Satellite Promises: An Open-Source Investigation and Footprint Analysis of SGDC-1's Quest in Delivering Broadband to Brazil's Public Rural Schools

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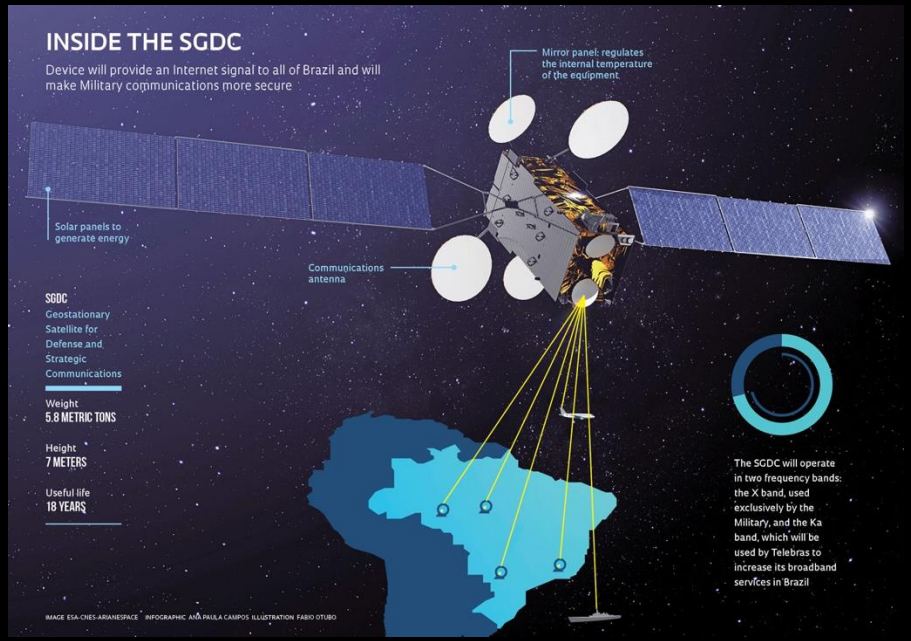
SGDC-1:

"A domestic broadband conector"

Satélite Geoestacionário de Defesa e Comunicações Estratégicas



Project approved in 2011. Launched on May 17, 2017

Multi-spot beam high-throughput (HTS) satellite covering 100% of Brazil's territory

Initially planned as part of a constellation composed of three other communication satellites

2,8 billion Brazilian Reais (70 million USD), more expensive than other satellites of this kind

Manufactured as part of a technology program between Brazil (Visiona) and France (Thales Alenia Space)

Operated by Telebras, a state company with on-ground segments provided by Viasat.

Civil-military function of the satellite: 70% for civil communication and 30% for military communication.

First government-owned communication satellite that is 100% operated by Brazilians for Brazilians.

Research Questions

1. How do digital inclusion, rural school connectivity, and telecom policies intersect with in the context of SGDC-1?
2. How does the Brazilian state-funded bodies rely on visual media strategies to portray the satellite as a domestic broadband connector/savior?
3. What underlying challenges or contradictions might limit the state agenda for the satellite to achieve its goal of digital inclusion (especially in the context of rural schools)?

Framing Satellites within the Communication and Media Studies Literature

Satellites as:

...as imaginary, post-war research objects to allow a world-wide communication system via radio waves **(Clark, 1945)**

... as representatives of “global military power” and “big science during the Cold War **(Schowch , 2009)**

… as levers for transforming the global village into a global theater due to their various performances and surveillance nature **(McLuhan, 1970)**

... as enablers of trade routes in the sky that require strategic orbital allocations and intergovernmental regulation **(Price, 2002)**

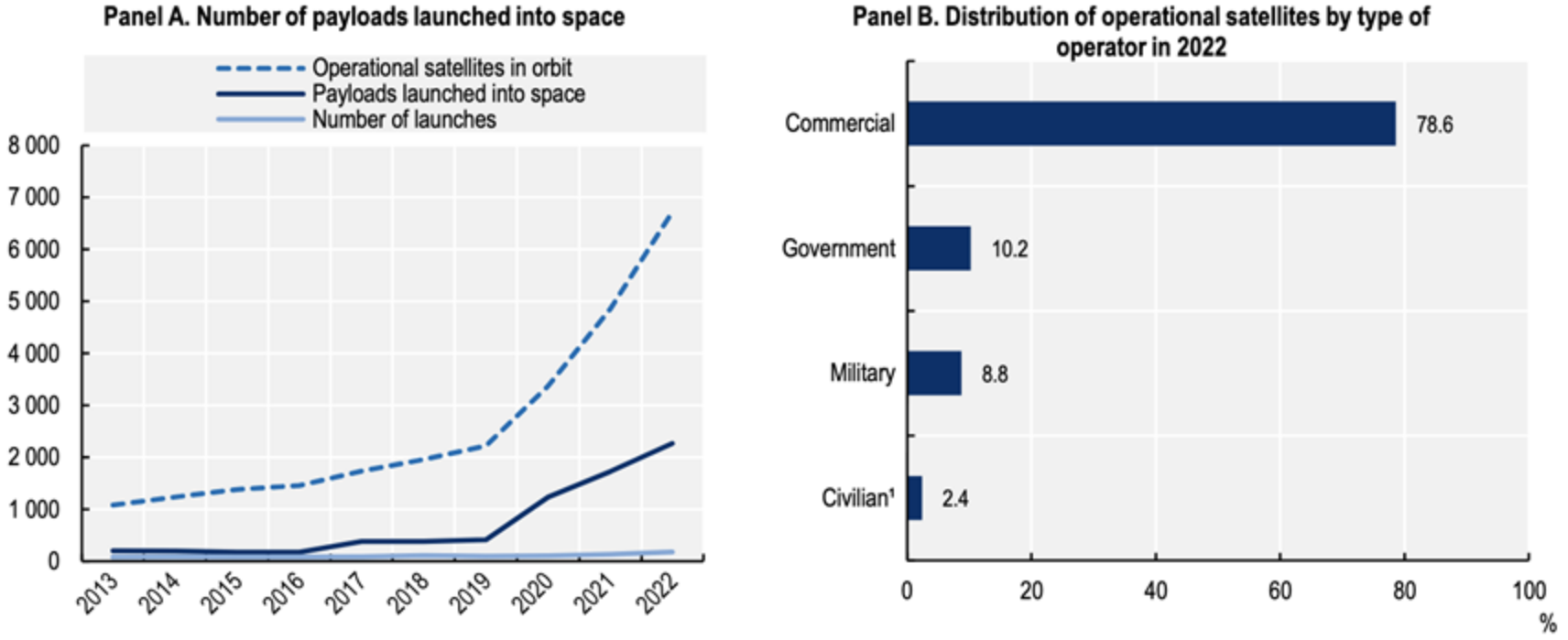
... as developers of a ‘global public sphere’ that lays cosmopolitan foundations of citizenship **(Volkmer, 2003)**

... as media apparatuses in outer space with direct connection “cosmo-biopolitical projections” and accumulation of capital **(Damjanov, 2015)**

….as obscure objects of media studies (**Parks, 2005; 2016)**

…“the most earthly form of space technology” **(Evans & Lundgren, 2023)**

An Increasingly Crowded Orbit



Source: OECD (2023), *The Space Economy in Figures: Responding to Global Challenges*, based on data from the US Space Force and the Union of Concerned Scientists Satellite Database.

F.A.A. Temporarily Halts Launches of Musk's Starship After Explosion

The agency launched an investigation into the "space vehicle mishap" on Thursday night that forced commercial flights to divert and caused debris to rain toward Caribbean islands.

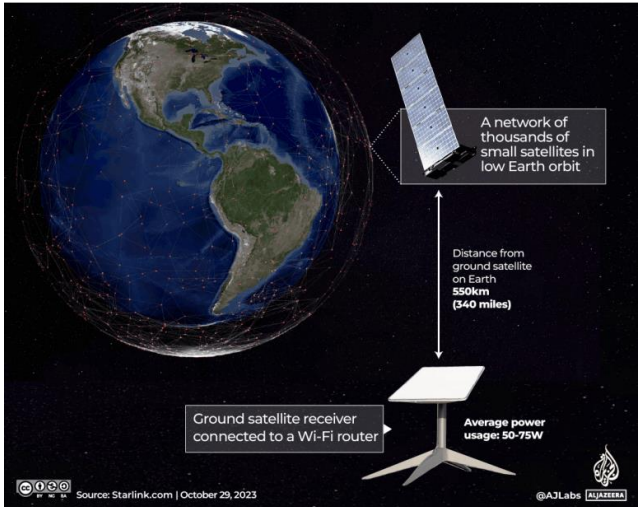
INVESTING IN SPACE

FCC approves SpaceX to deploy up to 1 million small antennas for Starlink internet network

TECHNOLOGY

How does Starlink work?

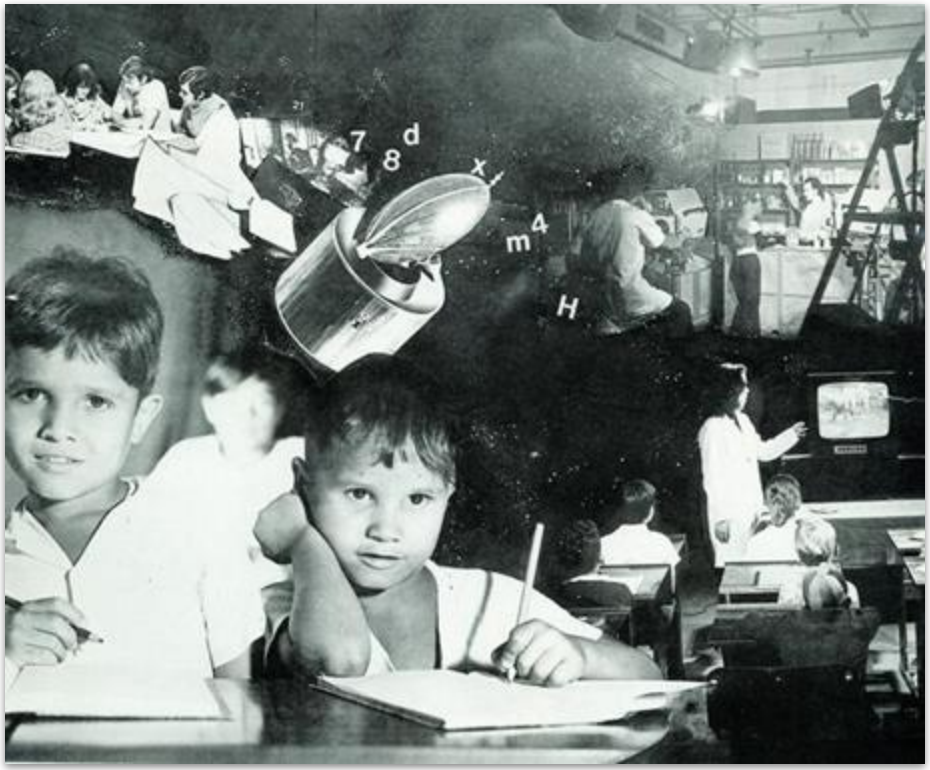
Starlink, developed by SpaceX, is the world's largest satellite constellation that delivers high-speed internet to remote regions through small satellite receivers.



Critical analysis of satellites in the Context of the Global South

- The early efforts to develop a regional Andean satellite **(Ospina, 1988)**;
- The burgeoning of a new media ecology with the development of satellites in Asia **(Paul & Wang, 1995)**;
- The satellite broadcasting and television news exchange system in Africa **(Holmes, 1996)**;
- The emergence of satellite TV networks and “offshore democracies” across the Arabs-peaking world **(Sakr, 2001)**;
- The use of radio and satellite television stations for ideology spread by extremists groups such as Hezbollah in the Middle East **(Byman, 2008)**;
- Venesat-1 and RascomQAF/1R as Counter-Hegemonic Satellites **(Parks, 2012)**;
- Building technological capability within satellite programs in developing countries **(Wood, 2012)**;
- The ongoing industry efforts to bring satellite Internet connectivity to the most remote regions of Africa, Latin,America and Asia via the deployment of satellites in LEO orbit **(Graydon & Parks, 2019)**.

SACI Project (1960-70s)



A 1974 collage depicts schoolchildren and classrooms along with a sketch of the NASA ATS-6 satellite used in the SACI project, with the original headline stating, “ATS-6 in Orbit: Via Satellite SACI will be in the Air.” Source: INPE.

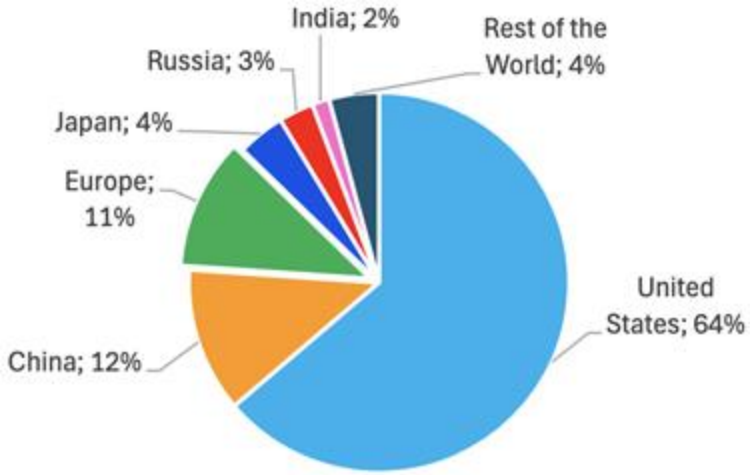
Taping of a primary school class for satellite transmission - SACI Project. Source: INPE.

Relevance for interdisciplinary research, policy, and the civil society

"Satellite telecommunications have potential as a source of information for rural and remote areas, **and may help countries to "leapfrog" stages in development**. They can contribute to sustainable development by giving people access to information and helping members of the public to participate in decision-making, or **more generally by improving education and health services and promoting favourable conditions for environmental protection."** **(UN Office for Outer Space Affairs, 2005)**

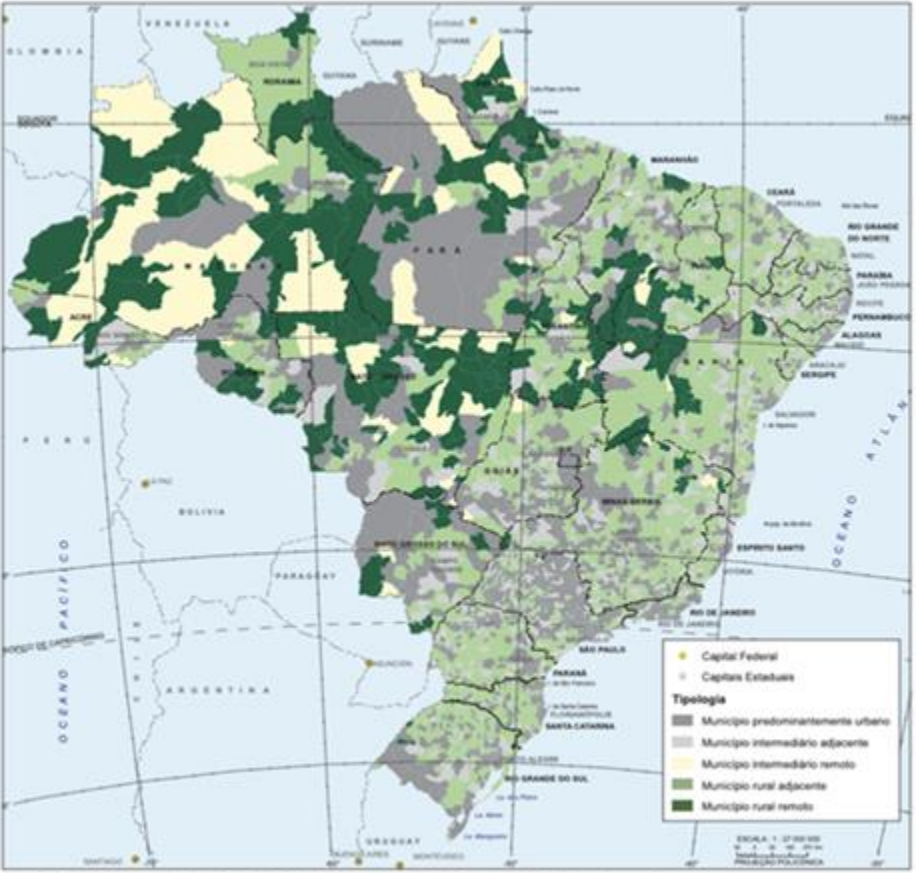
"National governments are influenced by **many non-technical factors** when they consider space policy decision, including factors such as **geopolitical relationships, regional status, military postures, and national pride."** **(Wood, 2011)**

"Each satellite is a symptom of a complex institutional history and imperceptible signal traffic. While imagining and specifying the contours and vectors of this traffic, it is also important to explore in greater detail the **financial, temporal, regulatory, and intermedial dimensions** of the satellite economy and to recognize that this part of the culture industry synthesizes and alternates between scientific, military, entertainment, and educational modalities." **(Parks, 2016)**

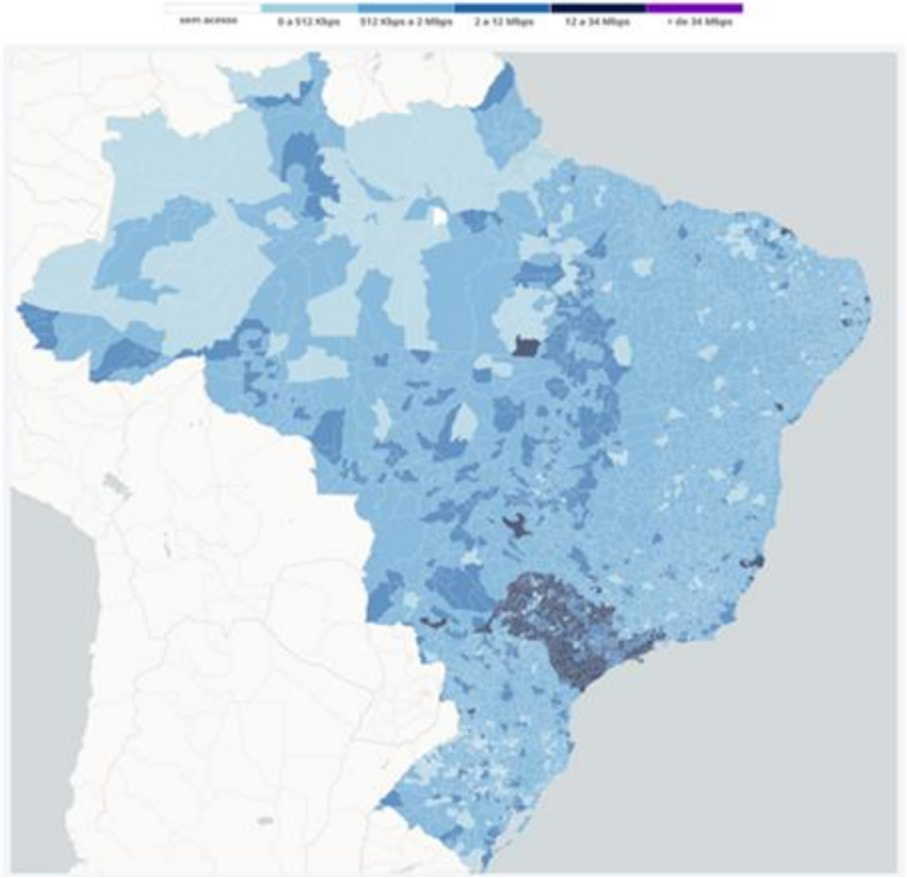


Distribution of institutional space budgets in 2023 (civil and defence), European Space Agency (2024).

“Dark Spots of Information”:
Digital Divides, Urban-Rural Public School Paradigms, and Telecom Infrastructure Policies



Fonte: IBGE, DGC/Coordenação de Geografia, IBGE, DGC/Coordenação de Cartografia, IBGE, Censo Demográfico 2010



Rural-Urban School Paradigms in Brazil

According to the 2018 census, there are **181,939** schools throughout Brazil––including private, public, urban, and rural schools

56,954 rural schools. These institutions enroll nearly 5,5 million students in basic education--more than the population of Slovenia and Mongolia combined. **(World Bank, 2022)**

Dramatic improvement in school infrastructure since 1990s **(IPEA, 2007)**

Access to Media Technologies per the 2020 census:

92% of public schools in urban areas of Brazil had at least one TV set versus 57% (32.619 schools) in rural areas.

81% of public urban schools had at least one DVD player versus 51% in rural public schools

Rural schools as "dark spots of information" (MCTIC, 2020)

PNBL and GESAC policies of telecommunication infrastructure for the “unconnected”

GESAC (2002 - Present)

Electronic Government – Citizen Assistance Service (*Governo Eletrônico – Serviço de Atendimento ao Cidadão*

Mission of providing free high-speed Internet connectivity to remote regions of Brazil.

Most extensive digital inclusion program on a federal level

Toward a public Internet: more than 11,000 connectivity points throughout Brazil today, GESAC is the leading government program benefiting from the SGDC.

PNBL (2010-2014)

National Broadband Plan (*Programa Nacional de Banda Larga – PNBL*)

Rooted in three main pillars: price, coverage, and speed

“The widespread use of broadband should be seen as an instrument to enforce the rights of citizens in the digital age.”

Establishment of a National Network of Optical-fiber cables (Rede Nacional), a federal corporate network in the capitals. The Network operates under the auspices of Telebrás and aimed to reach 4,278 municipalities by 2014. However, the targeted goal was never accomplished.

Fig. Image of a satellite dish installed in a school in the city of Monte Alegre, Para, in the northern region of Brazil, and an in-site router installed as part of GESAC connecting a notebook to the Internet. Source: Prefeitura Municipal de Monte Alegre, 2019.

DECRETO Nº 7.769, DE 28 DE JUNHO DE 2012

Dispõe sobre a gestão do planejamento, da construção e do lançamento do Satélite Geoestacionário de Defesa e Comunicações Estratégicas - SGDC.

A PRESIDENTA DA REPÚBLICA , no uso da atribuição que lhe confere o art. 84, **caput,** inciso VI, alínea "a", da Constituição ,

DECRETA:

Art. 1º A gestão do planejamento, do monitoramento, da construção, do lançamento do Satélite Geoestacionário de Defesa e Comunicações Estratégicas - SGDC, e da implantação da sua infraestrutura de solo será executada nos termos deste Decreto.

~~Parágrafo único. O SGDC deverá ser implantado até o dia 31 de dezembro de 2014.~~
~~Parágrafo único. O SGDC deverá ser implantado até o dia 31 de dezembro de 2016.~~ ~~(Redação dada pelo Decreto nº 8.153, de 2013)~~

Parágrafo único. O SGDC deverá ser implantado até o dia 31 de dezembro de 2017. (Redação dada pelo Decreto nº 9.051, de 2017)

Art. 2º A gestão de que trata o art. 1º será realizada pelos seguintes órgãos:

I - Comitê Diretor do Projeto: órgão diretivo e instância decisória máxima do Projeto do SGDC; e

II - Grupo-Executivo: órgão técnico-consultivo e executor das diretrizes e decisões do Comitê Diretor do Projeto.

Art. 3º O Comitê Diretor do Projeto será constituído por um representante titular e um suplente de cada um dos seguintes órgãos:

I - Ministério das Comunicações;

II - Ministério da Defesa; e

III - Ministério da Ciência, Tecnologia e Inovação.

§ 1o Os representantes titulares e suplentes dos órgãos, preferencialmente ocupantes de cargo de Secretário de Ministério, serão designados por ato do Ministro de Estado das Comunicações, após indicação dos titulares dos órgãos.

Space-telecom Discourse via the Televisual: SGDC through High-Profile Media Events

High-profile media event #1

Discovery Channel: *Brasil Ciência* (2016)

MCTIC commissioned Discovery Brasil to produce a TV series called *Brasil Ciência*

Produced in partnership with a São Paulo-based film production company, Trator Filmes, Discovery Brasil broadcasted each 50-minute episode between December 12th and December 16th, 2016

Brasil Ciência's main goal was to portray "the Brazilian scientific research at the frontiers of global knowledge."

Relied on techniques found in expository documentaries Discovery, Inc. is known for

Building of National and Technological Capability

"This Project of the SGDC satellite is very important for the country of Brazil. Because, in fact, there are very few countries that have access to space and Brazil is one of them. And it is a several-steps strategy. It started many years ago with the first building of a space community in Brazil which went to work with different entities and especially there was in the past partnerships of Brazil with China, for instance, for some satellites. But these were partnerships. With the SGDC, Brazil is getting its own autonomy and sovereignty with access to space with having their own satellites. And it is only the first step, which means that the next steps will have SGDC-2 and so on. So, really, Brazil has a very strategic view of enhancement, access and control of space for the sovereignty of the country, which makes Brazil comes in force in relation to other countries that have their own autonomy of space."

Brasil Ciência: SGDC, Discovery Brasil (2016), DVD, TV, and YouTube.

National labor personification

Rural School Students

High-profile media event #2

Connecting the Unconnected via Videoconferecing

“(...) Firstly, I would like to thank God for this moment and on behalf of our team in the school we would like to thank you for bringing this program to us. With this Internet, we see it like a door that is opening to us. It will be a very important library that will help us guide our students on what to access the Internet and how to access it. Given that our school lacks pedagogical materials and it is located in a region of difficult access, we believe that broadband Internet will facilitate the lives of students, teachers and other members of the community.”


Go gle

SGDC as a *Space-Telecom Discursive Tool*

Government's tactics of exploring the televisual.

Brazilian state in framing the SGDC as a *space-telecom discursive tool*—a clear message that is orchestrated to the masses through a captivating and celebratory use of the televisual.

Language and propaganda are instruments of power **(Rutherford, 2000)**

Propaganda must create a total environment of persuasion, using all available media and leaving no gaps to be filled with opposing views." **(Soules, 2015)**

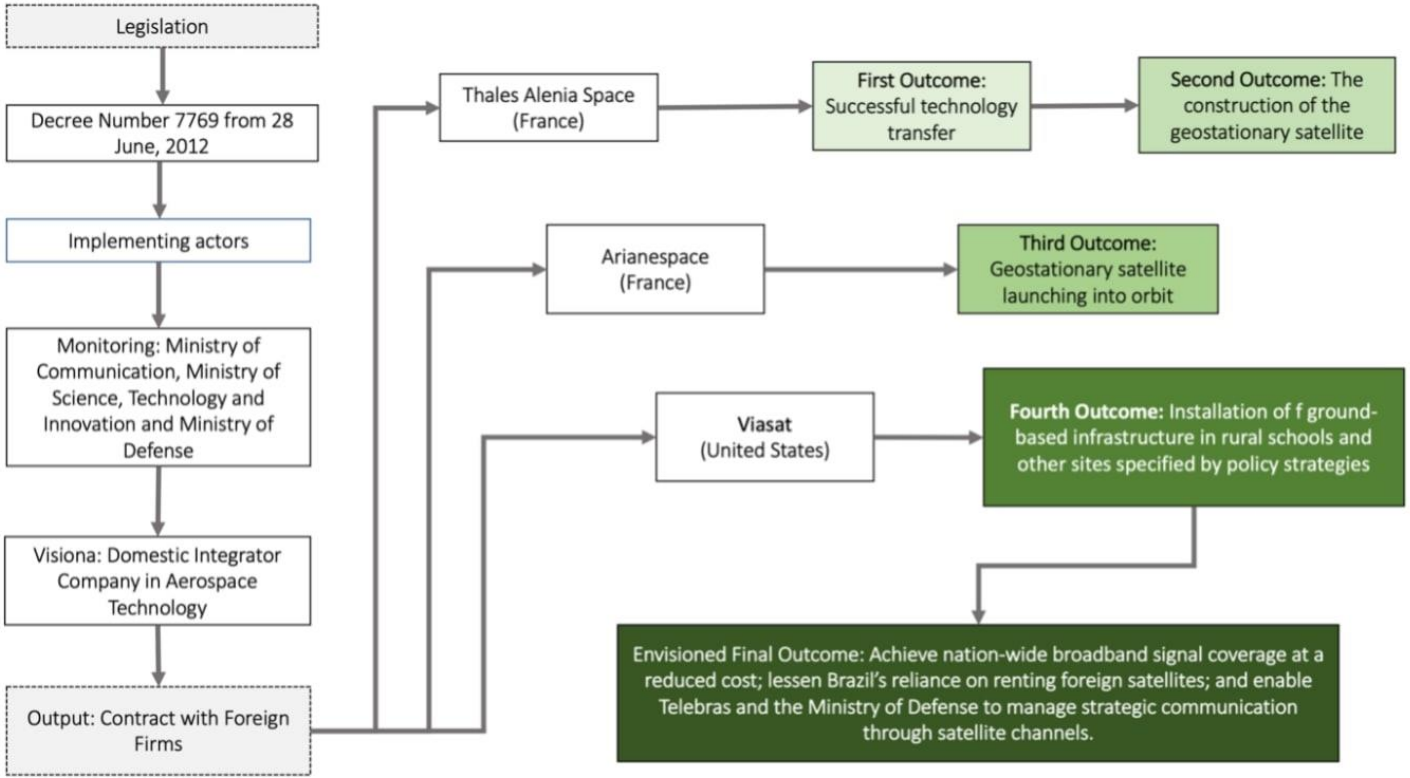
Development of "organized myths" **(Ellul, 1973).**

> *(...) Through the myth it creates, propaganda imposes a complete range of intuitive knowledge, susceptible of only one interpretation" "* **(Ellul, 1973).**

Mapping SGDC’1’s Footprints: School Connectivity Outcomes and Potential Shortcomings

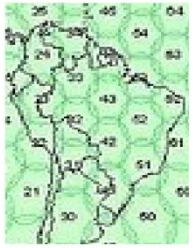
Aerial photos of satellite dishes installed at rural school facilities, utilizing Viasat infrastructure to support traffic for SGDc-1.
Source: Brazil’s Ministry of Communication.

SGDC-1 Governance



Organization chart of the SGDC-1's planning and operations. Adapted from Barcellos (2017)

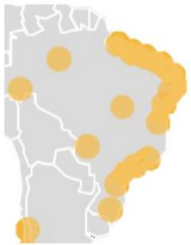
Hispasat
Amazonas-3



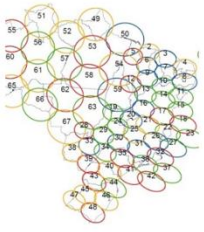
Inmarsat
I5-F2

Eutelsat
E65WA

StarOne
D1

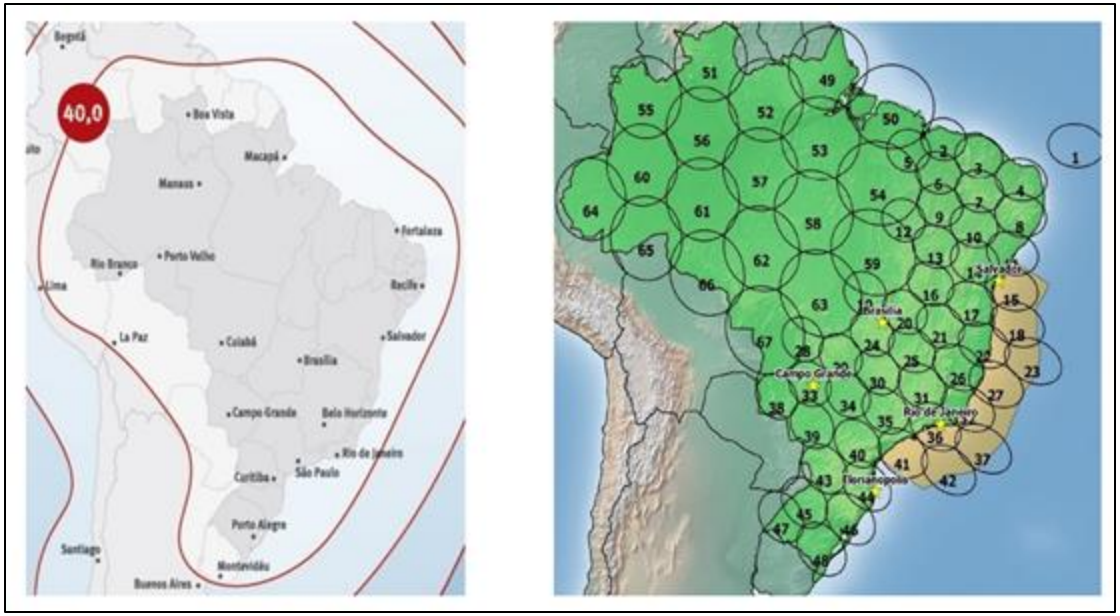


Hispasat
Amazonas-5

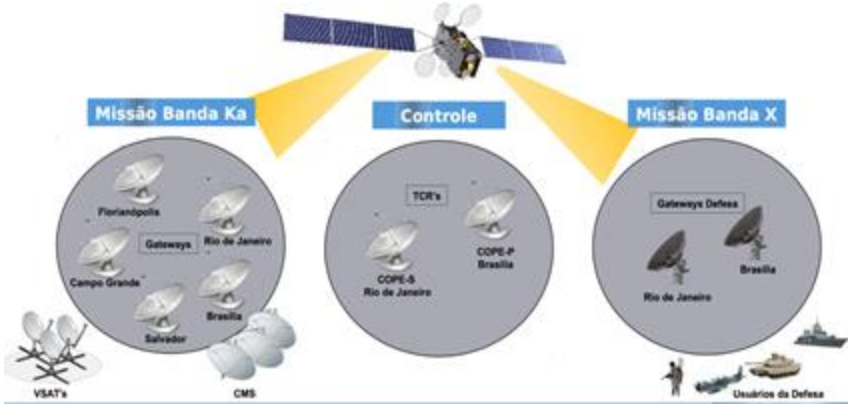


TELEBRAS
SGDC

Yahsat
Al-Yah3

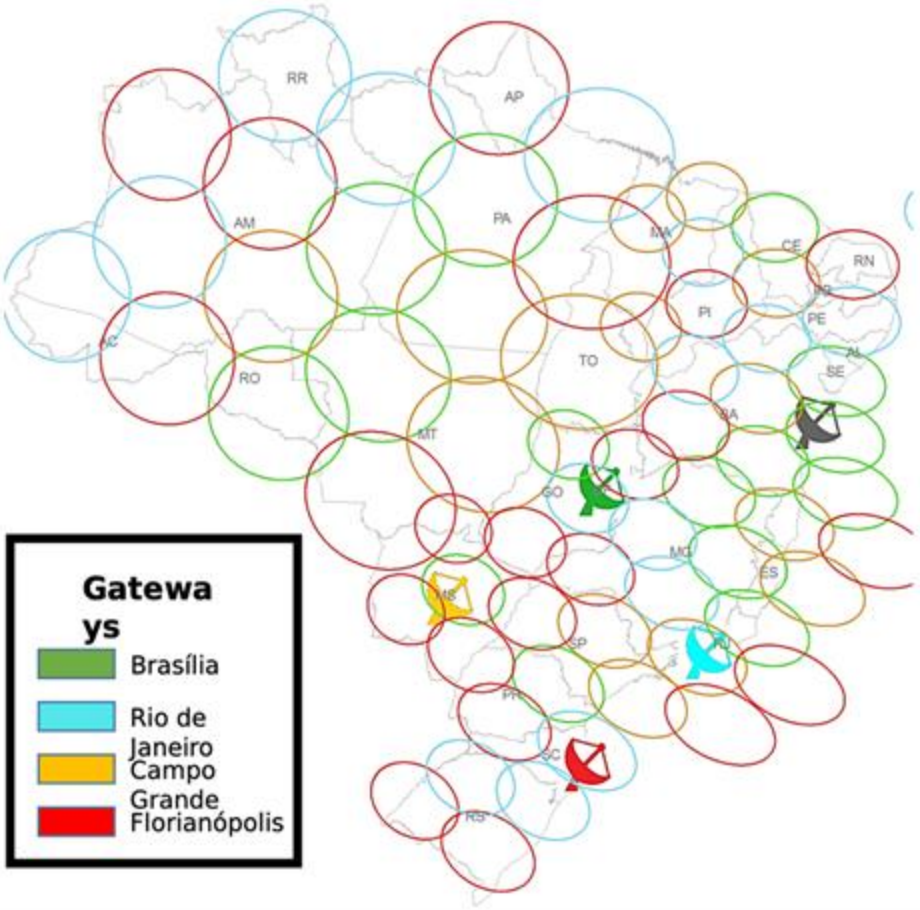


Source: Telebras



Salvador

Florianópolis



Source: Telebras

However...

I) the reliance on a single highly complex object with a limited lifetime as part of a national media infrastructure.

TCU TRIBUNAL DE CONTAS DA UNIÃO

GRUPO I – CLASSE VII – Plenário
TC 023.683/2018-0
Natureza: Representação.
Unidade: Telecomunicações Brasileiras S.A. - Telebras.
Interessada: Visiona Tecnologia Espacial S.A. (CNPJ 13.944.554/0001-99).
Representação legal: Gabriel Netto Bianchi (OAB/DF 17.309) e outros representando a Telecomunicações Brasileiras S.A. - Telebras.

SUMÁRIO: REPRESENTAÇÃO. INDÍCIOS DE IRREGULARIDADES NAS DECISÕES DO COMITÊ DIRETOR E DO GRUPO EXECUTIVO DO SATÉLITE GEOESTACIONÁRIO DE DEFESA E COMUNICAÇÕES ESTRATÉGICAS 1 (SGDC 1). OITIVAS E DILIGÊNCIAS. CONFIRMAÇÃO DE IMPROPRIEDADES QUE DEVEM SER SANADAS ANTES DO PROSSEGUIMENTO DA LICITAÇÃO ORA SUSPENSA. INDEFERIMENTO DA MEDIDA CAUTELAR. PROCEDÊNCIA PARCIAL. DETERMINAÇÕES, RECOMENDAÇÃO E CIÊNCIA.

RELATÓRIO

Adoto como parte do relatório a instrução à peça 87, elaborada na Secretaria de Fiscalização de Infraestrutura Hídrica, de Comunicações e de Mineração - SeinfraCOM e acolhida por seus dirigentes (peças 88-89):

"INTRODUÇÃO

1. Trata-se de representação formulada pela Secretaria de Fiscalização de Infraestrutura Hídrica, de Comunicações e de Mineração (SeinfraCOM), em face de possíveis irregularidades decorrentes da decisão adotada pelo Comitê Diretor e Grupo-Executivo do Satélite Geoestacionário de Defesa e Comunicações Estratégicas 1 (SGDC 1) e pela Telecomunicações Brasileiras S. A. (Telebras) de contratação da empresa Visiona Tecnologia Espacial S.A. (Visiona) para realizar e concluir a busca e a seleção de fornecedores para a implantação do SGDC 2 até 31/8/2018, decorrentes tanto de um embasamento técnico e jurídico robustos e consistentes a fim de viabilizar com sucesso a implantação do empreendimento, quanto do lastro no planejamento orçamentário e financeiro da União para os anos de 2018 e seguintes, e ainda pelos diversos indícios de irregularidades identificados no processo da referida contratação.

HISTÓRICO

2. Tais indícios de irregularidades foram identificados no âmbito do processo administrativo de produção de conhecimento TC 017.207/2017-7, com base nas informações e nos documentos enviados a esta Corte pelos órgãos e entidades referidos abaixo, em resposta às diligências expedidas, entre 26/3/2018 e 5/6/2018, com o intuito de serem obtidas informações preliminares sobre o SGDC 2:

a) Telebras (peças 1-3, 11, 17, 23, 24, 39, 40, 44, 47-49 e 59);
b) Ministério da Ciência, Tecnologia, Inovações e Comunicações (MCTIC) (peças 6, 18, 33);
c) Ministério da Defesa (MD) (peças 7, 14, 19, 36, 37, 52, 53 e 55-57);
d) Comando do Exército (peças 21, 31-33, 41-43, 50, 51 e 58);
e) Comando da Aeronáutica (peças 20, 22 e 34);
f) Comando da Marinha (peças 38 e 54);
g) Casa Civil (peças 5, 13 e 29);
h) Agência Nacional de Telecomunicações (Anatel) (peças 4, 12, 30, 45 e 46);
i) Secretaria do Tesouro Nacional (STN), do Ministério da Fazenda (peças 10, 16, 26 e 27);

II) the soon-to-be used total capacity of the satellite's Ka-band beams both due to the growing public and private agreements (MCTIC, ME, and VIASAT) as well as uncertainty over the shared use and coverage;

III) the suspension of the Brazilian federal accountability office (TCU) for the selection of the SGDC-2.

What happens if the satellite breaks down?

What happens when the SGDC-1 reaches 100% of its beam capacity?

What happens if Viasat pulls out of the agreement to provide on-ground infrastructure at schools?

What happens if Brazil is unable to publicly fund the manufacture of the next generation of communications satellites predicted in the SGDC project?

What happens to the rural schools, “the unconnected” in the so-called “dark spots of information”?

What happens when new foreign actors (i.e. Tech Giants) emerge with plans to provide satellite-enabled connectivity to the country?

Reflection - Toward a National Satellite Internet Plan

Comprehensive Long-Term Strategic Vision

Develop a forward-looking roadmap to guide the entire lifecycle of satellite infrastructure, ensuring resilience and scalability for future connectivity demands.

Transparent Funding and Public-Private Partnership Models

Establish clear financial reporting and accountability mechanisms to ensure public-private partnerships prioritize equitable access and public benefit.

Public Monitoring Through Data and Mapping Tools

Create real-time, publicly accessible platforms to visualize connectivity points and track the satellite program's progress at local, regional, and national levels.

Clear, Measurable Goals with Strict Timelines

Define specific targets and enforce strict timelines to ensure the satellite program achieves its intended impact effectively and efficiently.

Clarity in Governance, Policy, and Partnerships

Outline clear governance structures, stakeholder roles, and policy frameworks to foster seamless coordination and accountability.

Community Integration and Local Empowerment

Engage local communities through digital literacy programs and participatory initiatives to maximize the social and economic benefits of broadband connectivity.

Scalable and Sustainable Infrastructure Development

Ensure the satellite system's sustainability by planning for future capacity, technology upgrades, and integration with complementary infrastructure.


Conecta
Amazônia

Thank you!

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