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Daniel Blinder
National Defense School in Argentina, daniel.blinder@edu.edu

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Daniel Blinder

Desire for a comprehensive space program, one that includes an indigenous satellite launch capability, motivated Argentina to strengthen relevant policy institutions and carefully reconsider its approach in foreign affairs. In the process, this space power on the semi-periphery bridged bitter domestic partisan differences on the federal budget and allayed security fears of the international community, fulfilling at least some important national objectives regarding economic development as well as Argentinean access to space.

Argentina has pursued space technology development since the 1960's, and this development has always been linked to national political forces.[1] In Arturo Frondizi's presidency (1958-1962) the National Commission on Space Research (CNIE) was created and immediately subordinated under military control. Since then, many remarkable goals were achieved: the rockets Alfa, Beta, and Gamma Centauro; subsequent projects Orion, Castor, Rigel, Tauro; and especially the Canopus II, which launched a monkey into space and brought it back alive.[2]

However, there was no policy aimed at institutionalizing space programs that continued across political administrations, and often there was a fine line between civilian and military activities[3]: This could be explained because no democratic consolidation existed until 1983, and space activities were not consolidated until the 1990's, when a shift of political direction brought more intense and productive linkage between two processes: foreign and space policy.[4] For methodological purposes, space policy is defined broadly in this paper to include all those explicit or non-explicit policies, planned or unplanned, systematically or non-systematically organized, which are aimed toward developing or having space capabilities.[5]

The point of view we take tests a somewhat controversial assumption that different theoretical approaches are needed to understand the international and political environment of peripheral states. What is the real connection between foreign policy and space policy in a middle-income country like Argentina, and our employment of specialized theoretical frameworks like Peripheral Realism or Dependency Theory? The scholar and former advisor to Argentina's foreign minister Carlos Escudé introduced his theory of peripheral realism by trying to understand the world not from the viewpoint of the world powers, but from the countries of the

[1] Dr. Daniel Blinder is researcher at the Centre for Studies on History of Science and Technology, José Babini, National University of San Martín (UNSAM) and professor at the National Defense School (EDENA) in Argentina.

[2] The CNIE achieved technological successes. However, due to traumatic political events in Argentina during the 1960s and 1970s, and the lack of an explicit direction or clear technological development project, CNIE never solidified as an institution. Other issues likely contributed to low institutionalization such as the international context of the Cold War and the influence of that bipolar conflict upon diffusion of technologies on the periphery. In my doctoral research I tracked institutional documents with scarce results: not many documents could be found about CNIE (as would be expected for a politically sensitive and highly personalized organization).

[3] To read more about the ambiguous line between civil and military activities see: J. Johnson-Freese (2007), *Space as a Strategic Asset* (New York: Columbia University Press).

[4] Satellites are another stage of technology policy in Argentina, related to the institutionalization of space policy and the creation of the National Commission on Space Activities (CONAE) under civilian control. Since the 1990's onwards, Argentina has successfully built satellites such as Lusat-1, Victor-1, SAC-A, SAC-B, SAC-C, SAC-D, and SAOCOM.

[5] Launcher, satellite, or both.

periphery.[6] According to Escudé, the international system has an incipient hierarchical structure based on perceived differences between states: those that have power and give orders, those that do not have power and obey, and those that rebel.

His approach introduced a different way to understand the international system: that is, from the unique viewpoint of states that do not impose the rules of the game in the international arena, and which suffer high costs when they confront them. Therefore, foreign policies of peripheral states are framed and implemented in such a way that national interest is defined in terms of development, confrontation with great powers is avoided, and autonomy is not understood as freedom of action but in terms of the costs of using that freedom. Escudé recognized that his theory is indebted to Dependency Theory, which is essentially a theory to explain lack of or perverse development. Notwithstanding, Peripheral Realism is also a "periphery and core" theory, and according to Escudé, many "realists" were actually peripheral realists because they read the international environment realistically and from the periphery: Big powers object, bully, or even destroy small powers when these have the temerity to challenge international written or unwritten rules.[7]

The following sections of this article first analyze ruptures and continuities of domestic politics and foreign policy regarding missiles and space for Argentina during the Menem (1989-1999) and Kirchner/Fernández de Kirchner (2003-2012) presidencies. The article then discusses whether space policy on the periphery is primarily a matter of security or development, taking Argentina as a case study of space technology on the semi-periphery. This paper traces the pathway toward strong institutions regarding space policy and examines the topic of Argentina as a reliable state: a country that conforms to legitimate codes of conduct in world affairs with regard to its space activities.[8] Finally, it argues that institutions matter when a state embarks on development of sensitive dual-use technology. There is a strong relationship between technology acquisition and international relations. Consequently, peripheral states in general, not just Argentina, are more likely to succeed in development and national security aims when they consciously integrate their technology policy with foreign policy.

SECURITY OR DEVELOPMENT?

The foremost institutions that played a role in the consolidation of space policy in Argentina were the Ministerio de Relaciones Exteriores (Ministry of Foreign Affairs), Comercio International y Culto (MRECIC), and CONAE (National Space Commission). The first one depended directly on the president; even so, the political direction was imprinted in MRECIC, and MRECIC is still one of the most professional bureaucracies of Argentina, along with the Armed Forces. CONAE is also a professionalized institution, and until 2012 it was under the MRECIC umbrella. The aim of this institutional hierarchy was to have a dual purpose for space policy. First, space was a venue for foreign policy and the pursuit of peace through carefully calibrated international objectives, nuclear nonproliferation policy, and cooperative Argentine foreign policy on sensitive issues such as technologies related to war. The second purpose of space institutions was to achieve technical objectives such as satellites and launchers.[9]

Considering technology policy as part and parcel of foreign policy, both substantively and institutionally, we can draw lessons for managing

[6] C. Escudé (1992), *Realismo Periférico: Fundamentos para la Nueva Política Exterior Argentina* (Buenos Aires: Planeta).
[7] C. Escudé (2012), *Principios de Realismo Periférico: Una Teoría Argentina u Vigencia ante el Ascenso de China* (Buenos Aires: Lumiere).

[8] My use of the term "reliable" or "reliability" stems from politicians, diplomats, and space policy actors' regular use of this term in Spanish. The word refers to the reliability of behavior for a country, which follows (and is believed to follow) international norms.
[9] On the one hand, space policy was a top-down process in which political leaders used space as a foreign policy issue, and later as a development issue as well. But in CONAE it was not only Conrado Varotto leaving his mark as director. Diplomats, technicians, engineers, mathematicians, physicists, and astronomers became influential, also, in a bottom-up process.

tradeoffs between national security and development objectives. To begin, we try to understand the decision-making processes on research, development, and cancellation of the *Condor II* missile project in Argentina during the 1990s. The *Condor II* project was initiated during the last military dictatorship (1976-1983), and the subsequent (Radical Party) civilian government of Raúl Alfonsín took the political decision to go ahead with it, disposing institutional and economic expenditures for this purpose. Nevertheless, *Condor II* was restricted in practice, and paralyzed later, due to hyperinflation and economic crisis. At the same time, European companies financed the project,[10] linking it to Middle Eastern countries, namely Egypt and Iraq, and changing the focus from an economic development agenda to an international security agenda, given international sensitivity toward those countries suspected of weapons proliferation.

The ending of the *Condor II* project and the emergence of the civilian National Commission on Space Activities (CONAE) were two connected events. Again, before the creation of CONAE, the national space institution was the National Commission on Space Research, under the Air Force, and space policy was not sufficiently institutionalized.

Condor II was a medium-range missile developed in Argentina under Air Force auspices. Its development started between the end of the 1970s and the beginning of 1980. For military aviation, it became a strategic project after Argentina had been defeated in the Falklands War (1982) and the Air Force had lost deterrent capability along with its aircraft and fighter pilots. Though *Condor II* received contributions from both European companies and countries such as Egypt and Iraq, its development was classified.

Due to its secretive nature and the reputation of certain countries supporting its construction, the United States pressured Argentina to deactivate the project for the sake of limiting missile proliferation and stabilizing international security.[11] At the same time Argentina was developing the Condor project, it was developing nuclear technology as well, which was in fact, a part of the strong tradition of this South American country. From the 1960's, in these two sensitive technologies Argentina had important advances, linked always to a nationalist ideology, developmentalism, and the regional security dilemma with Brazil.[12] This explains why military institutions were involved. In Harding's words, "a technological and political maxim that materialized during the space age is that there has been an inexorable and symbiotic relationship between space programs, missile technology, and nuclear programs, whenever technologically and politically feasible".[13]

The foreign policy of President Carlos Menem (1989-1999) radically changed the traditional positions of the Argentine Republic in international relations. In the context of his presidency, the world was also mutating in a

[10] According to the 1985 Secret National Decree, which created the institutional frame for the "Satellite Plan," the name given to the project *Condor II*, and further investigations that linked companies, the contract between the Air Force with Aerospace SA (a company composed by the Argentina Air Force and other small national companies) led to interactions with several European countries. Consen (Consulting Engineers) had by then headquarters in Switzerland and Monte Carlo, and was a subsidiary of the Messerschmitt Bölkow Blohm, Daimler Benz. IFAT Corporation had relations with the Ministry of Defense of Egypt, and Desintec was a West German company. Consen worked with Italian SNIA-BDP, a subsidiary of Fiat, and with the French SAGEM. See D. Blinder (2011), *Tecnología Misilística y Sus Usos Duales: AproximacionesPolíticas entre la Ciencia y las Relaciones Internacionales en el Caso del V2 Alemán y el Cóndor II Argentino*. Revista Iberoamericana de Ciencia Tecnología y Sociedad (CTS), 6 (18): 9-33; see also R. Diamint, "Cambios en la Política de Seguridad. Argentina en la Búsqueda de un Perfil no Conflictivo". N°7, Vol. VII, Chile: Flacso. Both papers summarize links between European companies and the Middle East.

[11] The United States was concerned about *Condor II*'s potential to serve as a Weapon of Mass Destruction (WMD) delivery system.

[12] Emanuel Adler (1987), *The Power of Ideology. The Quest for Technological Autonomy in Argentina and Brazil* (Berkley: University of California Press).

[13] R. Harding (2013) S*pace Policy in Developing Countries: The Search for Security and Development on the Final Frontier* (London: Routledge), p. 16.

radical way: the Soviet Union disappeared, and the tensions of the Cold War faded. The United States emerged as an international superpower, and in that context, Argentina had a long tradition of anti-Americanism in its foreign policy, a tradition that Menem proposed to change, opening up to free trade and generating "special"[14] relations with the major world power.[15] However, the economic, political, and social crises that affected Argentina towards the end of the Menem administration (and that deepened in the following presidency of Fernando de la Rua) resulted eventually in a rupture of national leadership and a major change of direction on political and economic issues with President Kirchner in 2003. Kirchner's administration proposed to restart and develop the industrial policy that had existed before Menem, recover the economy on the basis of import substitution, and project foreign policy especially toward South America. Although there was some confrontation with the United States, institutional frameworks of foreign policy made in the 1990s nevertheless continued, for example, the stable Argentine policy positions on international security and terrorism[16]. But under Menem's administration, technological development was limited while under Kirchner's, the country sought to develop its own technological capabilities, organic to the country's productive means.

The foreign policy objectives of the 1989-1999 period with respect to space policy were "special relations" with the United States and a successful quest for international reliability. Notwithstanding these efforts, results of 'technology policy' from the period, derived in conjunction with the free market economy, were deindustrialization of the country and technological denationalization. In contrast, again, for the period 2003-2012, the foreign policy, in broad terms, resulted in good relations with the United States, cooperation in the major international forums in the field of security, and establishment of a South American orientation. Technology policy of the Kirchners was different in that it was activist and industrialist, promoting national scientific and technological development.

The political role of technology called 'sensitive' in peripheral contexts is a key issue encompassing missile and satellite launcher programs.[17] For developing nations that seek to exploit space technology in general, counting all satellite launchers as sensitive technology is problematic and contentious. On the other hand, having missile launch technology mastered by fast developing nations is also controversial because this has destabilizing effects and poses consequent dangers for world peace and international order. Especially for peripheral countries in the international system, security related to nonproliferation is incompatible with the right to development, that is, of non-central countries to develop new technologies for export-led growth.

In this environment, *Condor II* and CONAE[18] were salient cases for institutionalization of a technology policy, linking it directly with foreign policy. The Condor missile was a defense project begun during the military dictatorship in Argentina. The ultimate destruction of this missile and abandonment of the program was the reason for creating CONAE. The new Argentine space agency was institutionalized through bilateral relations with other space agencies as an insurance policy. This way, Argentina would only develop space technologies for peaceful purposes consistent with the standards of multilateral regimes such as the Missile Technology Control Regime (MTCR), the UN Committee on the Peaceful Uses of Outer Space (COPUOS), etc.

[14] C. Escudé (1992) *Realismo Periférico: Fundamentos para la Nueva Política Exterior de Argentina* (Buenos Aires: Planeta).
[15] F. Corigliano (2003), "La Dimensión Bilateral de las Relaciones entre Argentina y Estados Unidos durante la Década de 1990: El ingreso al Paradigma de las 'Relaciones Especiales'," en Carlos Escudé (Ed.), *Historia General de las Relaciones Exteriores de la República Argentina*, Parte IV, Tomo XV (Buenos Aires: GEL).
[16] C. Escudé (2012), *Principles of Peripheral Realism* (Buenos Aires: Lumiere).

[17] Countries that have the capability to launch satellites are the United States, France, Japan, China, Great Britain, the European Space Agency, India, Israel, Ukraine, Russia, Iran, and North Korea.
[18] National Commission on Space Activities, again, the space agency of Argentina.

What drove Argentina toward a dramatic institutional change in order to pursue similar space launch technologies? Recall that *Condor II* affected military interests because it (a) could be a military threat to future targets of the Argentine state (the Falklands/Malvinas War was close in time); and (b) could be sold to other nation-states, which would use it for military purposes. Yet, *Condor II* also affected commercial interests due to the fact that (a) the missile system included dual-use technology, and, as the military technology was also part of international trade, missile technology suppliers feared market competition; and in addition (b) the missile technology could be used for space exploration and to orbit satellites for commercial reasons.

ARGENTINA AS A CASE STUDY OF SPACE TECHNOLOGY ON THE SEMI-PERIPHERY

Studying the case of space policy in Argentina allows us to make some informed conjectures on the role of peripheral states in the development of sensitive technology projects. Specifically, space technology on the periphery brings out the relationship between domestic policy and technology policy in developing countries, and some tensions between the sovereign right to development and security limits imposed by the international order. Does every country have the right to develop dual-use technologies that only a select club of space powers currently possesses?[19] In the case of Argentina, a semi-peripheral state, there are direct and indirect pressures from central states of the international system, threats of sanctions or other impediments, aiming to prevent access to sensitive technologies, treating them as weapons of war.[20]

Despite major changes in political orientation, there was institutional continuity between 1989 and 2012. Cancellation of the Condor project, signing and ratification of nonproliferation treaties, confidence-building measures toward the United States, and neoliberal[21] economic policies implemented in the first period (1989-1999) had a decisive impact on the second period (2003-2012). However, the success of the second period corresponds with economic policies (Keynesianism or state intervention; industrialization; and foreign policy focusing on regional integration, especially Latin America) in opposition to those of the first. The institutional consolidation of CONAE and intervention of the Foreign Ministry, cooperating in all these matters with the United States (enduring agreements with NASA, ratification of nonproliferation treaties), marked the course of development of space technology for the next decade. Numerous ongoing satellite missions, today, and the development of a satellite launcher, the Tronador II,[22] are products of successful institutions, as opposed to specific political parties or private sector corporations, guiding technological development.

Journey toward Strong Institutions

Condor II and the military dictatorship, 1976-1983: The reasons for the Argentine military to protect *Condor II* contemplated geopolitical and economic considerations and a vision for the country to become a technological powerhouse, to increase its military power after defeat in the Malvinas War. With this goal in mind, the

[19] See R. Harding (2013), S*pace Policy in Developing Countries: The search for Security and Development on the Final Frontier* (London: Routledge). About dual-use technologies this book says that "Besides the bipolar nature of the East–West conflict during the Cold War, one of the traditional constraints on the space programs in developing countries has been restrictions placed on the export of space-related technology. Before 1992, all US satellite-related technologies were classified as "munitions" and therefore subject to regulation by the US State Department under a regime known as the International Traffic in Arms Regulations (ITAR). During the mid-1990s, these restrictions were eased for "dual-use" technologies, which are those not exclusively military in purpose and application. The line between the two concepts in practice, however, is nebulous, since essentially all space technology is dual-use."

[20] By semi-periphery, we mean a country on the periphery of the international system but which has some kind of industrial and technological development,

[21] Free market economy, market deregulation, no State intervention, and privatization.

[22] Having a national launcher is considered by the space authorities in Argentina as a goal for autonomous technological development in space.

military, without any public oversight,[23] did not behave as a responsible social group in terms of technology management. But the context is relevant, here: The Condor project was the fruit of a military dictatorship in which the Air Force was a political player of the first order. As such, and bereft of any control, they did what they wanted to do. In the follow-on civilian administration of President Alfonsín, the military were no longer the political power, but the power of the military lobby was still strong. In that sense, during the period of the return to democracy, the government of Alfonsin could not be characterized as free from pressures of the "military party" and, for that reason, Condor remained unaccountable to the Argentine public.

Condor II and the Alfonsín Government, 1983-1989: During the administration of Raul Alfonsín, *Condor II* took on greater dimensions, expanding its financing through capital from Middle Eastern countries—Egypt and Iraq—as well as funds from domestic and European companies, through a secret presidential law.[24] Even so, the project was halted due to the lack of a budget: There was always difficulty assessing the true financial costs of *Condor II* and political irresponsibility when it came to promoting missile development incompatible with the economic and financial circumstances of the country. Argentina was undergoing major economic and monetary crises caused by high, uncontrolled inflation. There were informal pressures during this period. Defense officials received through several channels messages from the American government linked to the missile project and concern over its eventual use. During the subsequent Menem government, Argentina did enter the Missile Technology Control Regime (MTCR), a decision arising from international pressure as well as Menem's pro-American instincts.

Condor II and the Menem Government, 1989-1999: During the Menem government, the Condor missile came to light, taking on status as a public issue. In addition, the international context transformed. The Soviet Union imploded, and the United States was emerging as the single superpower. In Menem's presidential term, international pressure for cancellation and destruction of Condor could no longer be denied in political discourse. The missile became an irritant in bilateral relations with the United States. With Argentina's new foreign policy of alignment and the urgent need of international credit for managing the country's external debt, Menem decided to terminate it. The creation of CONAE under the Ministry of Foreign Affairs was the plan adopted by the Menem government, aiming to institutionalize pillars of foreign affairs and space issues.[25] Due to this same impulse, the government signed international security treaties such as the MTCR. Agreements were also signed with NASA, and joint satellites were developed and launched. But an indigenous launcher was not considered, given the bilateral conflicts that had emerged over *Condor II*. Instead of investing enormous quantities of money to make a launcher that would arouse international suspicion, launch services were hired when needed.

Success or Failure?

Was Argentina's foreign policy between 1989 and 2012 regarding space policy a success? Destroying the Condor missile and creating CONAE was a long-term policy. Could it be assessed as positive? Broadly speaking, the government of Menem de-industrialized the economy, binding decisions of technology policy to "market forces." Neoliberalism and special relations with the United States were two facets of this policy agenda. By the same token, special relations with the United States led Argentina to higher status in terms of international trust and access to technologies that before were denied due to an erratic policy on space. The Menem administration complemented strategic agreements with NASA with policies that aimed to build a good relationship with the American

[23] The govermment was a dictatorship; no checks and balances existed as in a pluralistic democracy in which the budget and infrastructure projects are public domain and under control of democratic institutions.
[24] A Secret and Executive Order under the law of Argentina of 1985, quoted above.
[25] F. Corigliano (2003), "La Dimensión Bilateral de las Relaciones entre Argentina y Estados Unidos durante la Década de 1990: El Ingreso al Paradigma de las 'Relaciones Especiales'," en Carlos Escudé (Ed.), *Historia General de las Relaciones Exteriores de la República Argentina*, Parte IV, Tomo XV (Buenos Aires: GEL).

government as a whole. Argentine-U.S. space cooperation included the launching of *μSAT-1*, the experimental satellite *Victor* in 1996, the *SAC-B* in 1996 to study the sun, the *Nahuel-1A* in 1997, the *SAC-A* in 1998 with experimental objectives, and the *SAC-C* in 2000 for earth observation. All these satellites were launched by rockets from other countries, of course. They were meant to send a clear signal to the United States that Argentina would not develop its own ballistic missile. Nevertheless, due to solid space institutions under CONAE, Argentina advanced its national space capacities and achieved international recognition.

Since the creation of CONAE, institutional foreign policy has borne fruit: If we compare technological achievements from before and after creation of the agency, CONAE is clearly associated with new space capacities. Had Argentina remained burdened with the Condor missile project,[26] it is unlikely the country could have pulled off this performance. Technological outcomes were also tied to industrial policy started in 2003 by the Kirchner administration. The need for a public policy on industrial and technological development tied to a responsible foreign policy is indicated. All these policies were important elements of a grand strategy built around national development.

INSTITUTIONAL CONTINUITIES MATTERED MORE THAN POLITICAL RUPTURES

Discontinuities in the 2003-2012 period: A new non-confrontational foreign policy toward the United States, active participation in the MTCR (and other agreements such as non-proliferation treaties), cooperation with NASA and other agencies, and of course, the process of institutionalization of the space sector focused on CONAE, against these endeavors, we can question, what were key discontinuities in the 2003-2012 period? First, the country changed from a non-industrial economic model in the 1990s, to a model of industrialization in the Kirchner presidency. In terms of technology development, there was a greater emphasis on multilateral foreign policy, especially toward South America, the ongoing development of a domestic launcher (Tronador), and a sequence of Argentine satellites placed into orbit. For Argentina, development of a rocket engine or a communications satellite was no longer wedded to a nonnegotiable national security strategy of nuclear deterrence. On the other hand, national prestige and compensation for wounded pride of the military defeat in the Malvinas War were only feasible through civilian-run programs at CONAE, and left-of-center governments in the post-Menem era wisely appreciated both enduring political objectives.

International Reliability

The issue of Argentina's climb to respectability as a powerful partner in Latin America also relates to the shift from a secret space program under the military dictatorship to open institutionalization under CONAE. Prior to that change, Argentina had confrontational discourses and policies, and was reluctant to follow U.S. international leadership. The American diplomatic response included a storyline that continued over many years, consisting of diplomatic efforts (formal and informal) to paint the South American country as a state that promoted proliferation, a U.S. narrative that gained credence from Argentina's historical attempts, under military leadership, to develop space and nuclear technologies.

The way it was imagined internationally, Argentina was not reliable during the dictatorship because it was a military government that seized power, menacing neighbors and killing its own people without trying them in a legal court. After that, even with the democratic government of Alfonsín, Argentina was not reliable because it was a weak and incipient democracy—army attacks against the government in order to return to military rule had already taken place. Then, in the days before the inauguration of Menem, Argentina was not reliable because it was going to be ruled by a nationalist and xenophobic government, rooted in Peronist doctrine. Such a doctrine had frequently been associated with confrontational behavior towards the United States. In the end, even with the Menem

[26] The Condor project lacked an institutional frame, on-budget investment, and a compatible, supportive foreign policy.

government showing clear signs of alignment with the West on foreign policy, it was required by the H.W. Bush administration that the *Condor II* missile be destroyed. This was accomplished under Menem, though much later, during Kirchner's administration, alarms still dogged the claim that Argentina yearned for an indigenous satellite launcher.[27]

When Argentina's past unreliability was mentioned within the international community, what was being transmitted was a representation built by U.S. diplomacy, the mass media, and the universities.[28] The categorization of reliability was divorced from actual threats to the national security of the United States, to international peace, and to non-proliferation of weapons of mass destruction. Rather, the epithet was married to political economy, to political and economic gambits, the main objective of which was economic and military supremacy of the hegemonic power. The pursuit and continuance of hegemony along key dimensions of international power still involves control of sensitive technologies, which really do pose danger to U.S. dominance if they spread around the world.

This leads us to think about arguments couched in security terms that mask commercial interests. Such arguments are not necessarily conspiratorial. Whether the space technology in question is domestic or foreign, a country that wants to have some place among nations, "a place in the sun," and that wants to improve its citizens' standard of living would use state of the art technologies: Rockets and satellites are among them. Without using space technology, a country, in general, loses in the field of economic development. Using alien and so-called reliable technology, though, often marks a path to dependency. From an analytical point of view, it is impossible to separate concepts of safety and business. How far does commercial interest extend until political interest or security reasons, not related to commercial ones, compel a central power to impose technological bans or restrictions on peripheral countries? A sensitive technology has always both sides of the coin, and a peripheral country who does not write the rules of the game is in a disadvantaged position in comparison with a central state who does write such rules.

A quick glance shows that countries with reliable space technology are the United States (major world power), Russia (former Soviet Union and previous world power), France (and through it the European Space Agency), Japan, China, India, Israel, Ukraine, and South Korea. Countries with unreliable space technology are Iran and North Korea. Again, what makes some reliable and not others? Which category will describe countries such as Argentina or Brazil that develop in the next decade satellite launchers? Without predicting precisely what will happen in technology development, acceptance of Argentina as a space power will depend upon written and unwritten international rules as well as the interests of the U.S. hegemon. Should the current trend toward multipolarity deepen, wise and moderate diplomacy from Argentina and other semi-peripheral states could raise the chances of these countries achieving reputation and *de facto* legitimation as reliable space powers, with all the attendant commercial and security benefits.[29]

Years after the consolidation of space policy at CONAE, Argentina developed the GRADICOM[30] missile project, which raised concerns on external and internal levels, including diplomatic officials and CONAE members, who wanted to be explicitly separated from any activity qualified as

[27] *La Nación*, 24/04/2011. "EEUU Terminó un Plan para Revivir el Misil Cóndor."
[28] D. Hurtado de Mendoza (2010), *La Ciencia Argentina. Un Proyecto Inconcluso. 1930-2000* (Buenos Aires: Edhasa).

[29] Written and unwritten rules include the claims upon the Falkland/Malvinas Islands in the United Nations and in other international forums, the repudiation of a war, as such, that drove the military coup, and criticism aimed at nuclearization of the South Atlantic by the United Kingdom (the British are supposed to have nuclear weapons in the Falklands, going against all peace treaties of the regional states). Agreements and treaties attach direct consequences to the status of being a "reliable country" internationally. No such treaty surpasses in importance the Treaty of Tlatelolco for the Proscription of Nuclear Weapons in Latin America and the Caribbean.
[30] Gradicom missile development involves a solid-fuel rocket developed by the Argentine Ministry of Defense for weapons purposes.

military.[31] Despite international pressures, formal and informal, mimicking those that buffeted Argentina in the nineties with respect to the Condor project, GRADICOM may survive in the new international environment. States contending for power on the international scene such as China and Russia now open a horizon of possibilities for Argentina. The strategic alliance with Brazil and MERCOSUR's importance in foreign policy, along with UNASUR and CELAC,[32] indicate a substantial change in the international arena, which reduces priority of relations with the leading powers and lends momentum to the integration and development of other nations. This shift in permissible initiatives, including GRADICOM, presents a window of opportunity in Argentina's case to develop the space sector without crashing directly into the United States or oncoming countries seeking to revise American hegemony[33].

The creation of the Ministry of Science, Technology and Productive Innovation at the end of 2007 changed expectations and linked commercial and security policies even more closely. The system of science and technology must now provide knowledge to increase value-added exports. National industrial recovery requires closure of the technological gap and invites the State, once again, to take an active role in development.

Investment and Technological Development

With the creation and consolidation of CONAE in the 1990s, progress was made in institutional issues, as well as in some access to sensitive technology. Difficult budget decisions notwithstanding, since 2004 annual funding increased as befitting CONAE's strategic status, this despite the new industrial direction of the country under the Kirchners. A glance at Law 24,061 of 1991, which contained the national budget with the newly created CONAE, reveals the amount was 1,587,124,000 pesos for Culture and Education, and for Science and Technology 466,094,000 pesos[34] (Budget 1991).[35] Working from this baseline, the specific budget, in pesos, for CONAE in 2001 was 15,007,037 (Budget 2001), and in consecutive years was 13,896,000 (Budget 2002), 17,023,066[36] (Budget 2003), 13,663,051 (Budget 2004), 39,922,336 (Budget 2005), 73,370,035 (Budget 2006), 120,368,547 (Budget 2007), 203,909,252 (Budget 2008), 293,317,858 (Budget 2009), 260,913,712 (Budget 2010), 346,321,636 (Budget 2011), and 565,174,968 (Budget 2012).[37] The CONAE

[31] Gradicom stirred debates within political and business circles linked to Argentine space policy regarding proliferation. Argentina already has a liquid-fueled rocket for peaceful purposes, the Tronador. Gradicom opened discussion about how a solid-fueled companion would affect civil space, which depends heavily on international cooperation, Argentina's standing in the policy arena of non-proliferation, and foreign affairs, especially those related to conventions in the field of space development.

[32] MERCOSUR (Southern Cone Common Market) includes Argentina, Brazil, Uruguay, Paraguay, and recently Venezuela. It is an alliance of free trade and the axis of integration between Argentina and Brazil since the 1990s. UNASUR (South American Union of Nations) is an Alliance of countries in the territory of South America, whose diplomatic objective is to achieve regional integration. CELAC (Community of Latin American and Caribbean States) is a diplomatic alliance with objectives of integrating nearly all countries of the Western Hemisphere. Successor to the Rio Group, it is an institutional alternative to the Organization of American States, which includes the United States.

[33] Further evidence of informal pressure on Argentina was the broadcast concern of CONAE Administrator Conrado Varotto to be reliable to the United States and show that space development in Argentina was peaceful at all aspects.

[34] From 1991 to 2002, established by the "Convertibilidad" Law, 1 peso was equivalent to 1 U.S dólar.

[35] Until 2001, the budget is hard to find published or online. To take an example, the budget of 1991 was not only obscure with respect to space technology; it did not specify expenses by item, which makes it nearly impossible to classify where the money went according to law.

[36] From 2003 on, each U.S. dollar was 3 pesos. From 2010 to 2012, each U.S. dollar was 4 pesos.

[37] Presupuesto del Sector Público Nacional de la República Argentina, año 1991. Presupuesto Consolidado del Sector Público Nacional 2001 de la República Argentina. Aprobado por la Decisión Administrativa N°53 del 2 de Mayo de 2001. Presupuesto Consolidado del Sector Público Nacional 2002 de la República Argentina. Aprobado por la

numbers tell a clear tale; they show the growth of the budget during the presidencies of Kirchner and Fernández de Kirchner, exhibiting strong interest in space activity despite their skepticism toward free-market policies. The Kirchners built upon the institutional base of the former Menem period (the 1990s) and supported economic and political sacrifices as technology investments, in terms of budget implementation in space.

To fully appreciate the determination behind this national effort to become a space power, it serves to recall major changes in the international environment coinciding with the domestic transition from Menem to the Kirchners. First, prior to the assumption of Nestor Kirchner, the attacks of September 11 abruptly shifted American policy, which became consumed by war in Afghanistan and Iraq and often neglected South America. Second, the free-market economic policies of Argentina by 2002 led to yet another economic crisis and default. In the context of the new international environment based on regionalism and integration of South America, Argentina found its strongest allies, not within the traditional scope of Europeans, Americans, and Asians, but among its geographical neighbors, progressing at long last along the historical ambition of Latin Americanism in foreign policy.

The Kirchner and Fernández de Kirchner administrations inherited from the Menem presidency, on the one hand, an economic crisis tied to liberal economic measures, but, on the other, a legacy of liberal-oriented international commitments such as MTCR, the Tlatelolco Treaty, and the CONAE space agency with prestigious international ties.[38] Without resources, of course, without a plan for technological development, it is not possible to produce a sensitive technology of strategic importance. But to develop such a technology, a state must also account for strategic behavior of powers in the international system: From 2003 Argentina, under a statist administration that could easily have undercut the national venture in space technology, instead increased significantly the public capital put toward science and technology, and undertook the strategic diplomacy necessary to protect the space sector. The result is observable progress on the satellite launcher, Tronador II, centerpiece of a longstanding national dream to possess an Argentine launcher and blossom on the international stage as a true space power.[39]

Decisión Administrativa N°16 del 18 de Julio de 2002. Presupuesto Consolidado del Sector Público Nacional 2003 de la República Argentina. Aprobado por la Decisión Administrativa N°53 del 19 de Mayo de 2003. Presupuesto Consolidado del Sector Público Nacional 2004 de la República Argentina. Aprobado por la Decisión Administrativa N°134 del 20 de Abril de 2004. Presupuesto Consolidado del Sector Público Nacional 2005 de la República Argentina. Aprobado por la Decisión Administrativa N°257 del 30 de Mayo de 2005. Presupuesto Consolidado del Sector Público Nacional 2006 de la República Argentina. Aprobado por la Decisión Administrativa N°621 del 12 de Septiembre de 2006. Presupuesto Consolidado del Sector Público Nacional 2007 de la República Argentina. Aprobado por la Decisión Administrativa N°243 del 29 de Junio de 2007. Presupuesto Consolidado del Sector Público Nacional 2008 de la República Argentina. Aprobado por la Decisión Administrativa N°154 del 15 de Abril de 2008. Presupuesto Consolidado del Sector Público Nacional 2009 de la República Argentina. Aprobado por la Decisión Administrativa N°339 del 28 de Septiembre de 2009. Presupuesto Consolidado del Sector Público Nacional 2010 de la República Argentina. Aprobado por la Decisión Administrativa N°388 del 7 de Junio de 2010. Presupuesto Consolidado del Sector Público Nacional 2011 de la República Argentina. Aprobado por la Decisión Administrativa N°67 del 30 de Diciembre de 2011. Presupuesto Consolidado del Sector Público Nacional 2012 de la República Argentina. Aprobado por la Decisión Administrativa N°428 del 29 de Junio de 2012.

[38] Liberal as an economic concept means free-market oriented policies and deregulation. Liberal as an International Relations Theory relates to one of the most important schools of thought, focusing on international institutions and cooperation.

[39] The VEX-1A and VEX-1B were test rockets for Tronador II development. Both tests were made in 2014. The first could not fly, but the second was a successful launch.

RECOMMENDATIONS

In countries with weak processes of development and, therefore, without the economic capacity, governments struggle to gain international legitimacy for the use of sensitive technologies. To be a reliable space power, for example, Argentina must not only establish a technically credible satellite vector, it must also demonstrate political and economic capacities to legitimize possession and use of these technologies. If satellite technologies can be considered indispensable in the path toward 21st century economic development, then political unreliability in the fields of proliferation and security becomes a significant obstacle to economic growth[40].

Developing countries such as Argentina should articulate technology policy and foreign policy in such a way that they are really one integrated program for development and diplomacy. For example, if Argentina were to successfully develop a domestic satellite launcher in the coming years, it would come about five decades since world powers were able to produce the first launchers, enough time for this technology to mature.[41] Half a century ago, the race for a satellite launcher meant for Argentina a race to be part of the first group of countries in the 1960s with access to space. In the 2010s, however, launcher technology is becoming less provocative for powers that, years before, developed it. For semi-peripheral states, of course, the technology remains a factor of economic dynamism, and thus a strategic achievement in terms of regional leadership and national prestige.[42]

The unwritten law of the free market requires each independent actor to balance costs and benefits. Consequently, if for Argentina it was more profitable to deliver its own satellites using a *foreign* launcher, this would make investments in local research and development less attractive. Under this free market view, when it was cheaper not to develop the technology, the domestic launcher became unnecessary for the country. Other budget priorities like food, infrastructure, or police filled the vacuum.

Saying that the Condor missile/launcher project, “was no longer necessary for the country" was an affirmation, which at its root denied the value of technology policy. Unfortunately, as we have implied, technology development (even more since the Washington Consensus of the 1990s) is central to any semi-peripheral state with the requisite human capital: for international prestige; regional and global leadership; deterrent capability; expanding markets and new businesses; and creating spillover that accelerates economic development.[43] As the second in command at the Ministry of Foreign Affairs during the Menem administration explained,

"Do you think Argentina can spend five thousand million dollars to put a vector in the air? Brazilians could not. They were not able and they have a budget ten times higher than our own. From fifteen years now they have wanted to put a satellite with a national launcher […] and they couldn't. It is very difficult and very expensive technology. Then, what did the Menem administration do? We could not produce vectors because we were not reliable; the world was going to believe that we were manufacturing costumed missiles. […]. Then, if you want to put a satellite in the sky, you have to go elsewhere, and do what is called the taxi service, hiring the services of countries such as the United States, Europe, China, and Russia. You could hire their services, and you would be putting the satellite in the sky! […] It is

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[40] Sensitive technologies are a red line in the overlapping fields of technological capabilities, international politics, and ethics. Hegemonic powers, in order to preserve the status quo, commonly relegate non-core countries to the technological margins, far away from sensitive capabilities and, not incidentally, to economic dependence on lead powers that created and control the contemporary order.

[41] Vernon Ruttan (2006), *Is War Necessary for Economic Growth? Military Procurement and Technology Development* (Oxford: Oxford University Press).

[42] The question of mature technologies is an important issue: "As a field of commercial technology that initially drew heavily on military R&D or military and defense-related procurement matures, its dependence on military and defense-related sources tends to decline. The flow of knowledge and technology may then reverse— from spin-off to spin-on" (Ruttan, 2006).

[43] Ruttan, (2006).

much cheaper to travel by taxi than to buy a car. The most expensive part is not the launch, but the research to achieve it".[44]

Space technology policy in the presidency of Carlos Menem was not focused on research and strategic development but on the laws of the free market and the institutionalization required to gain reliability. The space policy was an excellent institutional policy and a wise foreign policy. But it definitely was not technology policy. The Minister's taxi metaphor spoke to the fact that—in the short term—it is considerably less expensive to hire the launcher than to develop a domestic one. Paying for a car, or pursuing a rocket launcher, results in the domestic capabilities to reach national space goals, but a state must invest a large amount up front: It is necessary to perform the research. Taking a taxi, or renting a launch service, also allows a country to reach space goals, probably faster, but a developing country renting a ride will always be dependent on someone else's car.[45] The choice to have a technology or not, for a country on the semi-periphery, is just as strategic as it would be for an economic and military powerhouse like Russia or the United States.

CONCLUSION

This paper does not endorse building a launcher without analyzing the economic cost of such an effort. On the contrary, having a launcher gives not only greater political autonomy for activities in space but also opens opportunities for economic development: Countries that once struggled to build launchers now offer launching services in the marketplace. The question is why when some countries develop technologies they are innovative while others are rogues that proliferate. The answer is a construction of scholars, media, and diplomacy. While empirical evidence about Argentinean proliferation does not exist, the facts instead show how journalists, politicians, and scholars speculate on the potential and possibilities of such nefarious enterprise. These ideational constructions matter. Regardless of how compliant Argentina is empirically, an international belief that the government is a scofflaw hurts Argentina's national interest: Following Escudé, small powers cannot throw themselves against large powers—even in popular misconception—without paying a real world price.

The ongoing story of Tronador II has highlighted dynamics between international politics and the development of dual-use technologies in semi-peripheral contexts. There is, in fact, a strong relationship between international policy and technological development, no less so on the semi-periphery, where developing countries with great promise face limits or outright bans on technologies already produced and in some cases commercialized by world powers. In addition, powerful states that created the current world order also set the rules of that order. In consequence, written and unwritten laws of the international system determine which countries register as developing a benign space rocket and which others end up ostracized for proliferating ballistic missiles. Despite the serious potential for hostile reactions, semi-peripheral countries that want to grow economically will need to act firmly in their development aims, even as they pay respect to rules of world powers. Under this tension between development goals and cooperation with the international community, technology policy with the proper institutional basis, accommodating to domestic political

[44] Cisneros, Andrés (Vice Canciller). Buenos Aires, May 18, 2010. Interviewed by Daniel Blinder. Quoted from "Globalization, Geopolitics and Sensitive Technologies in Peripheral Situation: Missile/Space Technology in Argentina (1989-2012)." [Globalización, Geopolítica, y Tecnologías Sensibles en Situación Periférica: Tecnología Misilística/Espacial en la Argentina (1989 -2012). Tesis para optar al título de Doctor en Ciencias Sociales por la Facultad de Ciencias Sociales de la Universidad de Buenos Aires.]

[45] This was Varotto's idea, and he explained it, off the record. He went through a litany of reasons why Argentina would not be able to continue relying on the United States or others to get its satellites into space: the high launch costs of acceptable providers and the GOA's unwillingness to run afoul of International Traffic in Arms Regulations (ITAR) by dealing with lower-cost providers of launch services such as China or India. Developing its own SLV (satellite launch vehicle) capability was the least costly alternative for Argentina's space program with such constraints (no documentation/citation available).

constraints of a vibrant democracy, can still flourish.

What are the political and economic benefits of space and other state-of-the-art technologies in the context of semi-peripheral countries? State-of-the art technology gives semi-peripheral countries recognition and extra chips for international negotiation with rule-making world powers. On the economic front, such technology stimulates research and development, technology transfer, and spillover into other areas of international commerce. The story of Tronador II demonstrates that a semi-peripheral country like Argentina can thread the needle in order to reap both diplomatic and developmental benefits from state-of-the-art technology.

The missile/space policy of the Menem government (1989-1999) was to cancel the military's Condor project and bind Argentina through international agreement to nonproliferation as a means of improving relations with the United States. These radical course corrections coincided with institutionalization of space policy, creating CONAE under civilian control with civilian purposes only.

CONAE's careful correspondence with Argentina's broader foreign policy objectives was a key accomplishment of Menem's administration. CONAE's purpose was to pave the road to space for Argentina, in part by facilitating international agreements with foreign space agencies and international treaties. Interestingly, CONAE helped Argentina build its reputation for international reliability during this initial phase without significant investments in launcher technology or groundbreaking satellite projects. Nevertheless, institutionalization through CONAE and a foreign policy of international engagement set the basis for future events of Argentine technological development.

Institutionalization at both domestic and international levels had important consequences during the subsequent Kirchner and Fernández de Kirchner administrations. The institutional frame of CONAE and the main accords of the prior administration under international agencies like the UN and the MTCR continued, actually thrived, as state spending on technology, including space technology, mounted without setting off international alarm bells. With an active policy on re-industrialization and development of science and technology, Argentina achieved its objectives of having satellites in space, and several milestones toward the manufacture of Condor's descendant, Tronador II.

Today, Argentina, against long odds at the cancellation of Condor, is fast becoming a space power, with the capacity to produce satellites and launchers, in cooperation with other countries and while enhancing its reputation for international reliability. Indeed, wise technology policy is more likely to emerge on the semi-periphery in general when public institutions shape it in conformance with enduring goals of *both* strategic diplomacy and national development.