverty and national-Catholic suffocation. Knowledge of such advances was, in any case, very shallow. Since the 1950s, when the possible installation of American bases in Spain began to take shape more clearly, the propaganda machine of that country began to devote a growing space to the dissemination of the various manifestations of such leadership. This was reflected in the information that appeared in *NA* or in the USIS documentaries—disseminated in ministries, training centres, schools, barracks, and so on.³⁸

USIS documentaries in Spain, 1954 and 1957

	1954	1957
The American Leadership	257	350
- Scientific	109	171
- Productive	109	110
- International	21	48
- Anticommunism	5	15
- Military	3	6

Source: León Aguinaga (2012: 215)

Among the contents that those media collected, news about industrial applications or improvements in the quality of life derived from scientific advances were frequent. There were even fixed sections in *NA* that lasted

³⁷ “The human factor, the main binder”, *NA (Spanish-American Economic Cooperation, 1953–1956)*, October 1, 1956: 6.

³⁸ More information on these propaganda channels in León Aguinaga (2009).

for some time on “America invents for the world”, “Science and Industry”, and “Science and Space”, together with the spread of biographical notes of US Nobel Prize winners as examples of the country’s scientific leadership. Those reports and images of North American origin constituted, since the mid-1950s, the almost exclusive source of scientific and technological information of the NO-DO, the graphic news organization whose screening was mandatory in all Spanish cinema screens.³⁹ In addition to the multiple allusions contained in the usual *News* of short duration, in the series *Imágenes* (Images), which was screened as a single documentary of greater duration, the programmes dedicated to American science and technology had a prominent presence. In all those propaganda vehicles, there were two major themes: atomic energy and, somewhat later, advances in the space race.

NO-DO Images

<i>Premiere</i>	<i>Image</i>	<i>News</i>
1946	85	The Atobomba
1949	214	Traversing space
	249	Space lords
1-III-1953	426	Prodigious technique
19-IV-1954	484	Atomic energy. Development of nuclear physics
17-II-1958	684	Projectiles and rockets. The mastery of space
20-X-1958	719	Nuclear energy in Spain
24-XI-1958	724	Towards the Moon. Space exploration
9-XI-1959	774	Nuclear energy. Disclosure of atomic physics
28-XII-1959	781	Friendly cooperation (Spain and the United States).
15-V-1961	853	Man to space
25-IX-1961	872	Space explorers
11-I-1965	1044	The first atomic merchant ship (Savannah)
24-VII-1967	1176	Wings and flight (from the factory to the air)
31-VII-1967	1177	Time and face
8-I-1968	1200	The “Daedalus”. A helicopter carrier for our Navy
29-I-1968	1203	The mastery of the air

Source: Prepared by the author

Since the beginning of the 1950s, successive articles that provided accounts of the opportunities offered by nuclear energy to industry, medicine, or agriculture appeared in *NA*, but it was after the launch of the “Atoms for Peace” campaign in 1953 when the frequency of the news on

³⁹ Ordóñez and Ramírez (2008): 272.

the subject increased. This showed the centrality acquired by the nuclear issue in relations between states during the Cold War.⁴⁰ The objective was twofold: to underscore American leadership and its image as a “champion of peace”, expressed in its commitment to the investigation of the civil applications of that energy, in contrast to the Soviet “militarization”, as shown by its secret atomic trials. Simultaneously, the mobile teams of the USIS screened documentaries such as *The atom and agriculture*, *The atom and biological science*, or *The atom and medicine*. Such deployment was crowned with the presentation of *Atoms for Peace*, which could be seen in Spain for the first time at massive exhibition fairs in Barcelona and Valencia in 1955. The following year, a special monograph appeared in *NA* on the peaceful use of the atom,⁴¹ and until the mid-1960s, the successive American advances in nuclear matters—almost all related to peaceful purposes—continued to be told, sprinkled with the narration of some “exploits”, such as those carried out by the nuclear submarines that crossed the Arctic Circle submerged and circumnavigated the globe.⁴²

In 1964 in Madrid, the Atomic Energy Commission (AEC), in coordination with JEN, presented *Atoms in action*, which had circulated in several countries in Europe, Asia, Latin America, and Africa. The exhibition combined informative with demonstrative facets and included a training component, with Spaniards who had completed their education in North American centres acting as technical instructors.⁴³ It was, somehow, the swan song of the immaculate image of nuclear energy in Spain. Two years later, the accident in Palomares occurred, with the discovery by the Spanish public that American military aircraft flew over the Spanish sky loaded with atomic bombs. From then on, there was growing concern about the lack of information on such a safety-sensitive matter.⁴⁴ After that event, nuclear issues almost disappeared from American propaganda in Spain, which was not at odds with continuing to support the interests of its companies in this sector that almost took over the Spanish market.⁴⁵

Along with the atomic challenge, the space race was the other great field of scientific and technological competition between the two superpowers in their rivalry for international hegemony. In 1958, the first cover of *NA*

⁴⁰Hewlett and Holl (1989); Krige (2006).

⁴¹*NA*, June 6, 1955.

⁴²León Aguinaga (2012): 219–221.

⁴³“Spanish-American Atomic Exhibition”, *Atlántico*, March 1964: 31–35.

⁴⁴Moreno Izquierdo (2016).

⁴⁵Rubio-Varas and De La Torre (2017).

dedicated to the subject was published,⁴⁶ and news about propellant rockets, the design of manned space capsules, and even about a possible trip to the Moon began to appear regularly. The idea was to counteract the “Sputnik effect”, noting that the launch of the Soviet satellite into orbit was one of many notable achievements that were taking place in the scientific realm, in which the United States continued to be the world leader. In that line were measures such as the approval of the *National Defense Education Act* and the creation of NASA.⁴⁷ The topic gained presence in the following years in USIS information channels, through documentaries and brochures, and especially in the *NA* pages: space installations, scientists, and a series of satellites flew over the Earth with tasks that included studying atmospheric composition, solar radiation, and meteorology, providing telecommunications and military and civil observation, locating natural resources, aiding sea and air navigation, and so on (Pioneer, Vanguard, Discoverer, Tiros, Explorer, etc.). As with atomic energy, the space race mobilized the two superpowers that competed before world opinion to demonstrate their scientific and technological capabilities, in a struggle with both ideological and economic ramifications.⁴⁸

At the beginning of the 1960s, there was a more direct implication with that window to the future, when stations monitoring those space inventions were installed in Spain. In April 1961, Soviet astronaut Yuri Gagarin, aboard the Vostok I ship, became the first human being to travel to space and complete an orbit around the Earth. The American propaganda machine reacted by increasing information about its space achievements.⁴⁹ A special place was devoted to the Mercury project that allowed astronaut John Glenn to repeat Gagarin’s feat, and that was accompanied a few months after with a NASA-sponsored exhibition showing a life-size-scale model of his space capsule.⁵⁰ In the following years, the abundance of

⁴⁶ “Science explores the sky”, *NA*, April 28, 1958.

⁴⁷ Barksdale Clowes (1981); Divine (1993); Launius (1994).

⁴⁸ About US government propaganda campaigns dedicated to spreading its scientific and technical advances (“Atoms for Peace” and “Open Skies”), see Osgood (2006): 153–213 y 323–353.

⁴⁹ Only a few weeks after that event, full-page illustrations of the satellites and rockets sent to space by the United States with their respective characteristics appeared. *NA*, May 1, 1961: 20–23.

⁵⁰ “The Mercury project. First North American in orbit”; “The spacecraft that traverses Spain”, *NA*, March 1 and June 1, 1962: 12–13 and 7. A neat pamphlet that described the American progress in this field was also published. *US. Space exploration. 1962.*

news on the subject continued to arouse a mixture of fascination and curiosity in Spanish society, which was marked by the media impact of events such as the Gemini V astronauts' visit to Spain in 1965. The symbology of North American scientific and technological pre-eminence reached a fundamental milestone with the arrival of men on the Moon through the Apollo 11 mission, whose crew also made stops in Spain during their subsequent world tour.

CONCLUSIONS

Since the mid-1950s, new opportunities opened for Spanish professional cadres to expand their training in the United States. Although their proportions were still modest, those channels allowed articulating an incipient network of knowledge diffusion and methods that came from the other side of the Atlantic and that, gradually, would be assimilated into and adapted to the Spanish context. Those transfers were accompanied by the establishment of professional contacts, the dissemination of publications and specialized journals, and the translation of reference works, together with a growing bilateral collaboration in various sectors. The aspiration to convert the beneficiaries of those programmes into "transmitters" of the American model was always present as one of the main motivations of the US government. That was not a uniform or linear process: there were sectors where American influence was more intense, others where it found itself with better conditions to take root, and others, in short, where it did not succeed. The impact of all that activity is partially known; however, there is still a way to go to obtain an accurate idea of its overall dimensions and effects.

In parallel to the push to guarantee its leadership, the United States assumed that scientific internationalization was a way to win allies and capture the sympathies of relevant groups from other countries. In addition to its direct action, the United States supported the proliferation of international organizations in a wide range of sectors, in line with the influence that those issues acquired on the global agenda. American conceptions and methods were transferred to the Organization for Economic Cooperation and Development (OECD), United Nations Educational, Scientific and Cultural Organization (UNESCO), the World Bank (WB), philanthropic foundations, and so on, which formed an "International

Development Community”.⁵¹ The effects of this transnational process also came to Spain, although sometimes with rhythms and intensities different from those of other Western European countries.

At the same time, this action was combined with information towards wider audiences to convince them of the ability of American science to model the future. The propaganda story of those feats, together with the experiences of those who went to United States research centres and universities to complete their training, contributed to enhancing the role of American science in 1950s Spain. The leadership of the United States in the Western bloc, reviled a few years before, was assumed as something natural, making that country the unequivocal reference for any attempt to boost scientific and technical research. In the end, Spain was incorporated like other European countries into that “informal empire”, based not only on dependence of US power but also on the desire for emulation.

In the following decade, the technocratic project of joining the developmental economic policy with an educational and scientific policy that provided qualified personnel to grease the locomotive of Spanish growth gained strength. That orientation, based on the Copernican turn of economic policy encouraged by the Stabilisation Plan of 1959, favoured a greater rapport with the ideas on modernization and the formation of human capital coming from the United States. The reforms undertaken by technocratic leaders once again had a privileged interlocutor in the United States, either directly or through organizations such as the OECD and the WB.⁵² The roots of that process, in any case, were created in the path developed in the preceding years.

Acronyms Used

AEC	Atomic Energy Commission
AGA-MAEC	Archivo General de la Administración-Ministerio de Asuntos Exteriores y Cooperación/General Archive of the Administration/Ministry of Foreign Affairs and Cooperation
AHEA	Archivo Histórico del Ejército del Aire/Historical Archive of the Air Force

⁵¹ Miller (2006); Krige (2008); Frey et al. (2014).

⁵² Delgado Gómez-Escalonilla (2015); Martín García and Delgado Gómez-Escalonilla (2020).

CSIC	Consejo Superior de Investigaciones Científicas/Higher Council for Scientific Research
INTA	Instituto Nacional de Técnica Aeronáutica/National Institute of Aeronautical Technology
JEN	Junta de Energía Nuclear/Nuclear Energy Board
JRC	Junta de Relaciones Culturales/Board of Cultural Relations
MAAG	Military Assistance Advisory Group
NA	Noticias de Actualidad
NACP	National Archives of the United States-College Park
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
OECD	Organization for Economic Cooperation and Development
R&D	Research and Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAF	US Air Force
USIS	United States Information Service
WB	World Bank

REFERENCES

- Adler, Emanuel (1992): “Conclusion: Epistemic communities, world order, and the creation of a reflective research program”, *International Organization*, 46/1: 367–390.
- Álvaro Moya, Adoración (2011): “Guerra Fría y formación de capital humano durante el franquismo. Un balance sobre el programa estadounidense de ayuda técnica (1953–1963)”, *Historia del Presente*, 17: 13–25.
- Álvaro Moya, Adoración (2012): *La inversión directa estadounidense en España. Un estudio desde la perspectiva empresarial (c. 1900–1975)*, Madrid, Banco de España.
- Barjot, Dominique (ed.) (2002): *Catching up with America. Productivity Missions and the Diffusion of American Economic and Technological Influence after the Second World War*, Paris, Presses de l’Université de Paris-Sorbonne.
- Barksdale Clowes, Barbara (1981): *Brainpower for the Cold War: The Sputnik Crisis and National Defense Education Act of 1958*, Westport-CT, Greenwood Press.
- Calvo, Óscar (2001): “¡Bienvenido Mister Marshall! La ayuda económica americana y la economía española en la década de 1950”, *Revista de Historia Económica*, n° extraordinario: 253–275.

- Cardona, Gabriel (2008): *El poder militar en el Franquismo*, Barcelona, Flor del Viento.
- Claret Miranda, Jaume (2006): *El atroz desmoche. La destrucción de la Universidad española por el franquismo, 1936–1945*, Barcelona, Crítica.
- Delgado Gómez-Escalonilla, Lorenzo (2009): “La maquinaria de la persuasión. Política informativa y cultural de Estados Unidos hacia España”, *Ayer*, 75: 97–132.
- Delgado Gómez-Escalonilla, Lorenzo (2015): “Modernizadores y tecnócratas. Estados Unidos ante la política educativa y científica de la España del desarrollo”, *Historia y Política*, 34: 113–146.
- Delgado Gómez-Escalonilla, Lorenzo and León Aguinaga, Pablo (2018): “Fly Me to the Cold War: the United States and the Modernization of the Spanish Air Force in the 1950s”, in Stoker, Donald and Westermann, Edward B. (eds.): *Air Force Advising and Assistance: Developing Airpower in Client States*, Warwick, Helion & Company: 89–117.
- Díaz-Geada, Alba y Lanero Táboas, Daniel (2015): “Modelos de modernización para el desarrollismo: el influjo de las propuestas estadounidenses en el Servicio de Extensión Agraria (1955–1975)”, *Revista Complutense de Historia de América*, 41: 71–94.
- Divine, Robert A. (1993): *The Sputnik Challenge: Eisenhower’s Response to the Soviet Satellite*, New York, Oxford University Press.
- Fernández de Miguel, Daniel (2012): *El enemigo yanqui. Las raíces conservadoras del antiamericanismo español*, Madrid, Genuve Ediciones.
- Fernández Prieto, Lourenzo (2007): *El apagón tecnológico del franquismo. Estado e innovación en la agricultura española del siglo xx*, Valencia, Tirant Lo Blanch.
- Frey, Marc; Kunkel, Sönke, and Unger, Corinna (eds.) (2014): *International Organizations and Development*, Basingstoke, Palgrave Macmillan.
- García Pérez, Rafael (1994): *Franquismo y Tercer Reich. Las relaciones económicas hispano-alemanas durante la Segunda Guerra Mundial*, Madrid, Centro de Estudios Constitucionales.
- Gourvish, Terry and Tiratsoo, Nick (eds.) (1998): *Missionaries and Managers: American influences on European management education, 1945–69*, Manchester-New York, Manchester University Press.
- Haas, Peter M. (1992): “Introduction: epistemic communities and international policy coordination.” *International Organization*, 46/1: 1–35.
- Herrán, Néstor y Roqué, Xavier (eds.) (2012): *La física en la dictadura. Físicos, cultura y poder en España 1939–1975*, Barcelona, Universitat Autònoma de Barcelona.
- Hewlett, Richard G. and Holl, Jack M. (1989): *Atoms for Peace and War, 1953–1961. Eisenhower and the Atomic Energy Commission*, Berkeley, University of California Press.

- Krige, John (2006): “Atoms for Peace, Scientific Internationalism, and Scientific Intelligence”, en Krige, John and Barth, Kai-Henrik (eds.): *Global Power Knowledge. Science and Technology in International Affairs*, Osiris 21, Chicago, University of Chicago Press: 161–181.
- Krige, John (2008): *American Hegemony and the Postwar Reconstruction of Science in Europe*, Cambridge, MA, The MIT Press.
- Launius, Roger (1994): *NASA, A History of the US Civil Space Program*, Malabar-Fla., Krieger.
- Lebovic, Sam (2013): “From War Junk to Educational Exchange: The World War II Origins of the Fulbright Program and the Foundations of American Cultural Globalism, 1945–1950”, *Diplomatic History*, 37/2: 280–312.
- León Aguinaga, Pablo (2009): “Los canales de la propaganda norteamericana en España, 1945–1960”, *Ayer*, 75: 133–158.
- León Aguinaga, Pablo (2012): “*Faith in the USA*. El mensaje de la diplomacia pública americana en España (1948–1960)”, en Niño, Antonio y Montero, José Antonio (eds.): *Guerra Fría y Propaganda. Estados Unidos y su cruzada cultural en Europa y América Latina*, Madrid, Biblioteca Nueva: 197–234.
- León Aguinaga, Pablo (2019): “Los programas de formación para la «Mutua Defensa» entre España y Estados Unidos en los años cincuenta”, *Ayer*, 116: 49–76.
- León Aguinaga, Pablo and Delgado Gómez-Escalonilla, Lorenzo (2021): “The Deployment of U.S. Military Assistance to Franco’s Spain: Limited Modernization and Strategic Dependence”, *Cold War History*, 21/1: 55–70.
- Leslie, Stuart W. (1993): *The Cold War and American Science: The Military-Industrial-Academic Complex at MIT and Stanford*, New York, Columbia University Press.
- López, Santiago (1999): “El Patronato Juan de la Cierva (1939–1960), 3ª Parte: La investigación científica y tecnológica”, *Arbor*, 637, CLXII: 1–32.
- López, Santiago (2008): “Las ciencias aplicadas y las técnicas: la Fundación Nacional de Investigaciones Científicas y Ensayos de Reformas y el Patronato Juan de la Cierva del CSIC (1931–1961)”, en Romero de Pablos, Ana y Santasmases, María Jesús (eds.): *Cien años de política científica en España*, Bilbao, Fundación BBVA: 79–106.
- Martín García, Óscar J. and Delgado Gómez-Escalonilla, Lorenzo (eds.) (2020): *Teaching Modernization. Spanish and Latin American Educational Reform in the Cold War*, New York, Berghahn Books.
- Miller, Clark A. (2006): “‘An Effective Instrument of Peace’. Scientific Cooperation as an Instrument of U.S. Foreign Policy, 1938–1950”, en Krige, John and Barth, Kai-Henrik (eds.): *Global Power Knowledge. Science and Technology in International Affairs*, Osiris 21, Chicago, University of Chicago Press: 133–160.
- Moreno Izquierdo, Rafael (2016): *La historia secreta de las bombas de Palomares*, Barcelona, Crítica.

- Mott, William H., IV (2002): *United States Military Assistance. An Empirical Perspective*, Westport and London, Greenwood Press.
- Niño Rodríguez, Antonio (2012): “Los dilemas de la propaganda americana en la España franquista”, en Niño, Antonio y Montero, José Antonio (eds.): *Guerra Fría y Propaganda. Estados Unidos y su cruzada cultural en Europa y América Latina*, Madrid, Biblioteca Nueva: 155–196.
- Ordóñez, Javier y Ramírez, Felipe E. (2008): “Los públicos de la ciencia española: un estudio del NO-DO”, en Romero de Pablos, Ana y Santesmases, María Jesús (eds.): *Cien años de política científica en España*, Bilbao, Fundación BBVA: 257–292.
- Osgood, Kenneth (2006): *Total Cold War: Eisenhower’s Secret Propaganda Battle at Home and Abroad*, Lawrence, University of Kansas Press.
- Otero Carvajal, Luis Enrique et alii (2006): *La destrucción de la ciencia en España: depuración universitaria en el franquismo*, Madrid, Editorial Complutense.
- Presas i Puig, Albert (2005): “Science on the periphery. The Spanish reception of nuclear energy: An attempt at modernity?”, *Minerva*, 43/2: 197–218.
- Presas i Puig, Albert (2008): “La inmediata posguerra y la relación científica y técnica con Alemania”, en Romero de Pablos, Ana y Santesmases, María Jesús (eds.): *Cien años de política científica en España*, Bilbao, Fundación BBVA: 173–209.
- Presas i Puig, Albert (2017): “Human Capital and Physics Research for the Spanish Nuclear Program”, en Rubio-Varas, M^a. del Mar and De La Torre, Joseba (eds.): *The History of Nuclear Energy in Spain. Governance, Business and Finance*, London, Palgrave Macmillan: 97–117.
- Puig, Nuria (2005): “La ayuda económica de Estados Unidos y la *americanización* de los empresarios españoles”, en Delgado, Lorenzo y Elizalde, M^a. Dolores (eds.): *España y Estados Unidos en el siglo XX*, Madrid, CSIC: 181–205.
- Puig, Nuria y Álvaro, Adoración (2004): “La guerra fría y los empresarios españoles. La articulación de los intereses económicos de Estados Unidos en España, 1950–1975”, *Revista de Historia Económica*, 22/2: 387–424.
- Reynolds, David (2010): “Science, technology, and the Cold War”, en Leffler, Melvyn P. and Westad, Odd Arne (eds.): *The Cambridge History of the Cold War*, Vol. III *Endings*, Cambridge, Cambridge University Press: 378–399.
- Roca Rosell, Antoni y Sánchez Ron, José Manuel (1993), *Ciencia y Aeronáutica*, Madrid, Algaida/INTA.
- Romero de Pablos, Ana y Sánchez Ron, José Manuel (2001): *Energía nuclear en España: de la JEN al CIEMAT*, Madrid, CIEMAT.
- Rubio-Varas, M^a. del Mar and De La Torre, Joseba (eds.) (2017): *The History of Nuclear Energy in Spain. Governance, Business and Finance*, London, Palgrave Macmillan.
- Rubio-Varas, M^a. del Mar y De la Torre, Joseba (2018): “*American Nuclear Training*: científicos, ingenieros y empresarios españoles en los Estados Unidos

- del desarrollo atómico”, en CAMPRUBÍ, Lino, ROQUÉ, Xavier y SÁEZ DE ADANA, Francisco (eds.): *De la Guerra Fría al calentamiento global. Estados Unidos, España y el nuevo orden científico mundial*, Madrid, Catarata: 85–109.
- Ruiz Fornells, Enrique (1956): *Estudiantes españoles en los Estados Unidos. Diez años de intercambio*, Madrid, Asociación Cultural Hispano-Norteamericana.
- Sánchez Ron, José Manuel (1997): *INTA. 50 años de Ciencia y Técnica Aeroespacial*, Madrid, Ministerio de Defensa/Doce Calles/INTA.
- San Román, Elena (1999): *Ejército e industria. El nacimiento del INI*, Barcelona, Crítica.
- Scott-Smith, Giles (2006): “Building a community around the Paix Americana. The US government and exchange programmes during the 1950s”, in Laille, Helen and Wilford, Hugh (eds.): *The US Government, Citizen Groups and the Cold War. The state-private network*, London & New York, Routledge: 83–99.
- Scott-Smith, Giles (2008): *Networks of Empire: The US State Department’s Foreign Leader Program in the Netherlands, France, and Britain 1950–70*, Brussels, P.I.E. Peter Lang.
- Soler Ferrán, Pablo (2017): *El inicio de la ciencia nuclear en España*, Madrid, Sociedad Nuclear Española.
- Tascón Fernández, Julio (2003): “Capital internacional antes de la «internacionalización del capital» en España, 1936–1959”, en Sánchez Recio, Glicerio y Tascón Fernández, Julio (coords.): *Los empresarios de Franco: Política y economía en España, 1936–1957*, Barcelona, Crítica: 281–306.
- Viñas, Ángel (2003): *En las garras del águila. Los pactos con Estados Unidos, de Francisco Franco a Felipe González (1945–1995)*, Barcelona, Crítica.
- Weber, Nathaniel R. (2016): *United States Military Assistance Groups during the Cold War, 1945–1965*, Texas A&M University.