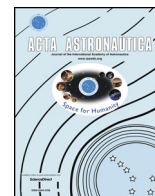




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## Exploring opportunities and challenges for establishing a South American Space Agency

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### ABSTRACT

The idea of establishing a South American Space Agency (SASA) is not new. There have been many discussions about this topic for a couple of decades, including an agreement by the Union of South American Nations to create such a space agency. Roughly 10 years ago, Argentina was the first to propose this collaboration with a military orientation. As the ideas progressed, Brazil was proposed to host its headquarters. However, not much support from the South American region has been given, either financially or logistically. To this day, a South American Space Agency or a similar concept has not yet been established in the region. The Space Generation Advisory Council (SGAC) hosted the first South American Space Generation Workshop in Argentina in 2015, where one of the working groups was tasked to further investigate the feasibility, advantages and challenges of implementing SASA. This paper presents an extension of the main findings from this working group where South American students and young professionals study and present a rationale in favor of SASA, outlining possible solutions and a structure that could be taken into account for its implementation. This paper pays particular attention to the question: Is it possible for countries in South America to establish the kind of cooperation necessary to stimulate the development and application of capabilities in the space sector, which would then enable undertaking missions far beyond the scope of what any single country in South America could do on its own? The existence of SASA would allow access to a common representative agency, which would lower costs, be accessible to all participating countries, and allow engagement with other emerging and established space agencies around the world.

### 1. Introduction

Since the cold war, access to space has been gaining more and more importance, having ceased to serve only as a means of geopolitical intimidation among nations, and becoming mainly an effective tool in providing strategic data to governments and the general population. In spite of many applications related to military and defense activities, such as border control, radar missions, troop displacements, and weapon control, most of the countries interested in space activities have been investing their money in civil missions, focusing on obtaining public data such as urban and crops mapping, telecommunication, earth observation, data collection systems, and positioning systems.

The challenge is that even though the price of space technologies is getting cheaper, it is still very expensive and even unaffordable for the majority of developing countries to own those technologies. However, developing countries are able to have access to space services by acquiring space data, services or even entire satellites and ground-segment systems from the developed countries. This allows developing countries to control their own satellite missions. In South America (SA), this is the case in countries like Venezuela, Bolivia, Chile and Peru. There are also other countries in SA where space activities are more developed as in Argentina and Brazil. These countries also acquire space services, equipment and entire satellites abroad, but they have their own development, especially in terms of ground segment and

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**Acronyms/abbreviations**

ABAE	<i>Agencia Bolivariana de Actividades Espaciales</i>	ISS	<i>International Space Station</i>
ABE	<i>Agencia Boliviana Espacial</i>	ITA	<i>Instituto Tecnológico da Aeronáutica</i>
ACS	<i>Alcantara Cyclone Space</i>	LEO	<i>Low Earth Orbit</i>
AEB	<i>Agência Espacial Brasileira</i>	MECB	<i>Missão Espacial Completa Brasileira</i>
AEP	<i>Agencia Espacial del Paraguay</i>	MTCR	<i>Missile Technology Control Regime</i>
ANTEL	<i>Administración Nacional de Telecomunicaciones</i>	NASA	<i>National Astronautics and Space Agency</i>
ARSAT	<i>Empresa Argentina de Soluciones Satelitales</i>	PEB	<i>Programa Espacial Brasileiro</i>
AOCS	<i>Attitude and Orbit Control Subsystem</i>	PMM	<i>Plataforma Multimissão</i>
CATE	<i>Congreso Argentino de Tecnología Espacial</i>	PNAE	<i>Programa Nacional de Atividades Espaciais</i>
CBERS	<i>China-Brazil Earth Resources Satellite</i>	PPP	<i>Purchasing Power Parity</i>
CCE	<i>Comisión Colombiana del Espacio</i>	SASA	<i>South American Space Agency; SA: South America/South American</i>
CLA	<i>Centro de Lançamento de Alcântara</i>	SABIAMAR	<i>Satélite Argentino Brasileiro para Informação del Mar</i>
CLBI	<i>Centro de Lançamento da Barreira do Inferno</i>	SA-SGW	<i>South American Space Generation Workshop</i>
CLISREN	<i>Centro de Levantamientos Integrados de Recursos Naturales por Sensores Remotos</i>	SA-SGAC	<i>Satélite de Aplicaciones Científicas</i>
CNIE	<i>Comisión Nacional de Investigaciones Espaciales</i>	SAOCOM	<i>Satélite Argentino de Observación Con Microondas</i>
CNOIS	<i>Centro Nacional de Operaciones de Imágenes Satelitales</i>	SARA	<i>Satélite de Reentrada Atmosférica</i>
CONAE	<i>Comisión Nacional de Actividades Espaciales</i>	SCA	<i>Space Conference of the Americas</i>
CONIDA	<i>Comisión Nacional de Investigación y Desarrollo Aeroespacial</i>	SGAC	<i>Space Generation Advisory Council</i>
EADS	<i>European Aeronautic Defence and Space</i>	SGDC	<i>Satélite Geoestacionário de Defesa e Comunicações Estratégicas</i>
ESA	<i>European Space Agency</i>	SGW	<i>Space Generation Workshop</i>
EXA	<i>Agencia Espacial Civil Ecuatoriana</i>	SME	<i>Subject Matter Expert</i>
FAE	<i>Fuerzas Armadas Ecuatorianas</i>	STEM	<i>Science, Technology, Engineering, and Math</i>
FASa	<i>Fuerza Aérea de Chile Satellite</i>	UNASUR	<i>Unión de Naciones Suramericanas</i>
FBM	<i>French-Brazilian Microsatellite</i>	UN	<i>United Nations</i>
GOCNAE	<i>Grupo de Organização da Comissão Nacional de Atividades Espaciais</i>	UNASUR	<i>Union of South American Nations</i>
GDP	<i>Gross Domestic Product</i>	UNCOPUOS	<i>United Nations Committee on the Peaceful Uses of Outer Space</i>
IGP	<i>Instituto Geofísico del Perú</i>	UNISPACE	<i>United Nations Conference on the Exploration and Peaceful Uses of Outer Space</i>
IMF	<i>International Monetary Fund</i>	USA	<i>United States of America</i>
INPE	<i>Instituto Nacional de Pesquisas Espaciais</i>	VLS	<i>Veículo Lançador de Satélites</i>
		VSB	<i>Veículo de Sondagem Booster</i>

satellites. Currently, both countries have completed integration and testing facilities to develop their own satellites. Regarding launch vehicles, these countries have already developed their own sounding rockets, but are still unable to put an object into Earth orbit on their own.

Taking into account these highly heterogeneous characteristics, in terms of the development of space technologies in SA countries, any proposal for creating a South American Space Agency (SASA), should consider all of the countries in the region. This would necessitate an organization that manages an entire space mission, including ground, space, and transport segments, and eventually launch vehicles.

The purpose of this paper is to provide a broad view of the considerations needed for the development of SASA. We explore the benefits, challenges, and possible starting projects the agency would work on; and provide some recommendations to address certain areas including political, legal, financial, and cultural aspects specific to the South American region.

## 2. Benefits of establishing a South American Space Agency

Space activities in SA are still modest as compared to other regions. SASA could serve in some extent as an umbrella for the region's space programs against political and financial instability. Once a project or task has been committed to by a government(s), the project administration then would transfer to SASA; thus allowing a project or mission to be fostered and managed with less overhead and more independence from changing political agendas. Although the administration of such project would be within the responsibility of SASA, a complete interdependency in terms of major decision making regarding the project is

unlikely. A project or agency council composed of governmental representatives would be established for major commitments. The representative of each country would be in charge of allocating the contribution of its country into a certain project. The council as a whole would be in charge of deciding whether a certain project continues or not, depending on its progress. An example of such a body is the ESA council at ministerial level [1]. This is further explained in the section of legal and financial aspects when establishing SASA.

An added bonus to the collaborations worked through SASA is that they will provide a higher ground to its members during international negotiations. These tend to be highly technical and security sensitive, which can be expanded to other areas and used as a basis for national or inter-regional negotiations.

Space projects are complex and involve several areas. Having a unified frame would allow countries to join forces and gather resources to promote space technology and research in academia and industry in the region. These activities will lead the agency to foster research and development in several areas of the regional industry, while procuring a legal framework for space activities to be developed in the region. As a specific example, SASA could provide member States with better negotiation capabilities when searching for launch services; and in the long run, a regional launcher could address the region's needs regarding projects and the region's predominant south-north geography. A heavy launcher is not recommended as a starting project for the agency; however, a joint effort between Argentina's recent projects with liquid fueled rockets, Brazil's successful VS-30 sounding rockets, and the lessons learned from the Launch Vehicle of Satellites (VLS for its acronyms in Portuguese) solid fuel powered program, could lead the way towards a regional launcher, which would enable participating countries to

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