

National Aeronautics and Space Administration Cooperation with Latin America, the Middle East and Africa

*Robin J. Frank**

Abstract

A key theme of the 2016 International Aeronautical Congress (IAC) is that “a new era in the use and exploration of space for Mexico and Latin America has [been] initiated.” This paper will discuss cooperation between the National Aeronautics and Space Administration (NASA) and countries in Latin America, as well as the Middle East and Africa. This paper will also look at United States (US) law regarding international agreements and the internal processes through which the United States Government (USG) coordinates agreements binding under international law. This paper also will discuss other partners’ processes for concluding agreements binding under international law.

* Associate General Counsel for International Law, National Aeronautics and Space Administration (NASA), United States.

Mr. David R. Lopez, Intern, International Law Practice Group, Office of the General Counsel, National Aeronautics and Space Administration (NASA) and a 2017 J.D. Candidate, University of Houston Law Center (Texas) is the primary author of Section 4 of this paper. In addition, the author thanks Mr. Lopez for his research and editing assistance on other parts of this paper.

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1. Introduction

NASA attorneys know, every day, that NASA Administrator Charles Bolden believes that NASA's vision is to reach for new heights and reveal the unknown for the benefit of humankind.¹ We also know that NASA's mission is to drive advances in science, technology, aeronautics, and space exploration to enhance knowledge, education, innovation, economic vitality, and stewardship of Earth.² Our job is to work cooperatively, thoughtfully and creatively, with our colleagues at NASA, throughout the USG, and with civil society to achieve NASA's mission within the boundaries of the US Constitution, US statutes, administrative regulations and USG policies. Legal work on missions and programs with international partners require the same skills, with the added layer of international law and the foreign partner's national³ legal systems. Since NASA's inception, NASA has enjoyed significant benefits to almost all of its programs through some level of international cooperation.⁴

The goal of this paper is to begin to develop a better understanding of the legal systems under which NASA and some of our foreign space agencies operate in order to further international legal cooperation. The paper briefly discusses several examples of multilateral and bilateral cooperation. This paper analyzes US law regarding the negotiation, conclusion and implementation of international agreements and discusses US internal processes for concluding international agreements. This paper examines cooperation mechanisms, other aspects of space cooperation and the domestic structure for space activities of several Latin American partners, South Africa, and Saudi Arabia. The paper is intended to assist in continuing and advancing space cooperation with Latin America in particular, in honor

1 2014 NASA Strategic Plan https://www.nasa.gov/sites/default/files/files/FY2014_NASA_SP_508c.pdf.

2 https://www.nasa.gov/sites/default/files/files/FY2014_NASA_SP_508c.pdf.

3 The special status of a key NASA partner, the European Space Agency (ESA), is of special note. ESA is an International Organization. As such, ESA has an international legal personality. ESA was established by the *Convention for the Establishment of a European Space Agency*, which entered into force on October 30, 1980. As of 2014, ESA has 20 Member States and a Cooperating State (Canada).

4 As a result of over 3,000 international agreements, NASA and its international partners have successfully shared the risks and the rewards of space exploration for decades. An increasing number of nations are relying on the unique vantage point of space for day-to-day activities such as communications, weather forecasting, and navigation. As a consequence, NASA's international partnerships continue to grow in diversity and importance. A View of NASA's International Cooperation, NASA Office of International and Interagency Relations (2008). (Copy available in the author's files.) A View of NASA's International Cooperation, NASA Office of International and Interagency Relations (2014), available at <http://oir.hq.nasa.gov/globalreach2014.pdf>.

of the Mexican hosts of the 2016 International Institute of Space Law (IISL) Symposium, and with many other US partners.

2. Multilateral and Bilateral Cooperation

The Committee on Earth Observation Satellites

The original function of the Committee on Earth Observation Satellites (CEOS) was to coordinate and harmonize Earth observations to make it easier for the user community to access and use data. CEOS initially focused on interoperability, common data formats, the inter-calibration of instruments, and common validation and inter-comparison of products. Over time, the circumstances surrounding the collection and use of space-based Earth observations have changed. CEOS now focuses on validated requirements created by external organizations, works closely with other satellite coordinating bodies (e.g. the Coordination Group for Meteorological Satellites, (CGMS)), and continues its role as the primary forum for international coordination of space-based Earth observations.

CEOS agencies work together to launch multi-agency collaborative missions, and such cooperative efforts have significantly benefited users all around the world. CEOS also provides an established means of communicating with external organizations, enabling CEOS to understand and act upon these organizations' Earth observation needs and requirements.

NASA, and its sister US agencies, the National Oceanic and Atmospheric Administration (NOAA) and the United States Geological Survey (USGS), all participate in CEOS. Other CEOS agencies include, for example, the China Center for Resources Satellite Data and Application (CRESDA), the Argentine space agency (CONAE), the National Space Research and Development Agency of Nigeria (NASRDA), and the Mexican Space Agency (AEM).⁵

International Space Education Board

The International Space Education Board (ISEB) was created in 2005 by founding members representing the education offices of the ESA, the

5 <http://ceos.org/>. CEOS was established in September, 1984 in response to a recommendation from a Panel of Experts on Remote Sensing from Space and set up under the aegis of the G7 Economic Summit of Industrial Nations Working Group on Growth, Technology, and Employment. This Panel recognized the multidisciplinary nature of space-based Earth observations and the value of coordinating international Earth observation efforts to benefit society. The CEOS Terms of Reference define the mission and scope of CEOS activities. The CEOS Strategic Guidance document articulates the overarching long-term (7-10 years) purpose and goals of CEOS. The CEOS Governance and Processes document provides guidelines on the structure, operations, and processes CEOS employs to achieve its goals. And, the CEOS Work Plan (3-year rolling) sets forth near-term actions to achieve the goals outlined in the CEOS Strategic Guidance document.

Canadian Space Agency (CSA), the Japan Aerospace Exploration Agency (JAXA) and NASA. Additional members of the ISEB are the Centre National d'Études Spatiales (CNES, France), the Victorian Space Science Education Centre (VSSEC, Australia), the Korea Aerospace Research Institute (KARI), the South African National Space Agency (SANSA), and the AEM (Mexico), the first Latin American space agency to join the ISEB.⁶

The ISEB members meet in person annually at the IAC. Each member sponsors students to attend the IAC to present their technical papers, observe other students' presentations, and learn about each others' research.

To expand learning and career development opportunities for university students worldwide, the ISEB partners host the International Student Zone and its annual program at the IAC. At the 67th IAC in September 2016, the ISEB presented a full program to allow students to share research ideas and experiences, learn from each other, and form lifelong bonds that will help them in their careers. Included were opportunities to meet and speak with the NASA Administrator and senior leaders of other space agencies, and a fun, active program engaging young Mexican students in science activities.

Space Geodetic Network

NASA cooperates with over 30 countries in space geodesy research in the support of the Global Geodetic Observing System (GGOS).⁷ These cooperative efforts recognize that geodetic networks are vital for understanding global change phenomena, assessing natural hazards, providing support for local geodetic control, and supplying ground support to space missions.⁸

NASA's cooperation with other states on space geodetic research operates through a series of bilateral agreements. NASA has Space Geodetic Research and Global Positioning System agreements in Latin America with the Argentine space agency (CONAE), the Brazilian Space Agency (AEB), and the Colombian Geological Service (SGC).⁹ NASA also cooperates with many other space agencies and foreign partners.

Global ground stations are included in the global geophysical network and have significantly improved the accuracy of global and regional geodetic measurements. The core NASA contributions to this cooperation comes from the Space Geodesy Project (SGP), which encompasses the development,

6 <https://edu.jaxa.jp/en/activities/international/ISEB/>.

7 <http://cddisa.gsfc.nasa.gov/GPS>.

8 A View of NASA's International Cooperation, NASA Office of International and Interagency Relations (2008).

9 Copies of these agreements are on file with the author. The agreement with the SGC was initially between NASA and the SGC's predecessor, the Instituto Colombiano de Geología y Minería (INGEOMINAS). See discussion below in Section 4 regarding NASA's agreement with a Saudi Arabian entity on space geodesy.

operation, and maintenance of a Global Network of Space Geodetic technique instruments, a data transport and collection system, analysis and the public disseminations of data products required to maintain a stable terrestrial reference system. This includes the management, operations and development of NASA's Space Geodetic Network that is comprised of the four major space geodetic observing systems: Very Long Baseline Interferometry (VLBI), Satellite Laser Ranging (SLR), Global Navigation Satellite System (GNSS), and the Doppler Orbitography and Radio-positioning by Integrated Satellite (DORIS) system.¹⁰

NASA's International Internship Program

NASA I² agreements with 11 foreign partners further science, technology, and math education by providing opportunities for undergraduate and graduate students from many nations to come to NASA Centers to participate in different types of missions and projects. At present, NASA I² students are only at the Ames Research Center in California. NASA intends additional NASA Centers to participate in the future. These international agreements are similar to traditional contracts because each partner sending students to NASA Centers pays the costs of its students' travel expenses and living expenses, as well as the costs to NASA for working with the interns. The NASA I² Program, like the ISEB program, gives students from many nations the opportunity to work and spend time with each other.

NASA presently has 12 agreements, *inter alia*, with partners in Latin America – AEB (Brazil) and AEM (Mexico); in the Caribbean – the National Institute of Higher Education, Research, Science and Technology (NIHERST, Trinidad & Tobago); in the Middle East – the Office of the Crown Prince of Jordan of The Hashemite Kingdom of Jordan; and in Africa – the South African National Space Agency (SANSA).¹¹

3. US Structures for Space Cooperation and Its Engagement with Other States

This section discusses the US Constitution, US statutes, US administrative regulations and internal USG processes relevant to the negotiation, conclusion and implementation of NASA's international space agreements.

Under international law, a treaty is any written agreement between States which is binding on the States.¹² The title does not need to include the word

¹⁰ <http://space-geodesy.nasa.gov/>.

¹¹ Copies of these agreements are on file with the author.

¹² Vienna Convention on the Law of Treaties (with Annex), concluded at Vienna May 23, 1969 (Vienna Convention). Art. 2(1)(a) of the Vienna Convention states that “[For the purposes of this Convention] “Treaty” means an international agreement concluded between States in written form and governed by international law,

“treaty.” For example, the treaty may be denominated as a convention, an agreement or a memorandum of understanding (MOU). The US Constitution provides that the President “shall have the power, by and with the advice and consent of the Senate, to make treaties, provided two thirds of the Senators present concur.”¹³ However, pursuant to long-standing practice,¹⁴ accepted by the US Congress and upheld by the US Supreme Court, the Executive Branch has broad authority to enter into agreements binding under international law, without the advice and consent of the Senate (commonly referred to as “Executive Agreements”).¹⁵ This authority is grounded in the President’s powers in the US Constitution, including the Executive¹⁶ and Commander-In-Chief¹⁷ powers.

In the past two decades, the Executive Branch often has handled important international agreements as Executive Agreements rather than treaties, in part because of the difficulty of obtaining Senate advice and consent for even the

whether embodied in a single instrument or in two or more related instruments and whatever its particular designation;”. Although the US is not a party to the Convention, it accepts that the Convention generally reflects international practice concerning treaties and that many of its provisions are binding as a matter of customary international law. § 101, Reporters’ Notes 1. *Restatement Fourth, the Foreign Relations Law of the United States, Tentative Version 11*, (“Restatement”), available at HeinOnline (downloaded January 7, 2017).

13 Art. II, § 2, cl. 2 of the Constitution of the United States of America, opened for Signature September 17, 1787. <https://www.whitehouse.gov/1600/> (“US Constitution”).

14 By the beginning of World War II, the US had concluded approximately 800 treaties and 1200 executive agreements. From 1940 to 1989 the US entered into 759 treaties and 13,016 Executive Agreements. Constitution of the United States of America: Analysis and Interpretation, S. Doc. 112-9 at 548 (June 27, 2016).

15 *US v. Pink*, 315 US 203 (1942). (The Supreme Court held that Executive Agreements “have a similar dignity” to treaties). *Dames and Moore v. Regan*, 453 U.S. 654 (1981) (general discussion of the role of executive agreements, though the specific issue in that case involved congressional authorization).

16 “The executive Power shall be vested in a President of the United States of America.” Article II, § 1 of the US Constitution. The US Supreme Court has decided that the executive is the “sole organ of the federal government in the field of international relations.” *United State v. Curtiss-Wright Export Corp.*, 299 U.S. 304, 320 (1936). This Supreme Court holding, while not specifically applying to agreements at the time, was later used to validate the authority of the President to conclude and implement an Executive Agreement regarding the Soviet Union. See *United States v. Belmont*, 301 U.S. 324, 330 (1937).

17 “The President shall be Commander in Chief of the Army and Navy of the United States, and of the Militia of the several States, when called into the actual Service of the United States;” Constitution of the United States of America, opened for Signature September 17, 1787. In *Tucker v. Alexandroff*, 183 U.S. 424, 435 (1902), for example, the Supreme Court suggested that the President has the authority to make agreements with foreign governments regarding the deployment of foreign troops on US soil and US troops abroad without obtaining the approval of Congress.

most noncontroversial agreements. In the area of space cooperation, the International Space Station (ISS) is the most politically and operationally complex program undertaken to date.¹⁸ The ISS also is the most ambitious and costly human exploration, scientific, and space research project ever undertaken.¹⁹ For the US, however, the treaties that established the creation and use of the ISS²⁰ were not concluded as treaties requiring the advice and consent of the Senate. Rather, the US entered into the relevant treaties as Executive Agreements. The US Department of State's Office of the Legal Adviser, with the concurrence of NASA's Office of the General Counsel (OGC), relied on US statutes in determining that the 1988 ISS agreement²¹ could be treated as an Executive Agreement.²²

18 Aoki, Setsuko, IAC-14-E7.32 (IAC 2014, Toronto, Canada). (Aoki).

19 Ferrazzani, Marco & Farand, Andre, IAC-14-E7.3.1 (IAC 2014, Toronto, Canada).

20 The Agreement among the Government of Canada, Governments of the Member States of the European Space Agency, the Government of Japan, the Government of the Russian Federation, and the Government of the United States of America Concerning Cooperation on the Civil International Space Station (the Intergovernmental Agreement or IGA) was signed in Washington, DC on January 29, 1998. NASA also entered into bilateral Memoranda of Understanding (MOUs) with the Canadian Space Agency (CSA), the European Space Agency (ESA), and the Russian Space Agency, in January 1998 and with the Government of Japan in February of 1998.

21 Agreement Among the Government of the United States of America, Governments of Member States of the European Space Agency, the Government of Japan, and the Government of Canada on Cooperation in the Detailed Design, Development, Operation, and Utilization of the Permanently Manned Civil Space Station (hereinafter "the 1988 Agreement"), done at Washington on 29 September 1988.

22 The State Department and NASA attorneys relied on, *inter alia*, the National Aeronautics and Space Act of 1958, as amended. 42 U.S.C. Sec 2451, *et seq.* (currently codified in Title 51 of the U.S.C.) The attorneys also took into account language in the NASA Authorization Act of 1988. NASA Authorization Act of 1988, Pub. L. No. 100-685, 102 Stat. 4086. Section 112 of the NASA Authorization Act of 1988 provided that:

"The Intergovernmental Agreement currently being negotiated between the United States Government and Canada, Japan, and member governments of the European Space Agency, the Memorandum of Understanding currently being negotiated between counterpart agencies in Canada, Japan and Europe concerning the detailed design, development, construction, operation, or utilization of the space station shall be submitted to the Committee on Commerce, Science, and Transportation of the Senate and the Committee of Science, Space, and Technology of the House of Representatives. So such agreement shall [not] take effect until 30 days have passed after the receipt by such committees of the agreement."

This requirement was complied with for the 1988 IGA. (The Executive branch also kept Members of Congress and their staffs informed during the course of the negotiations of the 1998 IGA.)

Whether a treaty or an Executive Agreement, the USG has the same obligations and is subject to the same remedies internationally²³ if the agreement is breached. It is a matter of debate, however, as to whether Executive Agreements apply equally in US courts.²⁴

Most international agreements binding under international law are required to go through an interagency concurrence process before NASA can formally begin negotiations with a foreign partner.²⁵ This process is run by the Department of State and coordinated with other parts of the USG (e.g., the National Security Council, the Office of Science and Technology Policy, the Office of Management and Budget and the Department of Defense). The relevant regulations have been interpreted to provide, in part, that Executive Branch officials may not initiate negotiations of such agreements or even undertake exploratory discussions until they have received approval from the Secretary of State or another designated State Department official.²⁶ In practice, NASA and other USG agencies often hold informal discussions and even initial negotiations with foreign partners prior to obtaining State Department approval, usually with the tacit understanding of the relevant State Department personnel. State Department approval also must be obtained prior to concluding an agreement. Because the process can take months if not years, it complicates NASA's relationships with many foreign partners.²⁷

23 Vienna Convention, Art. 2.1(a), Art. 60. "Treaties create international legal obligations for the United States, and limitations on the domestic enforceability of treaties do not alter the United States' obligation under international law to comply with relevant treaty provisions." *Restatement* § 101(3) (Treaties as Law of the United States). "When a federal statute overrides a treaty provision as a matter of U.S. domestic law, it does not thereby alter the United States' obligation under international law to comply with the treaty provision." *Restatement* § 109 (3) (Conflicts Between Treaties and Federal Statutes).

24 For a recent discussion, see *American Ins. Ass'n v. Garamandi*, 539 U.S. 396, 416 (2003) (holding that sole executive agreements, just as treaties and federal law, can preempt US states from legislating in certain areas).

25 U.S. International Agreements; Transmission to Congress, 1 U.S.C. sec. 112(b) (the "Case-Zablocki Act"). 22 C.F.R. sec. 181.4 (the so-called "C-175 procedures"). 11 Foreign Affairs Manual (FAM) § 721 *et seq.* sets forth C-175 procedures in more detail.

26 § 101, Comment d (Obligation to comply). *Restatement*.

27 "NASA International Partnerships: Capabilities, Benefits, and Challenges." NASA Office of Inspector General, May 5, 2016. <https://oig.nasa.gov/audits/reports/FY16/IG-16-020.pdf>. This Report states that the delays occur in part because the Department of State and other agencies do not have sufficient staff to conduct the reviews and because other matters take precedence over review of NASA agreements.

4. Partner States' Structures for Space Cooperation and Their Engagement with the US

Each of our international partners has its own Constitution, domestic organization, statutes, administrative regulations, policies and internal processes relevant to the negotiation and conclusion of international agreements.

Argentina

As of January 16, 2016, the National Commission for Space Activities (Comisión Nacional de Actividades Espaciales (CONAE))²⁸ is part of the Ministry of Science, Technology, and Innovation.²⁹ A core reason for CONAE being moved into the National Commission for Space Activities is that the Argentine government wishes to foster greater coordination among the agencies and other specialized institutions that make up the National System of Science and Technology.³⁰

Part of CONAE's mandate is to promote and develop international cooperation agreements in collaboration with the Ministry of Foreign Affairs and Worship.³¹ In addition, the Ministry of Science, Technology, and Productive Innovation plays an instrumental role in the way CONAE negotiates, drafts, and executes international agreements.³²

28 Generally, Decree 995 gives the CONAE the authority to direct space activities across the various ministries and identifies the functions to be carried out by the Argentine space commission. Comisión Nacional de Actividades Espaciales, "*Decreto Nacional 995/91: Creación de La Comisión Nacional de Actividades Espaciales [Decree 995/91: Creation of the National Committee on Space Activities]*," (hereinafter Decree 995), Secretaría de Ambiente Y Desarrollo Sustentable, May 28, 1991, available at <http://www.conae.gov.ar/images/legislacion/199591.pdf>. In 1991, President Menem issued Decree 995 that established the role of CONAE and placed the agency directly under the control of the Office of the President. CONAE was transferred to the Ministry of Foreign Affairs, International Trade, and Worship (Ministerio de Relaciones Exteriores, Comercio Internacional y Culto) in 1996. In 2012, CONAE was placed Ministry of Federal Planning, Public Investment and Services (under Ministerio de Planificación Federal, Inversión Pública y Servicios).

29 Comisión Nacional de Actividades Espaciales, "*Decreto Nacional 242/16: Dispone el Funcionamiento de la Comisión Nacional de Actividades Espaciales (CONAE) Bajo La Órbita del Ministerio de Ciencia, Tecnología e Innovación*." [Decree 242/16: Decree Ordering Operation of the National Commission on Space Activities (CONAE) under the Ministry of Science, Technology, and Innovation], (hereinafter Decree 242), *Secretaría de Ambiente Y Desarrollo Sustentable*, Jan. 26, 2016. CONAE has the authority to enter into agreements with public or private entities, and conclude the necessary contracts in order to fulfill its commitments.

30 Decree 995, art. 4(c).

31 Decree 995, art. 3(j).

32 In regards to entering agreements to share equipment and space technology with foreign entities, Decree 995 at Art. 4(f)) states that CONAE shall obtain prior

The ability to enter into bilateral and multilateral cooperation agreements in the areas of science and technology, including space-related agreements, is under the purview of the Ministry of Science, Technology, and Innovation.³³ CONAE is the only agency tasked to execute, control, manage and administer projects in space-related matters.³⁴ Therefore, Ministry of Science, Technology, and Innovation was given greater control over potential international cooperation and agreements.³⁵ Furthermore, in order to foster greater coordination between CONAE and the Ministry Science, Technology and Productive Innovation, an Argentine law created the Interagency Council on Science and Technology under the control of the Ministry of Science, Technology and Productive Innovation.³⁶

Argentina is a Member of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) and an active participant in the COPUOS Legal Subcommittee (LSC).

Brazil

The Brazilian Space Agency (AEB) is a civilian agency within the purview of the Executive Office of the President of Brazil, established by law on 10 February 1994.³⁷ The AEB's legal mandate provides the agency with the authority to shape national policy for the development of space activities.³⁸ In order to fulfill its role, the AEB has the legal mandate to formulate and carry

authorization from the Ministry of Defense, Ministry of Economy and Public Finances, and the Ministry of Foreign Affairs and Worship.

33 Ministerio de Ciencia, Tecnología e Innovación, “*Cooperación Bilateral (Bilateral Cooperation)*”, Ministerio de Ciencia, Tecnología e Innovación, accessed September 19, 2016, available at <http://cancilleria.gov.ar/en/bilateral-cooperation>.

34 Ministerio de Ciencia, Tecnología e Innovación, “*La Comisión Nacional de Actividades Espaciales (CONAE) estará bajo Ministerio de Ciencia, Tecnología e Innovación (The National Commission on Space Activities (CONAE) will be under the Ministry of Science)*”, January 26, 2016, available at <http://en.mincyt.gob.ar/news/the-national-commission-on-space-activities-conae-will-be-under-the-ministry-of-science-9601>.

35 Decree 242.

36 Ministerio de Ciencia, Tecnología e Innovación Productiva, “*Ley 25, 467: Creación de La Interinstitucional de Ciencia y Tecnología (CICYT) [Law 25,467: Creation of the Interagency Council on Science and Technology (CICYT)]*,” (hereinafter Law 25, 467), *Secretaría de Ambiente Y Desarrollo Sustentable*, September 20, 2001, available at <http://www.mincyt.gob.ar/adjuntos/archivos/000/021/0000021480.pdf>.

37 Presidency of the Republic of Brazil, “*Law 8, 854 Creation of the Brazilian Space Agency*,” (hereinafter Law 8, 854), February 10, 1994, art. 12, available at http://www.planalto.gov.br/ccivil_03/leis/L8854.htm. Previously, the space program had been under the control of the Brazilian military.

38 Law 8, 854, art. 3(II).

out the Brazilian National Policy on the Development of Space Activities (PNDAE) and the Brazilian National Space Activities Program (PNAE).³⁹

The AEB is authorized to develop, propose, negotiate, sign and execute international agreements and conventions together with the Ministry of Foreign Affairs (MFA) and Ministry of Science and Technology (MST).⁴⁰ The term “convention” is generally used to designate multilateral acts, coming from international conferences and dealing with matters of general interest, such as the Vienna Conventions on Diplomatic Relations, Consular Relations and Treaty Law. It is a type of international instrument designed in general to establish standards for the behavior of States in an ever wider range of sectors. Under Brazilian practice, international agreements are generally used in matters related to multilateral cooperation of an economic, commercial, cultural, legal, scientific or technical nature.⁴¹ AEB’s cooperation with the MFA and MST is similar to the NASA follows.⁴² Under the 1994 legislation, the AEB is authorized to execute its international activities, directly or indirectly, through contracts and agreements abroad with foreign entities.⁴³

In certain instances, Brazilian international agreements regarding space cooperation require the approval of the Brazilian Congress. For example, the Framework Agreement between the Government of the United States of America and the Government of the Federative Republic of Brazil on Cooperation in the Peaceful Uses of Outer Space was signed in March 2011 but has not yet entered into force. This Agreement provides for cooperation in space operations and exploration, earth and space science and other areas.⁴⁴ Specific cooperation is then agreed upon through lower-level agreements. The agreement has not yet entered into force because, as the Ministerio das Relacoes Exteriores informed the US Embassy in Brazil, (1)

39 Agência Espacial Brasileira, *Programa Nacional de Atividades Espaciais: 2012-2021 [National Program of Space Activities: 2012-2021]* (Brasília, Brazil: Ministério da Ciência, Tecnologia, e Inovação, 2012), available at <http://www.aeb.gov.br/wp-content/uploads/2013/03/PNAE-Portugues.pdf>.

40 Law 8, 854, art. 3(V).

41 For example, the Agreement on Educational Cooperation, signed with Argentina (1997) and the Agreement for Economic Co-operation in the Field of Coal, concluded with France (1981). See Escola Nacional de Saúde Pública, Sergio Arouca (Sergio Arouca National School of Public Health), *Cooperação Internacional (International Cooperation)*, (date accessed January 6, 2017), available at <http://www.ensp.fiocruz.br/portal-ensp/cooperacao-internacional/atos-internacionais/>.

42 See section 3 above.

43 Law 8, 854, art. 3(XIV) § 1.

44 The United States has Framework Agreements that have entered into force with, *inter alia*, Argentina. NASA has Agency-to-Agency Framework Agreements that have entered into force, with, *inter alia*, the Israeli Space Agency and, most recently, the Space Agency of the United Arab Emirates (UAE).

the Agreement first needs approval by the Brazilian Congress; (2) after this approval occurs, the Ministerio das Relacoes Exteriores informs the US Embassy; and then (3) the process continues to “Promulgacao.” Only then does the Agreement enter into force. To date, none of these steps has occurred. Accordingly, AEB and NASA must rely on the Framework Agreement between the Government of the United States of America and the Government of the Federative Republic of Brazil on Cooperation in the Peaceful Uses of Outer Space, signed on March 1, 1996. This Framework Agreement has been extended four times and the US and Brazil will need to extend it again before it expires on January 31, 2017.

Brazil is a Member of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) and an active participant in the COPUOS Legal Subcommittee (LSC).

Colombia

The Colombian Space Commission (CSC) was established in 2006.⁴⁵ The CSC is Colombia’s government body for the promotion and use of space. It is in charge of, among other responsibilities, promoting the development of space technology and communication satellites in Colombia.⁴⁶ The CSC’s application of space technologies contributes to the preservation of peace and public safety with respect to the environment and natural resources.⁴⁷ In 2010, the CSC, along with other organizations, produced a magazine titled “Experiences in the Use and Application of Satellite Technologies for Earth Observation,” which focused on the “prevention and attention of disasters from the use of meteorological satellites.”⁴⁸ The CSC is headed by the Colombian Vice President acting as the Director-General and a governing board comprised of heads of several government ministries. The Space Technical Committee (Comité Técnico de Asuntos Espaciales) is responsible for making project proposals.⁴⁹

45 Ministerio de Relaciones Exteriores, “Decreto 2442 de 2006 (Decree 2442),” (hereinafter Decree 2442), July 21, 2006, art. 2-3. *available at* https://www.cancilleria.gov.co/sites/default/files/Normograma/docs/decreto_2442_2006.htm.

46 Decree 2442.

47 Decree 2442.

48 Comisión Colombiana del Espacio, “Observación de la Tierra (Earth Observations),” *available at* <https://www.cce.gov.co/observacion-de-la-tierra> (“Climate change determined by the analysis of precipitation and temperature trends; Forecasts and alerts from the relationship of landslides and climate dynamics; Water and climate by monitoring various types of ecosystems such as wetlands, glaciers and coastal areas of Colombia.”).

49 Decree 2442, art. 7-11.

In 2011, the Space Technical Committee released a Report in support of the creation of a space agency.⁵⁰ The Report provides recommendations for how a potential Colombian space agency is to be organized in order to review proposals for international agreements with foreign governments. Namely, the CSC's Office of International Affairs is to work alongside the Ministry of Foreign Affairs to review and conclude international agreements.⁵¹ The 2011 Report further states the Space Technical Committee recommends that the CSC's Office of International Affairs advise the CSC's Director-General on the recommendations and requests by the Ministry of Foreign Affairs regarding international agreements and treaties.⁵² The Report proposes that the CSC's Office of International Affairs coordinate jointly with the Ministry of Foreign Affairs on concluding domestic⁵³ and foreign agreements.⁵⁴ Based on the Technical Committee's Report and recommendations, the CSC is actively engaged in the establishment of a Colombian space agency. The Report identifies several governmental entities and institutions that are willing to support a standalone space agency.⁵⁵ According to the Report, the Ministry of Foreign Affairs has not yet expressed willingness to contribute to the functioning of a prospective Colombian space agency.⁵⁶

50 See Comisión Colombiana del Espacio, "*Documento de Recomendaciones Del Comité Técnico [Document of Recommendations of the Technical Committee]*," (hereinafter Committee Report), September 2011, available at https://www.cce.gov.co/sites/default/files/adjutnos_basic_page/Documento_Recomendaciones_Comite_Tecnico.pdf.

51 Committee Report, p. 20-21.

52 Committee Report, p. 20-21.

53 It is worth noting that the reference to domestic agreements may be similar to the legal framework in Venezuela in the 1980 and 1990s. As in other civil law countries, in Venezuela when a treaty is signed, it is automatically considered domestic law. However, implementation sometimes requires implementation and integration policy and regulations. Professional employees in the relevant Ministries involved write them. When a single Ministry is involved, the Minister has the authority to sign into effect the international agreement via an "administrative resolution," a document similar to an US executive order at the Minister level. When multiple Ministries are involved, all the Ministers sign the document and the President then declares a "Reglamento." In addition, implementation of treaties sometimes require action by non-governmental domestic entities, such as commercial companies. In such instances, professional staff at the relevant Ministry(ies) writes and negotiates such agreements, contracts under domestic law, with representatives of such domestic entities. Author's interview with Dr. Linda V. Perozo, Administrative Professional, International Law Practice Group, Office of the General Counsel, January 6, 2016.

54 Committee Report, p. 20-21.

55 Committee Report, p. 20-21.

56 The Report goes on to state that the Sergio Arboleda University, the Colombian Institute of Hydrology, Meteorology and Environmental Studies (Instituto de Hidrología, Meteorología y Estudios Ambientales de Colombia [IDEAM]), and the Ministry of Defense have agreed to contribute resources and information to the

The Colombian Ministry of Foreign Affairs is responsible for formulating and guiding Colombia's international cooperation policy on bilateral and multilateral agreements and instruments, including agreements related to space.⁵⁷ In 2004, the Ministry created the International Cooperation Department, a division whose task is to strengthen relations of cooperation with foreign states and international bodies.⁵⁸ Within the International Cooperation Department, the Vice Ministry for Multilateral Matters is responsible for leading negotiations on both bilateral and multilateral cooperation agreements.⁵⁹ Among its responsibilities, the Vice Ministry coordinates with various government institutions to complement national and international efforts in the effort towards sustainable development.⁶⁰ Accordingly, the Ministry of Foreign Affairs plays a significant role in the internal review process of all international agreements proposed by the CSC. Colombia is a Member of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) and an active participant in the COPUOS Legal Subcommittee (LSC).

Mexico

In 2010, the Mexican legislature established the Mexican Space Agency (Agencia Espacial Mexicana (AEM)). Under the AEM's organic statute, authority to propose and promote international agreements resides in the General Director, appointed by the President, in coordination with the Governing Board comprised of fifteen agency heads.⁶¹ The General Director serves as a link with the Mexican Ministry of Foreign Affairs to review, formulate, and execute treaties related to space agency activities.⁶² The General Director: (1) reviews draft bilateral and multilateral treaties not yet in effect; (2) advises on the implementation of treaties that are in force; and

creation of a Colombian space agency. See Committee Report, at Annex 1: Contribution of Entities.

57 Ministerio de Relaciones Exteriores, "*Decreto 1942 de 2003 (Decree 1942 of 2003)*" (Decree 1942), July 11, 2003, art. 1.

58 Ministerio de Relaciones Exteriores, "*Cooperación Internacional (International Cooperation)*" (hereinafter International Cooperation Department), available at <http://www.cancilleria.gov.co/en/international/politics/cooperation>.

59 International Cooperation Department (the Ministry of Foreign Affairs is tasked to lead negotiations on international cooperation instruments at the bilateral, regional and multilateral levels).

60 International Cooperation Department.

61 Agencia Espacial Mexicana, *Estatuto Orgánico de la Agencia Espacial Mexicana [Organic Statute of the Mexican Space Agency]* (hereinafter AEM Organic Statute) (México, D.F.: Secretaría de Comunicaciones y Transportes, Nov. 27, 2012), art. 21(IX), available at http://www.gob.mx/cms/uploads/attachment/file/73035/Estatuto_Organico_AEM.pdf.

62 AEM Organic Statute, art. 3 (III).

(3) interprets treaties relating to international space activities.⁶³ The AEM's General Director, General Director of International Affairs and Space Security (CGAISME),⁶⁴ and the Office of International Affairs play an integral role in the review of international agreements.

Still in its nascent years, the AEM is in the process of establishing procedures and formal agency policies for internal review of international agreements entered by the AEM with other foreign governments and space programs. Key provisions in the AEM's organic statute and official policy guidelines provide a framework for the program's review process.⁶⁵

Of note is that AEM's organic statute delegates to the Director of Legal Affairs the duty to advise and assist the agency in reviewing agreements and other legally binding acts to protect the legal interest of the AEM.⁶⁶ Moreover, the AEM Organization Manual confers onto the Director of Legal Affairs the responsibility to assist the AEM by evaluating legal aspects of an agreement, contract, or legal instrument prior to finalization.⁶⁷

⁶³ AEM Organic Statute, art. 32 (II).

⁶⁴ Coordinación General de Asuntos Internacionales y Seguridad en Materia Espacial (CGAISME).

⁶⁵ Article 32 of the organic statute delegates to the CGAISME the responsibility to handle all international matters, including reviewing international agreements between the AEM and international entities. Moreover, the National Space Activities Program 2011-2015 signals the AEM's commitment to collaborate with federal agencies on matters related to national security and the preservation of Mexico's sovereignty on space-related issues. The AEM's National Space Program states that the General Director shall coordinate with the administrative units of the AEM in negotiating international instruments and preserving the sovereignty of the Mexican State. See Agencia Espacial Mexicana, *Programa Nacional de Actividades Espacial 2011-2015 [National Program of Space Activities 2011-2015]* [hereinafter AEM National Space Program] (México, D.F.: Secretaría de Comunicaciones y Transportes, Feb. 1, 2012), § 4.2.1, available at http://www.gob.mx/cms/uploads/attachment/file/73432/PNAE_2011-2015.pdf.

⁶⁶ AEM Organic Statute, art. 38(V). Compare the role of the AEM's Director of Legal Affairs with the role of the General Counsel and Center Chief Counsel in the drafting, negotiating and conclusion of NASA agreements under the National Aeronautics and Space Act, 51 U.S.C. § 20101 et seq. (the "Space Act"). NASA Policy Directive 1050.11, "Authority to Enter Into Space Act Agreements," (effective Dec. 23, 2008), available at http://nodis3.gsfc.nasa.gov/npg_img/N_PD_1050_001I_/N_PD_1050_001I__main.pdf. NPD 1050.11.

⁶⁷ Agencia Espacial Mexicana, *Manual de Organización de la Agencia Espaciales Mexicana* [Organization Manual of the Mexican Space Agency] [hereinafter AEM Manual] (México, D.F.: Secretaría de Comunicaciones y Transportes, Dec. 5, 2013), § 3.7, available at http://www.gob.mx/cms/uploads/attachment/file/73136/Manual_de_Organizacion.pdf. In 2013, the AEM's Organization Manual (Manual de Organización de la AEM, "AEM Manual") laid out the CGAISME's organization and responsibilities of different directors. The Office of International Affairs is also responsible for updating amendments to the treaties and international agreements in

The Mexican Foreign Ministry is responsible for Mexico's relationships with other nations. Mexico is one of the United States' closest and most valued partners, in part because of the critical work that the Mexican Foreign Ministry and the US Department of State do together.⁶⁸ And the US – Mexican partnership relationship with respect to space cooperation continues to grow.

Mexico and the US have a number of cooperative space agreements. The two states have several agreements regarding use of spectrum for satellite communications services and an agreement on scientific and technical cooperation for mapping and earth science. NASA (NOAA and USGS) and AEM cooperate in the CEOS.⁶⁹ NASA and AEM are both members of the ISEB.⁷⁰ NASA and AEM have an International Internship Program bilateral agreement.⁷¹ Moreover, NASA and AEM cooperate in various multilateral space programs together.⁷²

Mexico is a Member of the United Nations Committee on the Peaceful Uses of Outer Space (COPUOS) and an active participant in the COPUOS Legal Subcommittee (LSC).

Saudi Arabia

In the 1990s, King Fahad bin Abdulaziz transformed Saudi Arabia's Constitution to expand the scope of traditional and democratic values. On March 1, 1992, he promulgated three enactments under Royal Decrees Nos. A/90 – 92.⁷³ The changes affirmed the government's adherence to three

order to maintain current relevant data in order to protect the commitments concluded by the AEM. See AEM Manual, p. 13-17. Similarly, NASA's OGC is tasked with providing "legal representation for NASA in all Agency negotiations, including those involving foreign governmental or nongovernmental participation and formal regulatory processes." NASA Policy Directive 1000.E, "NASA Organization and Administration," (effective April 15, 2015), *available at* http://nodis3.gsfc.nasa.gov/npg_img/N_PD_1000_003E/N_PD_1000_003E_.pdf. In addition, the Office of International and Interagency Relations (OIIR) is responsible for coordinating with OGC to ensure that all international cooperation is consistent with relevant law and all international cooperation is consistent with Administration policy. NASA Policy Directive 1360.2B, "Initiation and Development of International Cooperation in Space and Aeronautics Programs," (effective April 16, 1999), *available at* http://nodis3.gsfc.nasa.gov/npg_img/N_PD_1360_002B/N_PD_1360_002B_main.pdf.

68 <https://www.whitehouse.gov/the-press-office/2016/07/22/fact-sheet-united-states-mexico-relations>.

69 See section 2 above.

70 See section 2 above.

71 See section 2 above.

72 See section 2 above.

73 Abdullah F. Ansary, *A Brief Overview of the Saudi Arabian Legal System*, (hereinafter "Overview of the Saudi Arabian Legal System"), Houser Global Law

fundamental sources for Saudi Arabia's Constitution: (1) The Basic Law of Governance (hereinafter referred to as the Basic Law); (2) The Shura (Consultative) Council Law; and (3) Regional Law.⁷⁴

The Basic Law is the most important of the three fundamental constitutional enactments promulgated in 1992 in the Kingdom of Saudi Arabia.⁷⁵ Article 7 of the Basic Law confirms the Shari'ah⁷⁶ (Islamic religious law) as the bedrock of the Kingdom of Saudi Arabia.⁷⁷ Generally, Shari'ah specifies that the Saudi government derives its authority from the Qur'an and the Sunnah and forms the basis of Saudi Arabia's legal system.⁷⁸

The Basic Law designates the King of Saudi Arabia as the highest authority over all the State authorities, including the legislative authority. Under the current Saudi government organization, the King is free to accept or reject proposals from either of those two legislative bodies (the Council of Ministers and the Shura Council) that participate in the legislative process.⁷⁹ The King reviews and holds the ultimate decision-making power on drafting and enactment of international treaties, agreements and related regulations and concessions.⁸⁰

In recent years, the Saudi government has taken steps to facilitate and encourage foreign investment in its developing industries. Non-Saudi persons and foreigners must attain approval from the Ministry of Industry and Electricity and register with the Ministry of Commerce.⁸¹ In the future, it is possible that Saudi Arabia will also encourage investment in its developing space industry with foreign partners.

School Program, New York University Law Global (accessed Jan. 6, 2017), *available at* http://www.nyulawglobal.org/globalex/Saudi_Arabia1.html.

74 Overview of the Saudi Arabian Legal System.

75 Ministry of Foreign Affairs of Saudi Arabia, The Basic Law of Governance, (accessed Jan. 6, 2017), *available at* <http://www.mofa.gov.sa/sites/mofaen/ServicesAndInformation/aboutKingDom/SaudiGovernment/Pages/BasicSystemOfGovernance35297.aspx>.

76 Overview of the Saudi Arabian Legal System. Shari'a law emphasizes that the State's role is to protect the principles of Islam and responsibilities of the State and the relationship between the ruler and the ruled based on brotherhood, consultation, friendship and cooperation.

77 Overview of the Saudi Arabian Legal System.

78 *See* Overview of the Saudi Arabian Legal System. Basic Law It specifically states that the Qur'an and the Sunnah of the Prophet Muhammad represent the Kingdom's Constitution.

79 Overview of the Saudi Arabian Legal System.

80 No statutory laws or regulations, treaties, international agreements or concessions may be enacted, concluded or amended unless they are approved by Royal Decrees after having been studied, usually by both the Council of Ministers and the Shura Council. *See* Overview of the Saudi Arabian Legal System.

81 John H. Donboli and Farnaz Kashefi, *Doing Business in the Middle East: A Primer for U.S. Companies*, 38 CORNELL INT'L L.J. 413, 427-28, 433-34 (2005).

Over the years, the USG and the Government of the Kingdom of Saudi Arabia have entered into cooperative agreements. In 2002, the USG and the Saudi Government entered into an agreement regarding cooperation on the Global Learning and Observations to Benefit the Environment (GLOBE) Program.⁸² The pertinent Ministry on the Saudi side is the Ministry of Education. This agreement continues to be in force.

In addition, NASA and the relevant Saudi Ministry or other entities have entered into cooperative agreements. In 2010, NASA and the King Abdulaziz City for Science and Technology (KACST) entered into an agreement for Cooperation in the Aerosol Robotic Network (AERONET), which remains in force.⁸³ The agreement recognizes the growing importance of collaboration on science and technology matters, as also noted in the Agreement between the United States and the Government of the Kingdom of Saudi Arabia on Science and Technology Cooperation.⁸⁴ Also in 2010, NASA and KACST entered into an agreement regarding Cooperation in the field of Space Geodesy, which remains in force.⁸⁵

In the most advanced cooperation between NASA and KACST to date, in 2013 NASA and KACST entered into an agreement concerning the Ultra-Violet Light Emitting Diodes (UV-LED) Mission.⁸⁶ This agreement remains in force through 2018. Under this agreement, KACST is developing a SmallSat bus, procuring launch services as a secondary payload aboard a Dnepr launch vehicle to be launched from the Baikonur launch facility in Kazakhstan, and conduct mission operations through KACST's mission operations center located in Riyadh, Saudi Arabia. NASA is developing the UV-LED technology instrument at NASA's Ames Research Center (Ames).

In 1994, NASA's Mission to Planet Earth Division, Office of Policy Coordination and International Relations and the Directorate of Mineral Resources, Ministry of Petroleum and Minerals of Saudi Arabia concluded an agreement regarding a scientific investigation regarding use of radar remote sensing studies of the Earth employing the US Shuttle Imaging Radar-C (SIR-C

82 Copy of this agreement is on file with the author.

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84 Copy of this agreement is on file with the author.

85 Copy of this agreement is on file with the author. This agreement also recognizes the growing importance of collaboration on science and technology matters, as also noted in the Agreement between the United States and the Government of the Kingdom of Saudi Arabia on Science and Technology Cooperation. *See* Section 2 above regarding NASA's multilateral cooperation on space geodesy.

86 Copy of this agreement is on file with the author. This agreement also recognizes the growing importance of collaboration on science and technology matters, as also noted in the Agreement between the United States and the Government of the Kingdom of Saudi Arabia on Science and Technology Cooperation. *See* Section 2 above regarding NASA's multilateral cooperation on space geodesy.

Experiment). The agreement established the relationship between a professor at the King Fahd University of Petroleum and several other people from the University, NASA, and NASA/ Jet Propulsion Laboratory (JPL) scientists involved in the scientific investigation.⁸⁷ This agreement has expired.

Saudi Arabia is a member of the Committee on the Peaceful Uses of Outer Space (COPUOS) and, *inter alia*, plays an active role in COPOUS's Legal Subcommittee (LSC).

South Africa

South Africa has been an active participant in the development and use of space technology over the last thirty years. In 2008, the South African National Space Agency (SANSA) was established, *inter alia*, to foster international cooperation in space-related activities.⁸⁸

South Africa's space-based systems provide a variety of domestic services and applications, such as communications, navigation, meteorology, natural resources management, environmental monitoring, and disaster management.⁸⁹ In this vein, South Africa's 2008 National Space Policy focuses on contributing to the country's economic growth and overall social development. According to the National Space Policy, greater inter-governmental cooperation among agencies promotes the development of a domestic space industry and overarching objectives in economic growth and social development.

Under the Space Affairs Act, the Minister of the Department of Trade and Industry (DTI) is the head of the country's space agency and is responsible for determining the general policy on space affairs.⁹⁰ The Space Agency Act states that the SANSA is to act through a Board consisting of a Chairperson appointed by the DTI Minister and up to fifteen Board members.⁹¹ The DTI is the overall central agency overseeing SANSA and its objectives.

87 Copy of this agreement is on file with the author.

88 South African National Space Agency Act (No. 36 of 2008), (hereinafter Space Agency Act), Republic of South Africa, *Government Gazette* (Dec. 15, 2008), Sec. 4(e), available at <http://www.unoosa.org/documents/pdf/spacelaw/national/safrica/Act36-2008.pdf>.

89 Department of Trade and Industry, National Space Policy (2008), Republic of South Africa, "Introduction," (hereinafter National Space Policy), available at <http://www.unoosa.org/documents/pdf/spacelaw/national/safrica/nat-policyE.pdf>.

90 The Space Affairs Act (No. 84 of 1993), Republic of South Africa, available at http://www.unoosa.org/oosa/en/ourwork/spacelaw/nationalspacelaw/south_africa/space_affairs_act_1993E.html. The DTI Minister may determine the policy after consultation with the South African Council for Space Affairs, and with the concurrence of other Ministers charged with the administration of any law, which in the opinion of the Minister, relates to space affairs, including the Minister of Finance. See National Space Policy.

91 According to the Space Agency Act, the Board shall have no less than ten Board members, but no more than fifteen. See Space Agency Act, Sec. 6(2).

Furthermore, the National Space Programme resides under the Department of Science and Technology (DST). In addition, the Department of Foreign Affairs' role is to facilitate international cooperative space related activities, in conjunction with the other departments.

Negotiation of all international agreements related to space activities are led by the DTI under the direction of the Minister.⁹² Furthermore, the Space Agency Act allows SANSA to "enter into an agreement with any person, government or administration on the terms and conditions agreed upon by the Agency and that person, government or administration."⁹³ International cooperation in the areas of space science and exploration and Earth observation and greater regional cooperation among African states are outlined in the National Space Policy.⁹⁴

South Africa is a Member of the United Nations' Committee on the Peaceful Uses of Outer Space (COPUOS) and an active participant in COPUOS's Legal Subcommittee (LSC).

5. Conclusion

In the almost 60 years since NASA was created by statute, NASA international cooperation has grown and become more sophisticated. Understanding the differences and similarities between legal systems that affect international civil space cooperation will help promote greater cooperation in the future.

92 National Space Policy, "Enhancing International Cooperation."

93 Space Agency Act, Sec. 5(2)(a).

94 National Space Policy, "Enhancing International Cooperation."