4 ARGENTINA

4.1 National space history

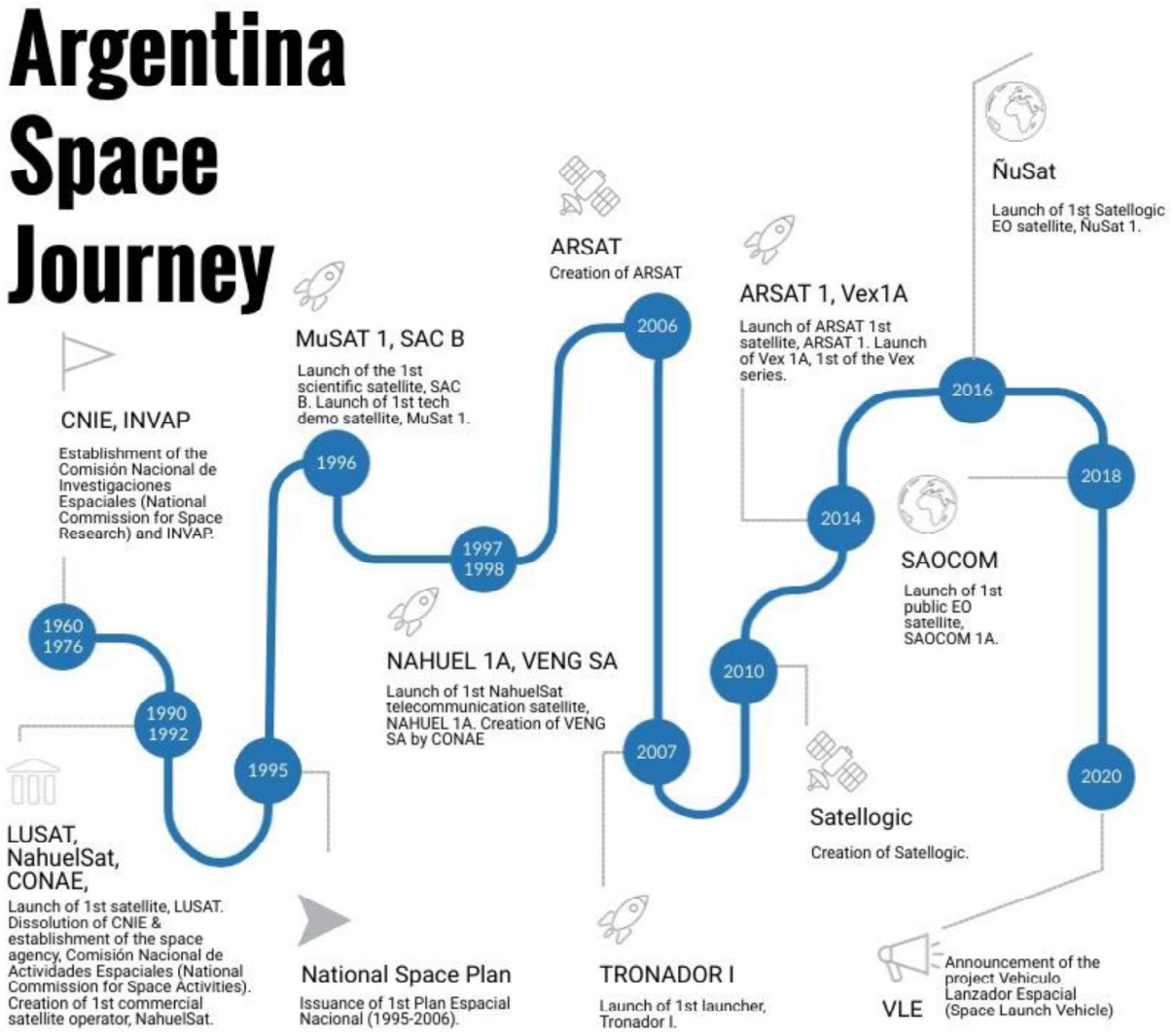

Figure 19: Timeline of Argentina space journey

Argentina's space journey first began with liquid rocket engine research in the 1950s and sounding rocket developments in the 1960s. Space developments were mostly related to defence and security interests, in particular Argentina's ballistic missile program.

Indeed, in 1961, the first space-related institution, named the National Commission for Space Research (CNIE), was established under the authority of the Air Force. Then, the Aeronautical and Space Research Institute, which was part of the Military Aircraft Factory developed sounding rockets (e.g. Orion, Canopus, Castor).[283]

[283] "Antecedentes". Government of Argentina. Available at: https://www.argentina.gob.ar/ciencia/conae/institucional/antecedentes. Accessed May 2021.

In 1965, Argentina launched the Gamma Centauro rocket from the Matienzo base in Antarctica in order to measure temperature and X radiation in the upper atmosphere.[284] In 1966, Argentina also launched its Orion II rocket from Antarctica.[285] In the 1970s, Argentina developed the Condor I missile due to border disputes with Chile and the United Kingdom.[286] After Argentina's defeat in the Falklands War, the Condor I missile proved to have limited capability, which led Argentina to further developed its ballistic missiles with the Condor II program.[287] [288]

However, under U.S. pressure, the program was dismantled due to concerns that Argentina was exporting missiles and space-based technologies to Egypt and Iraq. This led Argentina to stop its rocket developments and completely change the direction of its space program and focus mostly on civil activities. As a result, the National Space Activities Commission (CONAE) was created in 1991. When the Kirchners came to power in the early 2000s, some space developments were once again linked to the Ministry of Defence.[289] [290]

4.2 Space sector governance

4.2.1 Institutional framework

Different governmental entities are responsible for the conduct of space activities. Their involvement is summarized in the table below.

Entity	Involvement in space
National Space Activities Commission (CONAE)	Argentinian Space Agency. Coordinates civil space activities, proposes, and implements national space policy
Ministry of Science, Technology, and Innovation (MINCYT)	Disseminates information on national ventures in space-related projects.
Interinstitutional Council for Science and Technology (CICYT)	Coordinates common national S&T policies and reinforces linkages with the socio-economic sector. Composed amongst others of CONAE, CNEA, CONICET, and INTI (within Ministry of Science).
Chief of Cabinet of Ministers (Jefatura de Gabinete de Ministros)	Proposes and implements the connectivity plan.

[284] https://www.sciencedirect.com/science/article/abs/pii/S0094576500000710
[285] "Argentina Missile Chronology". 2010. Media NTI. Available at: https://media.nti.org/pdfs/argentina_missile.pdf. Accessed May 2021.
[286] "Argentina". 2015. NTI. Available at: https://www.nti.org/learn/countries/argentina/delivery-systems/. Accessed May 2021.
[287] Long, William. "Argentina Abolishes Missile Program with Iraq: Military: It turns over 'missing' parts, and in return wants to buy sensitive U.S. technology". 1993. *Los Angeles Times.* Available at: https://www.latimes.com/archives/la-xpm-1993-09-26-mn-39403-story.html. Accessed May 2021.
[288] Bilnder, Daniel. "Towards an Argentine Space Policy". Centro de Estudios sobre Ciencia, Desarrollo y Educacion Superior. Available at: https://www.redalyc.org/pdf/924/92438580003.pdf. Accessed May 2021.
[289] "Argentina's Space Program Sets Its Sights on Indigenous Launch Capabilities". 2016. *World Politics Review.* Available at: https://www.worldpoliticsreview.com/trend-lines/19423/argentina-s-space-program-sets-its-sights-on-indigenous-launch-capabilities. Accessed May 2021.
[290] Khol, Barbara. *Argentina: Condor Missile Project Dismantled.* 1991. Available at: https://digitalrepository.unm.edu/cgi/viewcontent.cgi?article=7644&context=notisur. Accessed May 2021.

National Atomic Energy Commission (CNEA)	Contributes to the satellite industry with micro and nano technologies, solar panels, and radar antennas.
National Scientific and Technical Research Council (CONICET)	Promotes national S&T, *e.g.*, astronomy (within Ministry of Science).
Federal Council of S&T (COFECyT)	Elaborates, assesses, and proposes policy and national priority strategies in order to develop STI activities. Releases studies such as on the historical development of the national satellite industry (within Ministry of Science).
National Communications Entity (ENACOM)	Merger of the Federal Authority of IT and Communication (AFTIC), and the Federal Authority of Audio-visual Communication Services (AFSCA) in 2016. Sets the conditions for a stable market that guarantees all Argentinians access to telecommunication services (within the Chief of Cabinet).
National Institute of Industrial Technology (INTI)	Promotes industrial competitivity through transfer of technologies to the benefit of SME's. Launched a strategic programme for aeronautic and aerospace development. (Within Ministry of Productive Development).
Ministry of Defence (Defence)	Promotes the utilisation of space assets for defence purpose. Enacts defence policies.

Table 13: Argentina's institutional framework (adapted from MINCYT, INTI and ENACOM)

National Space Activities Commission (CONAE)

In 1992, the National Space Research Commission (CNIE), which was under the authority of the Air Force, was dismantled after the termination of the Condor II missile program. It led to the establishment of the National Space Activities Commission (CONAE), under authority of the Presidency, to redirect Argentina's space efforts towards civilian objectives. Since 2016, CONAE has been under the responsibility of the Ministry of Science, Technology, and Innovation.[291]

CONAE is Argentina's space agency and has competence over the scientific, technical, industrial, commercial, administrative, and financial aspects of space activities.[292] CONAE is in charge of drafting and implementing the National Space Plan.

CONAE 's mission is to take advantage of space by:

- Gathering space-based data on the Latin American continent in order to improve the living standards of the population,
- Providing space-based data to economic and industrial sectors to increase productivity competitiveness at the national and international level,

[291] "Antecedentes". Government of Argentina. Available at: https://www.argentina.gob.ar/ciencia/conae/institucional/antecedentes. Accessed May 2021.
[292] "Misión". CONAE. Available at: https://www.argentina.gob.ar/institucional/mision. Accessed December 2020.

- Driving the development of the national industry through the creation of new companies that develop innovative technologies with the goal of expanding Argentina's participation in the global high added value supply chain,
- Taking part in international efforts in the field of space exploration and peaceful use of outer space,
- Providing advanced scientific knowledge as well as job and education opportunities in STEM.[293]

Scientific and Technical Research Institute for Defence (CITEDEF)

In 1954, CITEDEF was established under the Secretary of Planning of the Ministry of Defence. It mainly conducts research and development projects for the Ministry of Defence.[294] Among its various projects, CITEDEF developed the two Gradicom rockets.[295] In 2009, Gradicom I, a one-stage rocket, was launched and reached 40 km. In 2011, Gradicom II, a two-stage rocket, was launched and reached 100 km.[296]

4.2.2 Space industry and economy

According to Andres Lopez et al., the Argentinian space industry is one of the few high-tech sectors where Argentina managed to develop both design and manufacturing capabilities. Argentina developed its space industry by exploiting knowledge and capabilities from the civil nuclear industry and the military.[297]

Indeed, when CNIE was dissolved, CONAE was able to use to facilities that were previously exploited by the Air Force, which enabled CONAE to retain both capabilities and human resources of the Condor II programme.[298] According to Vera et al., the projects conducted by CNIE allowed Argentina to develop capabilities to design and build a satellite despite a lack of economic resources.[299]

In addition, Argentina took advantage of the knowledge and capabilities of its nuclear industry to apply and adapt them to the space sector.[300] INVAP is a state-owned company whose first activities were centred around nuclear energy. However, due to public budget restrictions in the 1990s, INVAP had to seek market shares outside Argentina and develop new activities. Also, when CONAE was established, it concluded that INVAP was the only company capable of carrying out space projects in Argentina.[301] According to Seijo and Cantero, technologies specific to the nuclear sector such as electronics, monitoring and control systems, vibration resistance, thermal and chemical analysis, quality assurance, software development, as well as the machining of high-quality complex components enabled INVAP to enter the space sector.[302] The capabilities and know-how derived from the nuclear industry shared similarities with aerospace technologies. As a result, INVAP has designed, developed, and manufactured most Argentinian satellites. INVAP manufactured most of Argentina's satellites. Today, INVAP and CONAE are still the main drivers of innovation in the Argentinian space sector.[303]

[293] "Misión". CONAE. Available at: https://www.argentina.gob.ar/institucional/mision. Accessed December 2020.
[294] "Instituto de Investigaciones Científicas y Técnicas para la Defensa – CITEDEF". Government of Argentina. Available at: https://www.argentina.gob.ar/defensa/citedef. Accessed May 2021.
[295] "Gradicom 2". Astronautix. Available at: http://www.astronautix.com/g/gradicom2.html. Accessed May 2021.
[296] "The Argentine Institute of Scientific and Technical Research Will Launch the Gradicom II Rocket". 2011. Dialogo- Digital Military Magazine. https://dialogo-americas.com/articles/the-argentine-institute-of-scientific-and-technical-research-will-launch-the-gradicom-ii-rocket/. Accessed May 2021.
[297] Lòpez, A., Space Policy (2018). Available at: http://doi.org/10.1016/j.spacepol.2018.06.001.
[298] *Ibid.*
[299] Vera M.N. et al. La participacion de la Argentina en el campo espacial, Ciencia, Docencia y Technologia, 26.
[300] *Ibid.*
[301] *Ibid.*
[302] Seijo G. Cantero. J.H. Como hacer un satélite espacial a partir de un reactor nuclear ? Elogio de las technologis de investigacion en INVAP, Redes 18 (35) (2012).
[303] *Ibid.*

Argentina's space industry has capabilities to build GEO telecommunication satellites and LEO Earth observation satellites.[304]

Capability	Examples
Launch systems /components manufacturers	Veng, LIA Aerospace, TLON Space, Aeropac S.A., Nanotek
Satellite/Space system / components manufacturers	Satellogic, INVAP, Mecanica 14, Space Sur, Ascentio, DTA SA, CEATSA, GSATCOM, Innova Space, VDS Ingeneria, Arsultra
Operators	ARSAT, Satellogic, Ascentio, INVAP
Applications and VAS	Aeroterra S.A., Telecom Argentina SA, SERSAT, Tesacom, Telespazio Argentina, Frontec

Table 14: Overview of Argentina's space industry

Some foreign companies established offices or subsidiaries in Argentina (e.g., Telespazio), and Argentinian companies are increasingly establishing themselves overseas, opening international offices and exporting their products and services (e.g., Satellogic, INVAP).

An overview of selected Argentinian companies is provided below:

ARSAT

Foundation

2006

Core Business

Communication systems , Satellite operator

Products & Services

- ARSAT series operation
- Cybersecurity
- Rural connectivity
- Optic Fiber Network
- Data National Center

INNOVA SPACE

Foundation

2020

Core Business

Communication systems, Satellite manufacturer, Satellite operator

Products & Services

- Picosatellites
- Nanotechnology
- IoT/ M2M
- PocketQube constellation under development

[304] *Seijo G. Cantero. J.H. Como hacer un satélite espacial a partir de un reactor nuclear ? Elogio de las technologis de investigacion en INVAP, Redes 18 (35) (2012).*

SATELLOGIC

Foundation

2010

Core Business

Earth observation systems, Satellite manufacturer, Satellite operator

Products & Services

- Geospatial analytics
- ÑuSat constellation
- High-frequency and high-resolution Earth remapping

INVAP

Foundation

1998

Core Business

Satellite manufacturer, Defense, Nuclear, Medical systems

Products & Services

- ARSAT, SAC, SAOCOM series manufacturing
- Geo information
- Consulting
- Small to large, EO & communication systems

GSATCOM

Foundation

2019

Core Business

Communication systems, Satellite manufacturer

Products & Services

- ARSAT SG1 in development
- GSATCOM series in development
- space system Assembly, Integration and Test facilities

VENG

Foundation

1976

Core Business

Micro Launch Systems, Propulsion Systems, Orbital & Sub-orbital Systems, EO systems

Products & Services

- Ground segment services
- SAC D & SAOCOM series instruments
- Tronador and VEX series rockets
- SAOCOM imagery distribution

LIA AEROSPACE

Foundation

2014

Core Business

Micro launch systems, Propulsion systems, Orbital & sub-orbital systems

Products & Services

- Launch pad projects
- Procyon rocket

TLON SPACE

Foundation

2010

Core Business

Micro launch systems, Propulsion systems, Orbital & sub-orbital systems

Products & Services

- Green propellants
- Aventura I rocket
- SICOM (control site for remote bench test operations)

4.2.3 Research & Academia

Several Argentinian universities participate in space research including the University of Comahue (UComa), the National University of San Martin (UNSM), the University of Cordoba (UNC), and the National University of la Plata (UNLP).

The UNLP houses the Argentine Institute of Radio Astronomy (IAR), which conducts research on astrophysics, compact objects, gravitation and numerical relativity, interstellar medium, planetary science, pulsar astronomy, massive stars, and machine learning.[305] The IAR also houses two single disc radio telescopes and two antennas to study radio astronomy. Students have access to the instruments at the IAR, and training and education are one of the main goals of the institute.[306] The UNLP also houses the Aerospace Technological Centre (CTA) and the Applied Mechanical Testing Group (GEMA), which participated in the development of the Argentine satellites SAC B, SAC A, and SAC D.[307]

CONAE also seeks to promote and provide academic and research programmes. The Agency has partnered with several universities in Argentina to establish master's degrees in spatial issues, including:[308]

- Master in Spatial Information Applications at UNC,
- Master in Satellite Technology at the National Technological University,
- Master in the Computer Development of Space Application at the National University of La Matanza,
- Master in Satellite Instruments at the National Technological University.

CONAE has also established different research centres and institutions throughout Argentina, which are also involved in the aforementioned degree programmes:

- Teófilo Tabanera Space Centre (TTSC): CONAE's main space centre., It houses the Cordoba Ground Station, the Mission Operation Centre, testing and integration facilities, and the Mario Gulich Institute for Advanced Space Studies,
- The Colomb Institute is housed by UNSM and focuses on advanced satellite technologies such as platforms and distributed instruments.

4.3 Policy and legal framework

4.3.1 Space policies and strategy

Argentina's main strategic document is the National Space Plan (PEN). The first PEN covered the period from 1995-2006.[309] It is periodically revised, with the current plan running from 2016 to 2027. Two additional instruments exist to direct telecommunication activities: the Geostationary Satellite Plan and the *Plan Conectar*.[310]

[305] "Finalidad" Instituto Argentino de Radioastronomia. Available at: https://www.iar.unlp.edu.ar/institucional/finalidad/. Accessed May 2021.
[306] "Observatorio". Instituto Argentino de Radioastronomia. Available at: https://www.iar.unlp.edu.ar/slider/observatorio/.
[307] http://www.gema.ing.unlp.edu.ar/eng_activities.html. Accessed May 2021.
[308] "Maestrías". Government of Argentina. Available at: https://www.argentina.gob.ar/ciencia/conae/maestrias. Accessed May 2021.
[309] "Plan Espacial Nacional". Ministerio de Justicia y Derechos Humanos". Available at: http://servicios.infoleg.gob.ar/infolegInternet/anexos/105000-109999/106502/norma.htm. Accessed May 2021.
[310] *Plan Satelital Geoestacionario Argentino 2015-2035.* 2015. Available at: http://servicios.infoleg.gob.ar/infolegInternet/anexos/250000-254999/254823/ley27208.pdf. Accessed May 2021.

Additional instruments not focused exclusively on space activities include the National Institute of Industrial Technology's (INTI) Strategic Programme of Aeronautics and Space Development, released in 2019.[311] Additionally, in October 2020, the Ministry of Science announced that it would begin work on the National Plan for Science, Technology, and Innovation 2030. An advisory commission was created to work on the plan, and it remains to be seen what role space will play in its final elaboration. [312]

Plan Espacial Nacional (PEN)

The PEN constitutes Argentina's national space plan. The first PEN was adopted for the period 1995-2006, and revisions have been conducted for the subsequent ten-year periods. The current version covers the period from 2016-2027 and is focused on three main components:[313]

- Earth observation,
- Peaceful exploration and use of outer space,
- Technological development for space purposes.

The PEN is implemented through eight courses of action:[314]

- Use and management of spatial information,
- Data reception and control of satellites and launchers,
- Design and construction of satellite systems,
- Access to space, specifically with the development of the Satellite Injector Program for Light Payloads (ISCUL),
- Assembly, testing, and demonstration of space systems and selection of appropriate materials,
- Peaceful exploration and use of outer space,
- Investment in education and training for space-related fields,
- Promote the use of spatial information throughout different sectors and levels of government and engage in international cooperation.

CONAE has approved and operates under the current version of the PEN, but the document is still awaiting government approval.[315]

[311] Nicastro, Juan. 2019. "El INTI lanzó un Programa estratégico de desarrollo aeronáutico y espacial". INTI. Available at: https://www.inti.gob.ar/noticias/21-asistencia-regional/1555-el-inti-lanzo-un-programmea-estrategico-de-desarrollo-aeronautico-y-espacial?utm_source=tw&utm_campaign=aeronautico. Accessed May 2021.
[312] "Plan Nacional de Ciencia, Tecnología e Innovación 2030: Primera reunión de la Comisión Asesora". 2020. Science Ministry Available at: https://www.argentina.gob.ar/noticias/plan-nacional-de-ciencia-tecnologia-e-innovacion-2030-primera-reunion-de-la-comision. Accessed by May 2021.
[313] "Curos de accion". Government of Argentina. Available at: https://www.argentina.gob.ar/ciencia/conae/plan-espacial/cursos-de-accion. Accessed May 2021.
[314] *Ibid.*
[315] Lòpez, A., Space Policy (2018), Available at: http://doi.org/10.1016/j.spacepol.2018.06.001

Figure 20: Argentina space plan courses

Argentinian Geostationary Satellite Plan 2015-2035 (PSGA)

PSGA was approved in November 2015 by the National Congress of Argentina through the passage of the Law of Satellite Industry Development. The Law grants ARSAT the mandate to carry out the PSGA. The PSGA's main objective is to strengthen capacity for the development of geostationary telecommunications satellites, as well as the exploitation of Argentinian satellite services.[316]

The PSGA provides for the development and launch of eight telecommunications satellites by 2035, under the auspices of ARSAT.[317]

In line with PSGA, the design and manufacture of satellites ARSAT-2 and ARSAT-3 was envisioned. ARSAT-2 entered into service in 2015 with a 30% utilisation contract. Construction of ARSAT-3 was then halted due to financial concerns.[318] In 2020, the project was revived, and ARSAT-3 was redesigned as ARSAT-SG 1, scheduled for launch in 2023. This revival also marked the relaunch of PSGA.[319]

[316] "Satellite Industry Development Law". 2015. *Marval O'Farrell Mairal.* Available at: https://www.marval.com/publicacion/ley-n-27208-de-desarrollo-de-la-industria-satelital-12709&lang=en/. Accessed May 2021.
[317] *Ibid.*
[318] "ARSAT 3". Gunter's Space Page. Available at: https://space.skyrocket.de/doc_sdat/arsat-3.htm. Accessed May 2021.
[319] "Relanzamiento del plan satelital geoestacionario". 2020. Government of Argentina. Available at: https://www.argentina.gob.ar/noticias/relanzamiento-del-plan-satelital-geoestacionario. Accessed May 2021.

Plan Nacional de Conectividad "Plan Conectar" 2020-2023

The National Plan for Connectivity 2020-2023 (*Plan Conectar*) aims to invest $37.9 million by 2023 to increase access to ICT services and provide broadband connections. The plan consists of four programmes, the launch of ARSAT-SG1, the update and expansion of the Federal Fibre Optic Network, the update and expansion of the National Data Centre, and the recovery of 100 transmission stations to provide improved television access for ten million homes.[320]

Programme	Objective and Content
ARSAT-SG1	Provide high-quality satellite connectivity to 200,000 rural households. *Development, manufacture and launch of ARSAT-SG1.* • Manufacture ARSAT-SG1 and launch mid-2023, • Raise the data traffic capacity to 50Gbps, • Enhance the 4G networks and support the deployment of 5G.
Federal Fibre Optic Network (REFEFO)	Connect 22 million Argentinians to REFEFO by 2023 *Update of equipment, finalization of stage 2, roll-out of stage 3* • Multiply REFEFO capacity by ten with the equipment update, • Build 4408 km of fibre optic and reach 38,808 km, • Add over 490,000 people to the "trunk network".
National Data Centre (CND)	Enhance political sovereignty over national data. *Development of the data centre and extension of services.* • Extension of cloud services to improve cost efficiency, • Update backup systems, • Implement contingency policies to meet international standards.
Digital TV Open (TDA)	Guarantee access to high-quality TV services to 10M households *Recovery of the 100 transmission stations.* • Renovate the transmission platform to improve the image quality, • Update equipment to prevent transmission losses.

Table 15: Programmes and objectives of Conectar (Chief of Cabinet of Ministers)

4.3.2 Legal and regulatory instruments

In Argentina, laws first provided a legal framework to institutions and space activities. For instance, the National Decree No. 995/91 of May 1991 established CONAE. The National Decree No. 125/95 of 1995 established the National Registry of Space Objects Launched into Outer Space.[321] In addition, the Decree 532/05 of 2005 outlines the development of space activities as a national priority and acknowledges the National Space Plan of 2004-2015 as a strategic plan, thereby translating the rising interest of the State in space.[322] However, Argentina does not seem to have adopted laws related to the commercialization of space, or taken an official legal position on the commercial exploitation of space resources or related

[320] "Conectar". Government of Argentina. Available at: https://www.argentina.gob.ar/jefatura/innovacion-publica/ssetic/conectar. Accessed May 2021.
[321] *Schematic Overview of National Regulatory Frameworks for Space Activities*. Committee on the Peaceful Uses of Outer Space UNOOSA. 2014. Available at: https://www.unoosa.org/pdf/limited/c2/AC105_C2_2014_CRP05E.pdf. Accessed May 2021.
[322] Froehlich et al. 2020. "Space Supporting Latin America, Latin America's Emerging Space Middle Powers". ESPI; Springer.

emerging issues. At this point, Argentina has not adopted national regulations or mechanisms on space debris mitigation.[323]

Law 26.095

Several legal tools form the framework of telecommunication activities, including Law 26.095, Law 27.208, and Decree 58/2019.

Law 26.092 of 2006 established the state-owned company ARSAT and defined its purpose, which is to design, develop, build (in Argentina), and launch GEO telecommunications satellites. The law provided the authorization for ARSAT satellites to use the orbital position 8° West Longitude and its associated frequency bands. The law also exempts ARSAT from paying any national tax, including VAT.

Law 27.208

In addition, Law 27.208 of 2015 places the development of the satellite industry as a national policy interest and a priority, in particular the development of telecommunication satellites. It also approved the Argentinian Geostationary Satellite Plan 2015-2035, which is considered as an integral part of this law.[324] The government will implement this law and the Satellite Plan through the ARSAT company. The law further details the governance of ARSAT as a state-owned company as well as its privileged procedures for frequency allocations.[325]

In 2019, Law 27.208 was modified through the Decree of Necessity and Urgency 58/2019. The decree still states that ENACOM will directly attribute the frequencies ARSAT needs for its activities. However, in order to prevent monopoly, enhance competitiveness, and promote regional development, ENACOM will assign frequencies to local and regional mobile providers, as well as ICT service providers.[326]

Law 27.078 Argentina Digital

In 2019, the Law 27.078 was adopted to develop telecommunications in Argentina, reduce the digital divide, and guarantee the "complete neutrality of the networks". To this end, the Federal Authority for Information and Communication Technologies will regulate, promote, and supervise the use and exploitation of the radioelectric spectrum, orbital resources, satellite services, and telecommunications networks. The law also gives priority to the use of Argentinian satellites to provide connectivity on its soil.[327]

4.3.3 International affairs

At the legal level, Argentina has ratified all UN Space Treaties except for the Moon Agreement. It is also party to the Nuclear Test Ban Treaty, ITSO Agreement, IMSO Convention, and ITU Constitution and Convention.

Moreover, Argentina is a Member State of UNOOSA and UNCOPUOS. While its diplomatic efforts are often discrete, Argentina's statements provide an overview of the country's space objectives, as well as its stance on the peaceful use of outer space. In 2018, the Permanent Mission of Argentina to International Organisations in Vienna declared that access to space for all countries is essential to the peaceful use of outer space, as space is a catalyst for socio-economic development and improving living standards.

[323] "Space Debris Mitigation Standards- Argentina". UNOOSA. Available at: https://www.unoosa.org/documents/pdf/spacelaw/sd/Argentina.pdf. Accessed May 2021.
[324] Law 27.208, *Desarrollo de la Industria Satelital*, art. 1.
[325] *Ibid.*
[326] Decree 58/2019, *Decreto de Necesidad y Urgencia modificando la Ley N° 27.208*
[327] Law N ° 27.078 Argentina Digital – 2014.

Argentina perceives space as a global common and common heritage of humanity.[328] In addition, Argentina hosted UNOOSA workshops on topics such as GNSS or space law for economic and social development.[329] CONAE is also part of the International Charter on Space and Major Disaster and provides satellite imagery for disaster monitoring purposes.[330]

Figure 21: Argentina international cooperation (adapted from CONAE)

At the bilateral level, Argentina cooperates with all space powers. CONAE signed partnership and cooperation agreements with ESA, NASA, CNES, DLR, Roscosmos, CNSA, UKSA, etc. As part of international cooperation, several deep space antennas have been installed on Argentinian soil. ESA's deep space antenna was set up in Argentina in 2012 and Chinese Moon Exploration Program's deep space antenna was also installed in 2017. 10% of the operative time of both antennas is available for

[328] Republica de Argentina, "INTERVENCION ARGENTINA PARA EL SEGMENTO DE ALTO NIVEL UNISPACE +50 (20-21 DE JUNIO 2018), PRONUNCIADA POR EL EMBAJADOR RAFAEL MARIANO GROSSI". 2018. Available at: https://www.unoosa.org/documents/pdf/copuos/2018/hls/07_03S.pdf

[329] "2nd United Nations/ Argentina International Conference on the Use of Space Technology for Water Management. 2011. Available at: https://www.unoosa.org/oosa/en/ourwork/psa/schedule/2011/international_conference_argentina_use-of-space-technology-for-water-management.html. Accessed May 2021.

[330] "About the Charter". International Charter Space and Major Disasters. Available at: https://disasterscharter.org/web/guest/about-the-charter. Accessed May 2021.

Argentinian scientific projects.[331] CONAE and the Russian Academy of Sciences signed a cooperation agreement to install three telescopes to track space debris, asteroids, and comets.[332]

At the industrial level, Argentina and Turkey are cooperating through INVAP and the Turkish Aerospce Industries, which have formed a joint venture named Gsatcom Space Technologies with the goal of developing and selling GEO telecommunication satellites.[333]

In Latin America, Argentina and Brazil have followed similar paths in their space journeys and have been cooperating extensively. Indeed, both countries have started to develop space activities within the military and both countries have transitioned to civilian activities in the 1990s. In 1989, the Joint Argentine-Brazilian Declaration on Bilateral Cooperation in the Peaceful Uses of Outer Space was signed and a working group for the creation of space cooperation programmes between the two countries was established. The Joint Declaration enables them to share information and use testing facilities of both countries. In 1996, the Framework Agreement for Cooperation in the Peaceful Applications of Space Science and Technology was signed. Argentina and Brazil have jointly developed an EO satellite (SABIA-MAR), which aims at monitoring the sea, agricultural fields, as well as deforestation and geology. In 2011, Argentina even suggested the establishment of a South American Space Agency.[334]

While this South American Space Agency was never established, in October 2020, Argentina signed a strategic agreement with Mexico that is expected to lay the foundation for the establishment of the ALCE, the Latin American and Caribbean Space Agency. The goal of this regional space agency is too pool financial, technological, and human resources. It is expected that Bolivia, Ecuador, El Salvador, and Paraguay will take part in this initiative. Colombia and Peru are expected to join as observers.[335]

[331] Colazo, Marcelo. "Space Science in Argentina- CONAE's Experience and International Cooperation. 2017. CONAE Argentina, Available at: https://www.unoosa.org/documents/pdf/psa/activities/2017/OpenUniverse/slides/Presentation23.pdf
[332] *Ibid.*
[333] Henry, Caleb. "Argentina, Turkey wade into tough GEO manufacturing market with joint venture". 2019. *SpaceNews.* Available at: https://spacenews.com/argentina-turkey-wade-into-tough-geo-manufacturing-market-with-joint-venture/. Accessed May 2021.
[334] Llendorazas, Elsa. "Nuclear and Space Cooperation- The Argentine-Brazilian Case: From Competition to Collaboration. REVISTA DE RELACÕES INTERNACIONAIS E COMÉRCIO EXTERIOR DA ESTÁCIO Nº1 Vº1 ANO 2019. Available at: http://revistaadmmade.estacio.br/index.php/rel_inter_comercio_exterior/article/viewFile/7542/47966645
[335] Valero, Myriam V. "Latin America's Moonshot". 2021. *Slate*. Available at: https://slate.com/technology/2021/05/latin-american-caribbean-space-agency-future.html. Accessed May 2021.

4.4 Programmes and infrastructure

4.4.1 Resources and infrastructure

The budget allocated to CONAE has increased in the past few years. In 2021, the budget of CONAE will account for 7458 million pesos. In 2020, the budget accounted for 3748 million pesos.[336]

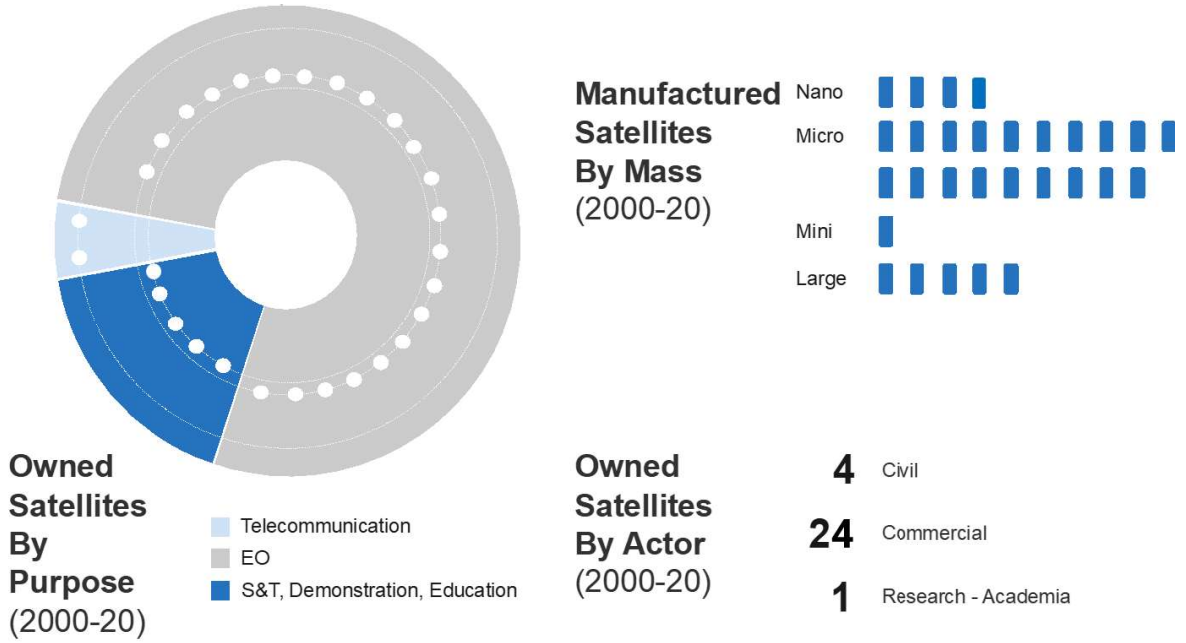

Figure 22: Argentina's space infrastructure overview (ESPI database)

4.4.2 Space programmes and activity

Telecommunication

Aside from Argentina's early satellites, the majority of telecommunication satellites are owned and operated by ARSAT, the Argentinian government-owned telecommunications company.[337] Through the PSGA and the *Plan Conectar*, ARSAT is granted the mandate to conduct activities relating to satellite telecommunications in Argentina through the ARSAT satellite constellation.[338] The ARSAT 1 and ARSAT 2 satellites were launched in 2014 and 2015, respectively. ARSAT 1 focuses on providing data, telephone, and television transmission services for Argentina, Chile, Uruguay, Paraguay, and Bolivia.[339] Construction of ARSAT 3 was halted in 2016 due to financial reasons, but the programme was resumed in 2020 with the announcement of the ARSAT-SG1 satellite. [340] This satellite is planned to be launched in 2023 and is based on a platform developed by the GSATCOM joint venture between INVAP and the Turkish Aerospace Industry.[341] The satellite will provide broadband connectivity to all of Argentina, including 200,000 homes

[336] Alonso, Matias. "Reactivación espacial". 2020. UNSAM. Available at: https://www.unsam.edu.ar/tss/reactivacion-espacial/. Accessed May 2021.
[337] Lopez, A., Space Policy (2018), http://doi.org/10.1016/jspacepol.2018.06.001
[338] "Satellite Industry Development Law". 2015. Marval O'Farrell Mairal. Available at: https://www.marval.com/publicacion/ley-n-27208-de-desarrollo-de-la-industria-satelital-12709&lang=en/. Accessed May 2021.
[339] "ARSAT 1". Gunter's Space Page. Available at: https://space.skyrocket.de/doc_sdat/arsat-1.htm. Accessed May 2021.
[340] "ARSAT retoma desarrollo de su tercer satélite". 2020. ARSAT. Available at: https://www.arsat.com.ar/arsat-retoma-desarrollo-de-su-tercer-satelite. Accessed May 2021.
[341] "ARSAT-SG 1". Gunter's Space Page. Available at: https://space.skyrocket.de/doc_sdat/arsat-sg-1.htm. Accessed May 2021.

in rural areas, and parts of Argentina's neighbouring countries, as well.[342] [343] So far, all ARSAT satellites have been constructed by INVAP.[344]

Spacecraft	Manufacturer	Launch Provider	Launch Year	Orbit & Mass	Customer	Purpose
ARSAT 01	INVAP	Arianespace	2014	GEO, 2985 kg	ARSAT	Ku-band. Data, telephone, TV services. Covers Argentina, Chile, Uruguay, Paraguay, Bolivia
ARSAT 02	INVAP	Arianespace	2015	GEO, 2975 kg	ARSAT	C-band, Ku-band. Data transmission, internet & TV services. Covers the Americas.

Table 16: Argentina telecommunication satellites (ESPI database)

Earth Observation

Satellogic has been responsible for the majority of Argentina's EO satellites through its Aleph-1 constellation, consisting of the ÑuSat satellites. Aleph-1 will consist of up to 90 satellites, and 18 have been launched so far. The majority of the satellites have been launched using Chinese launch services, however the launch of ÑuSat 6 was provided by Arianespace.[345]

CONAE also develops EO satellites. SAC-C was developed through a partnership between CONAE and NASA, and includes instruments from France, Italy, Brazil, and Denmark, as well. SAC-C was part of the Morning Constellation for Earth Observation (along with Landsat 7, EO 1, Terra, SAC-C) SAC-C was launched from Vandenberg Air Force Base in 2000. [346]

The SAC-D/Aquarius satellite was launched in 2011 and was also the result of collaboration between CONAE and NASA. The mission was focused on measuring sea surface salinity. [347] The SAOCOM constellation consists of two L-band SAR satellites which are part of the SIASGE joint project between CONAE and ASI aimed at providing information for emergency management.[348] The project ultimately encompasses six satellites, Argentina's two SAOCOM satellites and Italy's four COSMO-SKYMed satellites. SAOCOM1A and SAOCOM1B were launched in 2018 and 2020, respectively.[349] Two SAOCOM2 satellites are also planned.[350]

[342] "El ARSAT-SG1". Government of Argentina. Available at: https://www.argentina.gob.ar/jefatura/innovacion-publica/ssetic/conectar/el-arsat-sg1. Accessed May 2021.
[343] "ARSAT-SG 1". Gunter's Space Page. Available at: https://space.skyrocket.de/doc_sdat/arsat-sg-1.htm. Accessed May 2021.
[344] Lopez, A., Space Policy (2018), http://doi.org/10.1016/jspacepol.2018.06.001
[345] "ÑuSat 1, ..., 98 (NewSat 1, ..., 98, Aleph-1 1, ..., 98)". Gunter's Space Page. Available at: https://space.skyrocket.de/doc_sdat/nusat-1.htm. Accessed May 2021.
[346] Comob, F.R., et al. "SAC-C Mission and the Morning Constellation." 2002. Harvard University. Available at: https://ui.adsabs.harvard.edu/abs/2002iaf..confE.888C/abstract. Accessed May 2021.
[347] "Aquarius / SAC D (ESSP 6)". Gunter's Space Page. Available at: https://space.skyrocket.de/doc_sdat/aquarius.htm. Accessed May 2021.
[348] "SAOCOM-1" Gunter's Space Page. Available at: https://space.skyrocket.de/doc_sdat/saocom-1.htm. Accessed May 2021.
[349] *Ibid.*
[350] *Ibid.*

CONAE designated the technology and services company, VENG, the task of bringing SAOCOM products to market through the creation of an online platform which allows user to search SAOCOM imagery.[351]

The SABIA-Mar constellation is currently under development and will provide data on sea and coastal areas. The project was initially envisioned as a joint project between CONAE and AEB, but ultimately CONAE took full responsibility for SABIA-Mar 1 and SABIA-Mar 2 became AEB's project. SABIA-Mar is scheduled to launch in 2023.[352]

Spacecraft	Manufacturer	Launch Provider	Launch Year	Orbit & Mass	Customer	Purpose
SAC-C	INVAP	ULA	2000	LEO, 485 kg	CONAE	Remote Sensing. Observation of land and coastal water and internal waters to study geomagnetic fields and the atmospheric structure.
SAC-D/ Aquarius (ESSP6)	INVAP	ULA	2011	LEO, 1600 kg	CONAE, NASA	Remote Sensing. Gather climate information from salinity measurements and get an idea of circulation and mixing processes in the ocean.
ÑuSat 1 & ÑuSat 2	Satellogic	CASC	2016	LEO, 37,5 kg	Satellogic	Commercial real-time Earth imaging and video, 1 m resolution
ÑuSat 03, ÑuSat 4, ÑuSat 5	Satellogic	CASC	2017-2018	LEO, 37,5 kg	Satellogic	Commercial real-time Earth imaging and video, 1 m resolution
SAOCOM 1A, SAOCOM 1B	INVAP	SpaceX	2018, 2020	LEO, 3000 kg	CONAE	SAR L-Band. Soil moisture measurement and emergency applications (oil spill detection at sea, flood monitoring, etc.)
ÑuSat 7, ÑuSat 8	Satellogic	CASC	2020	LEO, 37,5 kg	Satellogic	Commercially available real-time Earth imaging and video
ÑuSat 6	Satellogic	Arianespace	2020	LEO, 37,5 kg	Satellogic	Test sub-meter imaging technology and improve R&D of EO capabilities.
ÑuSat 9-18	Satellogic	CASC	2020	LEO, 41 kg	Satellogic	Commercial real-time Earth imaging and video, 1 m resolution

Table 17: Argentina EO satellites (ESPI Database)

[351] "Official website for the marketing of SAOCOM® products". VENG. Available at: https://saocom.veng.com.ar/en/. Accessed May 2021.
352 "SABIA-Mar". CONAE. Available at: https://www.argentina.gob.ar/ciencia/conae/misiones-espaciales/sabia-mar. Accessed December 2020.

Additionally, CONAE seeks to meet the increased demand for EO data by developing new satellites and instruments through the project, *Arquitectura Segmentada*. Programmes include the plans for the development of improved communication systems, cluster navigation technologies, and new payloads.[353]

S&T, Education

Argentina has also deployed a number of technology demonstration, and education satellites.

The Cubebug satellites were launched as technology demonstration missions for a new cubesat design for universities and research institutions to use. The Argentinian Ministry of Science, Technology, and Productive Innovation, INVAP, Satellogic, and Radio Club Bariloche sponsored the project. The first mission tested the components for BugSat EO satellites and then entered a new mode to provide science data downloads and a digital repeater for the amateur radio community.[354]

Spacecraft	Manufacturer	Launch Provider	Launch Year	Orbit	Customer	Purpose
PehuenSat1	AATE, UNC, AMSAT Argentina	Antrix Corporation	2007	LEO, 6 kg	AATE, UNC, AMSAT Argentina	Provide experience in manufacturing and operating a small satellite. Give learning opportunity to students.
CubeBug-1 (Capitán Beto)	Satellogic	CASC	2013	LEO, 2 kg	Satellogic	Technology demonstration for new cubesat platform design. Amateur radio.
CubeBug-2 (Manolito)	Satellogic	ISC Kosmotras	2013	LEO, 2 kg	Satellogic	Technology demonstration for new cubesat platform design. Amateur radio.
BugSat1 (Tita)	Satellogic	ISC Kosmotras	2014	LEO, 22 kg	Satellogic	Prototype satellite for ÑuSat's. Amateur radio.

Table 18: Argentina S&T, education satellites (ESPI database)

PehuenSat 1is a nanosatellite project undertaken jointly by the AATE (Asociacíon Argentina de Tecnología Espacial), UNC (Universidad Nacional del Comahue), and AMSAT Argentina (Asociación Argentina de RadioAficionados por Satélites). [355] The satellite had educational, technological, and scientific purposes.[356]

In March 2021, the privately developed Argentinian test satellite, PocketQube, DIY 1 was launched to test a variety of different technologies.[357] Additionally, Technical School No. 5 in Mar del Plata is developing

[353] "Programas de Desarrollo". Government of Argentina. Available at: https://www.argentina.gob.ar/ciencia/conae/misiones-espaciales/arquitectura-segmentada/programas. Accessed May 2021.
[354] "CubeBug 1, 2 (El Capitán Beto, Manolito) / LUSAT-OSCAR 74 (LO 74)". Gunter's Space Page. Available at: https://space.skyrocket.de/doc_sdat/cubebug-1.htm. Accessed May 2021.
[355] "PehuenSat 1 (PO 63, PehuenSat-OSCAR 63)". Gunter's Space Page. Available at: https://space.skyrocket.de/doc_sdat/pehuensat.htm. Accessed May 2021.
[356] "PEHUENSAT 1". N2YO. Available at: https://www.n2yo.com/satellite/?s=29712. Accessed May 2021.
[357] "DIY 1 (ArduiQube)". Gunter's Space Page. Available at: https://space.skyrocket.de/doc_sdat/diy-1.htm. Accessed May 2021.

and building PocketCube, SatDuino. SatDuino will be the first Argentinian satellite built by public technical school students. The goal of this initiative is to introduce aerospace in technical schools and promote careers in STEM. Additionally, this project launches the National Programme, EduAR-Sat, which aims at providing similar opportunities for schools across the country.[358]

Space Transportation

Argentina's space journey started with space transportation. In 1947, Argentina started to develop small tactical rocket with liquid-propellant motors. In 1954, it started to develop rocket engines with solid propellant. The CNIE and the IIAE of the Air Force develop sounding rockets and missiles in the 1960s. In 1961, CNIE and NASA signed a cooperation agreement on sounding rockets for space research.[359] In 1961, Argentina used space platforms in Chamical to test the Beta and Gamma rockets-probes as well as stratospheric balloons.[360] In 1965, the Centaur rocket was launched from the Matienzo Base in Antarctica. In 1966, Argentina launched the Orion II rocket from Antarctica. Argentina became the first Latin American country to launch an object into space and the only country to have achievement significant development in the field of launchers.[361] [362]

In the 1960s, the U.S., France, and Argentina cooperated and launched 16 French Centaure rockets from Argentinian soil. In the 1960s and 1970s, CNIE develop several rockets, including the Alpha, Beta, and Gamma, Orion II, Castor, Canopus I and II, Rigel, and Clag I and II rockets.[363]

Argentina's efforts in developing launchers were closely related to the military and its missile programme. In 1979, Argentina started to develop the Condor I rocket due to border issues with both Chile and Great Britain.[364] However, the Condor I missile had a limited range of 100 km. During the Falklands War, the Condor I missile could not reach the Falkland Islands and Argentina could not use other missiles such as the French Exocet missiles it imported due to a French embargo. Therefore, Argentina decided to develop the Condor II rocket, which had a longer range capable of reaching the Falkland Islands.[365] [366] The Condor II programme was enabled by the imports of technologies from France, Italy, and Germany as well as funding from Egypt and Iraq.[367] At that time, Argentina was also developing its civil nuclear program. This led to concerns that Argentina was exporting missile and space-based technologies to Egypt and Iraq and contributing to Saddam Hussein's ballistic missile capabilities. In 1993, the Condor II programme was discontinued due to American pressure.[368] After that, Argentina stopped the development of launchers and redirected its activities towards civilian purposes.

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[358] "SatDuino". Argentine Technical Schools. Available at: https://satduinot5t1.wixsite.com/satduino?lang=en. Accessed May 2021.
[359] "Argentina Missile Chronology". NTI. 2010. Available at: https://media.nti.org/pdfs/argentina_missile.pdf. Accessed May 2021.
[360] Froehlich et al. 2020. "Space Supporting Latin America, Latin America's Emerging Space Middle Powers". ESPI; Springer.
[361] "Argentina". Astronautix. Available at: http://www.astronautix.com/a/argentina. Accessed May 2021.
[362] De Leon, Pablo. "The Condor Project". 2016. University of North Dakota. Available at: https://www.researchgate.net/publication/308890406_THE_CONDOR_PROJECT.
[363] Argentina Missile Chronology". NTI. 2010. Available at: https://media.nti.org/pdfs/argentina_missile.pdf. Accessed May 2021.
[364] Tollefson, Scott. El Condor Pasa: "The Demise of Argentina's Ballistic Missile Program" in *The International Missile Bazaar.* 1994. Routledge. Available at: https://www.taylorfrancis.com/chapters/edit/10.4324/9780429311932-11/el-condor-pasa-demise-argentina-ballistic-missile-program-scott-tollefson
[365] Long, William. "Argentina Abolishes Missile Program with Iraq: Military: It turns over 'missing' parts, and in return wants to buy sensitive U.S. technology". 1993. *Los Angeles Times.* Available at: https://www.latimes.com/archives/la-xpm-1993-09-26-mn-39403-story.html. Accessed May 2021.
[366] Bilnder, Daniel. "Towards an Argentine Space Policy". Centro de Estudios sobre Ciencia, Desarrollo y Educacion Superior. Available at: https://www.redalyc.org/pdf/924/92438580003.pdf. Accessed May 2021.
[367] "Missile Programs". Federation of American Scientists. 2012. Available at: https://fas.org/nuke/guide/argentina/missile/index.html. Accessed May 2021.
[368] Long, William. "Argentina Abolishes Missile Program with Iraq: Military: It turns over 'missing' parts, and in return wants to buy sensitive US technology". 1993. Los Angeles Times. Available at: https://www.latimes.com/archives/la-xpm-1993-09-26-mn-39403-story.html. Accessed May 2021.

Today, Argentina is developing launchers with the Tronador series in an effort to develop its industry by building autonomous capabilities. The Tronador I rocket was a suborbital rocket, which was successfully launched in 2007. The Tronador II is a small satellite launcher. The Tronador III is a launcher with a range of 600 km and a payload capacity of 1 ton.[369] The progress of Tronador III has been significantly slowed down due to fluctuations in public spending.[370]

Additionally, space start-ups Lia Aerospace and TLON Space have started working on the development of micro-launchers, (Procyon and Aventura-I).

Finally, Argentina established three launchpads on its soil:

- The Teófilo Tabanera Space Centre (CETT), located in the province of Cordoba. It hosts several facilities such as a mission control centre, a testing laboratory, the Mario Gulich Institute, etc.[371]
- The Manuel Belgrano Space Centre (CEMB), located in the province of Buenos Aires, within the Puerto Belgrano Naval Base. It is the selected launch pad for the Tronador II and Tronador III.[372]
- The Punta Indio Space Centre (CEPI), located in the province of Buenos Aires.[373]

Launch Vehicle	Manufacturer Launch provider	Characteristics	Performance (kg)	Launch Year (maiden)	Launch site
Tronador I	VENG	Suborbital 1 stage	60 kg	2007	Belgrano Space Centre
Tronador II	VENG	Orbital 2 stages	250 kg in LEO	2020	Belgrano Space Centre
Tronador III	VENG	Orbital 2 stages	750 - 1000 kg in LEO	> 2025	Belgrano Space Centre
VLE	VENG	Orbital 2 stages	80 kg in LEO	> 2023	Belgrano Space Centre
Aguila IV	CITEDEF	Orbital 4 stages	60 kg in LEO	> 2025	Belgrano Space Centre
Zenit	Lia Aerospace	Suborbital 1 stage	30 kg	> 2022	N/A
Procyon	Lia Aerospace	Orbital 2 stages	150 kg in LEO	> 2024	N/A
Aventura I	TLON Space	Orbital 2 stages	25 kg in SSO (500-800 km)	N/A	N/A

Table 19: Argentinian launch vehicles

[369] Froehlich et al. 2020. "Space Supporting Latin America, Latin America's Emerging Space Middle Powers". ESPI; Springer.
370 "VLE, nuevo enfoque de CONAE". 2020. *latamsatelital*. Available at: http://latamsatelital.com/vle-nuevo-enfoque-de-conae/. Accessed December 2020.
[371] "Centro Espacial Teofilo Tabanera". Government of Argentina. Available at: https://www.argentina.gob.ar/ciencia/conae/centros-y-estaciones/centro-espacial-teofilo-tabanera. Accessed May 2021.
[372] "Centro Espacial Manuel Belgrano". Government of Argentina. Available at: https://www.argentina.gob.ar/ciencia/conae/centros-y-estaciones/centro-espacial-manuel-belgrano. Accessed May 2021.
[373] "Centro Espacial Punta Indio". Government of Argentina. Available at: https://www.argentina.gob.ar/ciencia/conae/centros-y-estaciones/centro-espacial-punta-indio. Accessed May 2021.

4.5 Key takeaways

4.5.1 Argentina's space ambitions

Argentina's space efforts were first driven by military objectives and space capabilities were mostly developed by the Air Force. However, after the dismantlement of the Condor II programme, Argentina had no choice but to redirect its space development efforts towards civilian and peaceful purposes.

Since then, the main driver for pursuing space activities in Argentina has been socio-economic benefits. These goals are clearly highlighted in the National Space Plans, public speeches, and space projects. For instance, Argentina tries to uptake space-based data to provide citizens with information on health issues such as dengue or Chaga's disease through CONAE's Geoportal. CONAE is also cooperating with the Ministry of Health to organize courses on the use of EO data to monitor such disease and create risk maps. CONAE and other academic institutions are trying to analyse the link between the environment and the emergence of some diseases.[374]

Additionally, in the field of telecommunications, reducing the digital divide is one of the main objectives of the government. Argentina increasingly views SATCOM as a way to provide connectivity to rural areas without setting up complex and costly terrestrial networks.[375] In 2020, the government unveiled the Connectivity Plan, which aims at improving network capacities and providing connectivity in rural areas through fibre optics and satellites. The plan includes the development of the ARSAT SG1 telecommunication satellite.

Since the early 2000s, the Ministry of Defence has started to pursue space-related activities again. However, the use of space to meet national security objectives is rarely highlighted by policymakers. In addition, soft power and prestige are rarely mentioned in space policies and the space sector does not seem to be the object of a strong governmental communication campaign. Therefore, socio-economic benefits are the main driver for pursuing space activities in Argentina.

4.5.2 Space ecosystem highlights

Since the 1950s, the Argentinian space journey underwent several advancements and setbacks due to economic and political crises. Nonetheless, Argentina managed to develop space capabilities and reached key milestones, making it an emerging spacefaring nation.

Politics

Argentina signed all the UN space treaties, except for the Moon Agreement. It is a member of UNOOSA and UNCOPUOS.

At the national level, Argentina established its space agency in 1992. Since 1995, Argentina has adopted and regularly updated space policies. Argentina's main policy document is the National Space Plan, which defines objectives for the development of space activities and capabilities. The NSP focuses on EO, the peaceful use of outer space, and the development of space technologies. The NSP is being implemented by CONAE with the support of state-owned companies such as ARSAT or INVAP. However, while the NSP

[374] "Responses to the set of questions regarding policies, experiences and practices in the use of space science and technology for global health- Note by the Secretariat". *Committee on the Peaceful Uses on Outer Spaces- UNOOSA.* 2021. Available at: https://www.unoosa.org/res/oosadoc/data/documents/2021/aac_105c_1/aac_105c_1119add_2_0_html/V2007380.pdf. Accessed May 2021.
[375] "La conectividad en el medio rural". Ministerio de Agricultura, Ganadería y Pesca. Available at: https://www.magyp.gob.ar/sitio/areas/cambio_rural/boletin/conectividad.php. Accessed May 2021.

covering the 2016-2027 period has been approved by CONAE, it has not been approved by the government and has not been made public.[376] As a result, the scope, evolution, and ambitions of the space policy can hardly be assessed. Argentina's space budget has been increasing over the last few years. From 2020 to 2021, CONAE's budget went from 3748 million pesos to 7458 million pesos.[377] Yet, political changes and budget fluctuations often delay long-term space projects.

The national space ecosystem also relies on entities which provide training and education such as the University of Comahue, the National University of San Martin (UNSM), the University of Cordoba (UNC), and the National University of la Plata (UNLP). Several universities have contributed to national space missions.

Programmes

Argentina managed to develop capabilities in the field of Earth observation, telecommunications, and launchers. Argentina was the first Latin American nation to launch an object into space. In 1990, Argentina launched its first satellite (LUSAT-1). Since then, Argentina has developed manufacturing and design capabilities for GEO telecommunication satellites, and LEO Earth observation satellites by taking advantage of the technical progress in the nuclear sector. The first indigenous satellite, ARSAT-1, was launched in 2014.[378] Argentina has been developing indigenous launching capabilities with the Tronador III but has not yet launched an object into orbit.

[376] Lopez, Andres & Pascuini, Paulo & Ramos, Adrian. 2018. Climbing the Space Technology Ladder in the South: the Case of Argentina. Space Policy. 46. Available at: https://www.researchgate.net/publication/325926349_Climbing_the_Space_Technology_Ladder_in_the_South_the_Case_of_Argentina

[377] Alonso, Matias. "Reactivación espacial". 2020. UNSAM. Available at: https://www.unsam.edu.ar/tss/reactivacion-espacial/. Accessed May 2021.

[378] https://eu.usatoday.com/story/news/nation/2014/10/17/argentina-satellite-launch/17396753/