

Say bye to Garage Bands, say hi to Garage Satellites: Needs theory and Capacity-Building in Space in the 21st Century

A presentation by the Brazilian Space Agency
at the Human Capacity-Building in Space Science and Technology for Sustainable Social
and Economic Development Workshop

United Nations Office for Outer Space Affairs
Samara National Research University
30 October – 2 November, 2017
Samara, Russia

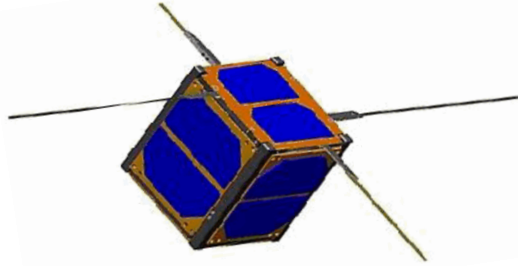
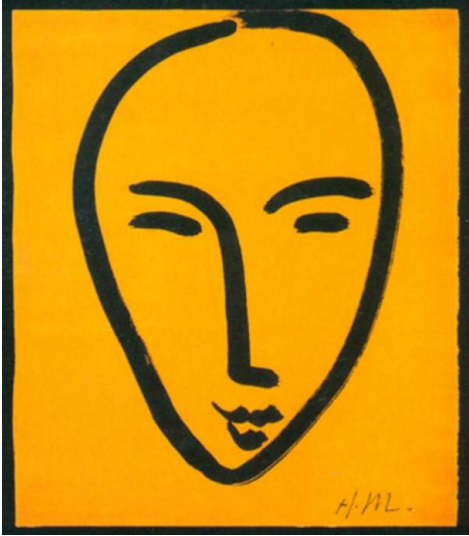


Ian Gough - Human Needs Theory

- Ian Gough (*) theorized two primary basic needs (Health and Autonomy) which must be met to avoid serious harm and engage in social participation.
- Civil, political, women's rights and a nonhazardous environment are prerequisites for satisfying intermediate needs (Agency Capacity).

(*) Ian Gough has published “A theory of human needs” with Len Doyal in 1991. He is a Visiting Professor at the Centre for the Analysis of Social Exclusion at the London School of Economics and Political Science.

Capacity Building in Space Science and Technology + Ian Gough Human Needs Theory



Space Technology helps humans to understand Sustainable Development for it develops a perception of wellbeing and sustainability consciousness over the planet and into the future. It creates better Food Security through technology and it enhances Human Agency Capacity.

A huge garage ... SGDC: Internet, Government users, secure communication demands

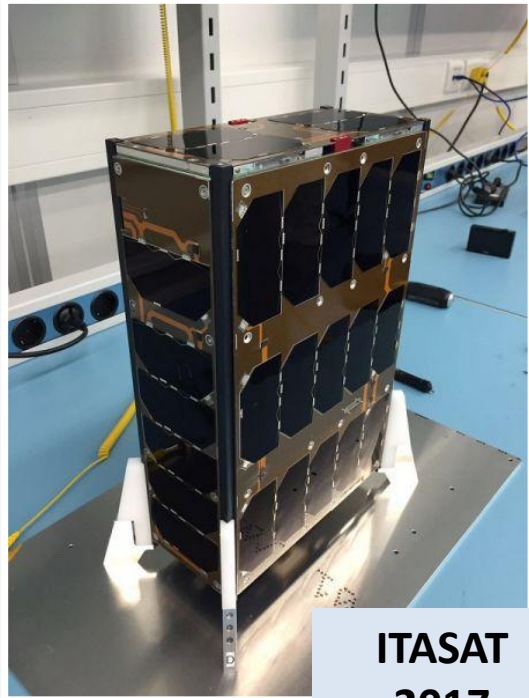


SGDC: a telecommunications satellite that is reducing Brazil's digital divide by delivering Internet coverage to the entire Brazilian territory.

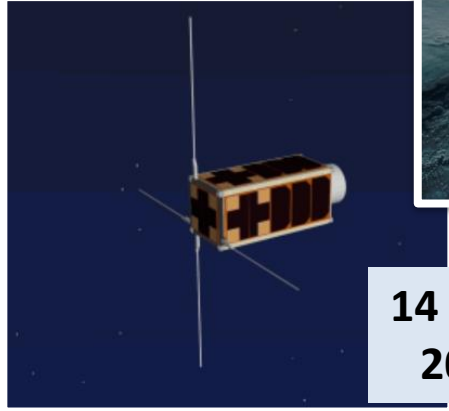


We keep the music playing ...

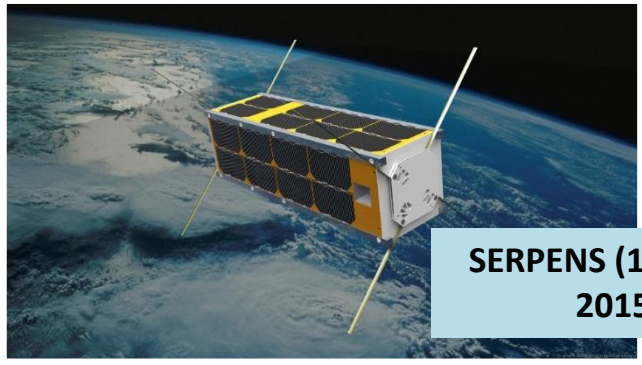
Small Satellite Initiatives in Brazil



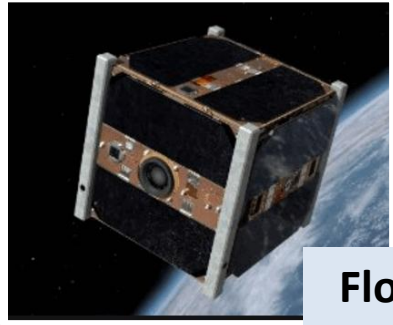
**ITASAT
2017**



**14 Bisat
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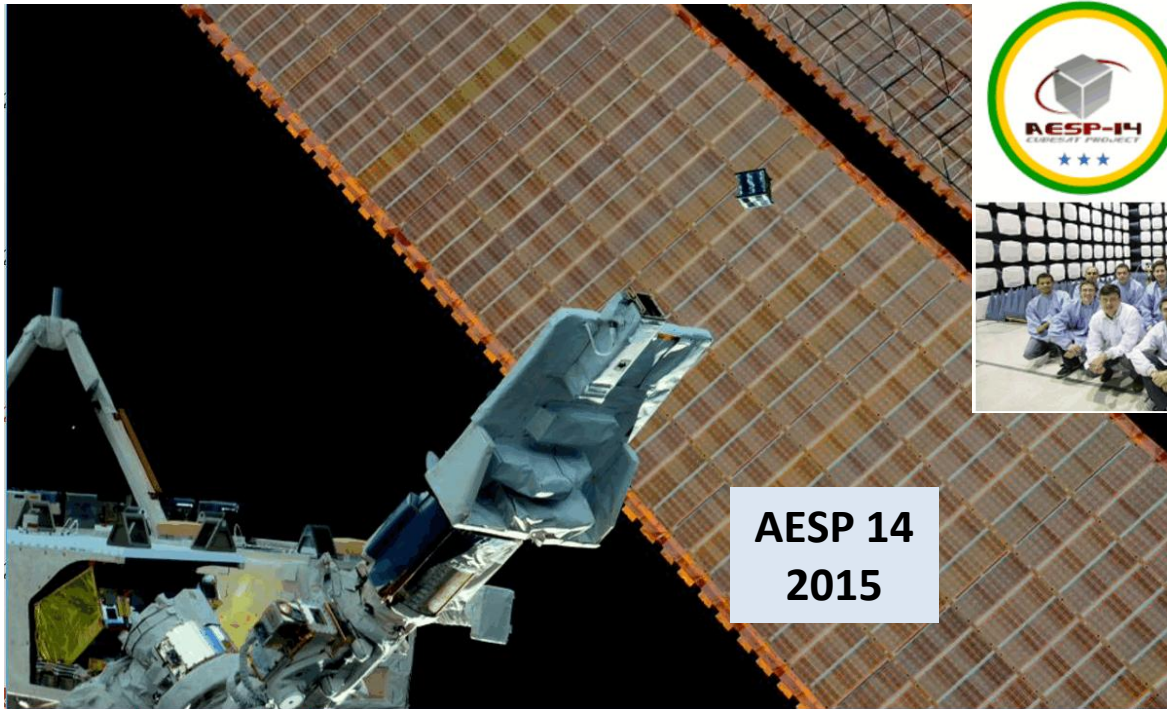


**SERPENS (1) – UnB
2015**

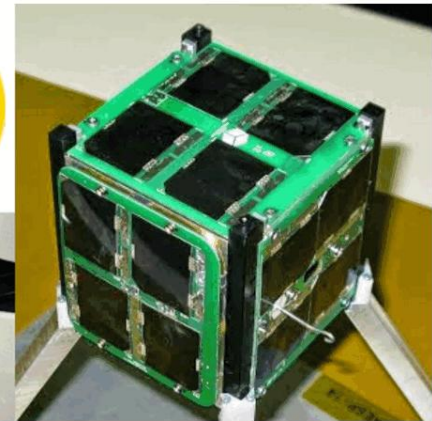


**FloripaSat
2018**

Small Satellite Initiatives in Brazil



**AESP 14
2015**





The SERPENS Program

System Engineering: Aerospace Engineering Courses

(COTS components)

Access to Space: Technology

Development/Demonstration

Subsystems with TRL > 5

The GLOBE Program

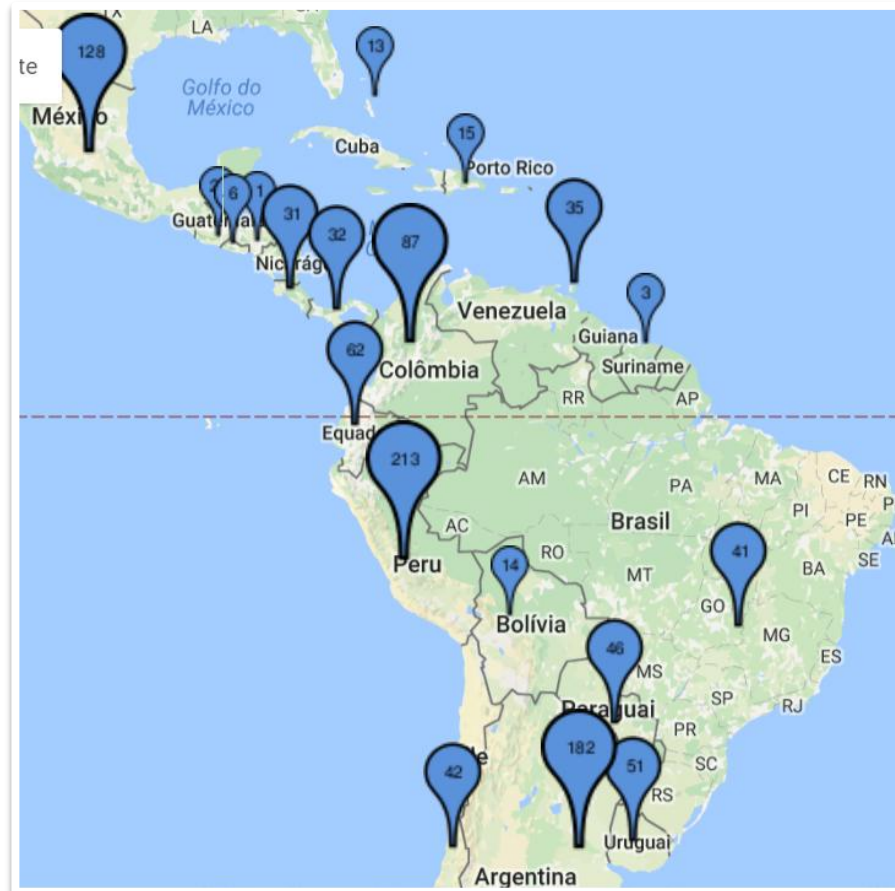
- International scientific and environmental education program promoted by NASA.
- Students and teachers around the world participate in environmental data collection and scientific studies.
- It started its activities in 1995.



GLOBE Stats

117	Countries
30,710	Schools
28,033	Teachers
141,338,810	Measurements
0	Measurements this month

Latin American participation in the Globe Program



Number of participant schools in the Globe Program per municipality.

Regional Centre for Space Science and Technology Education in Asia and the Pacific



Brazil holds a Regional Center for Space Science and Technology Education in Latin America and the Caribbean (CRECTEALC), a collaboration between the Brazilian Space Agency and INPE the National Institute For Space Research.



E2T : different institutions getting involved with the Brazilian Space Program and raising young people interested in space activities.

Future School for Brazil

At crossroads

Marjo Kyllonen (*) defends student-centered educations and multidisciplinary curriculum in Finland. The methodology change, for learning based on projects, is also cultural and moved with the routine of managers, directors and students.

- **What we have now:** national curricula disconnection from 21st century's needs: large young prison populations, high rate of school dropout, PISA's worst performers.
- **What we need:** real problem solving in Brazilian education: country with large borders and agricultural production. The miniaturization of space and broadband Internet can help create jobs in Internet of Things, satellite development, high precision agriculture, smart cities ...



(*) Future School expert; PhD in Education, Head of Development Service Unit, City of Helsinki.

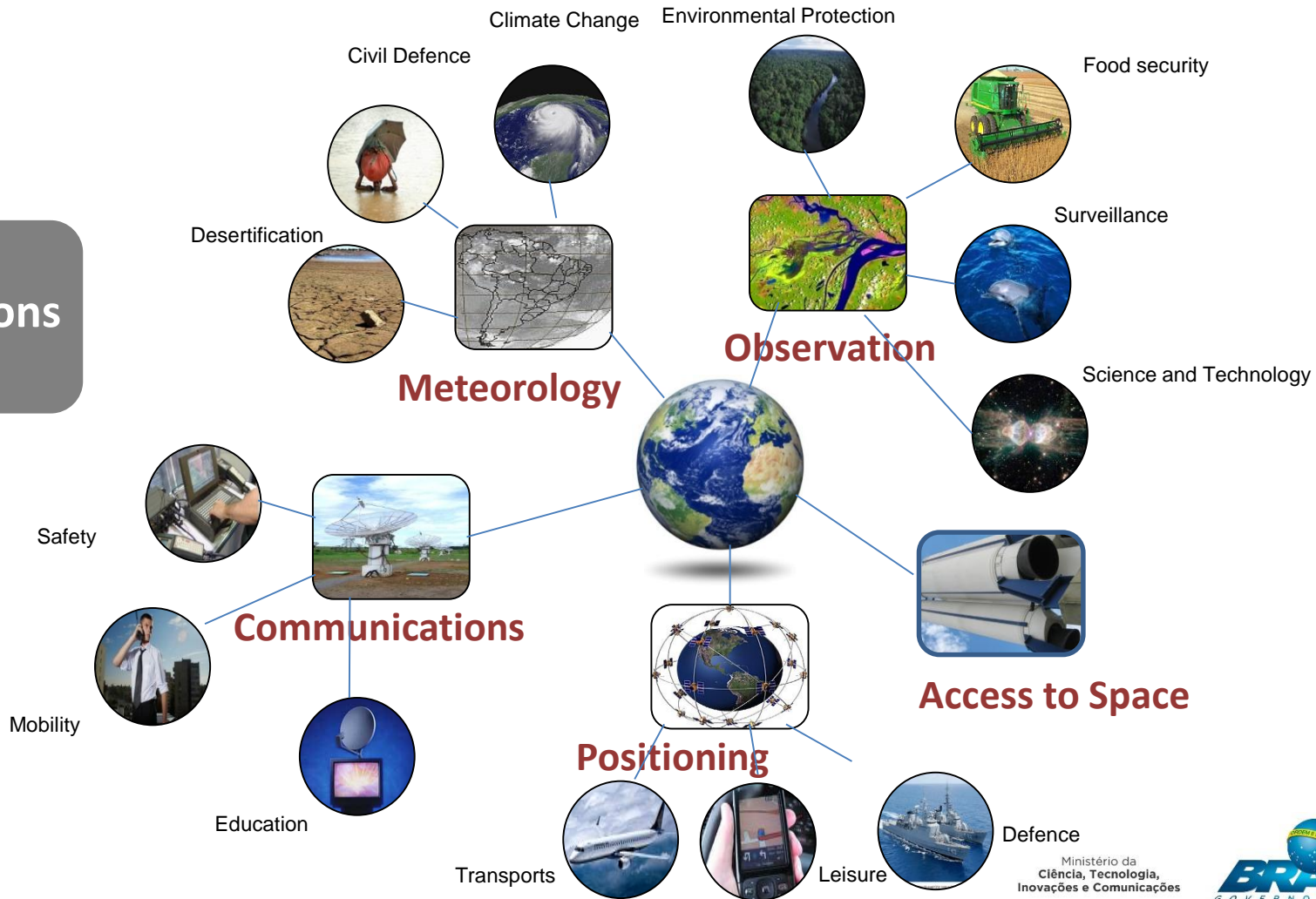
The three axes of change in space education

- 1) Applications
- 2) Young People
- 3) Curricula Innovation



UbatubaSat: Tancredo-1 claims to be the first satellite in the world assembled by Elementary School students.

Applications



Future School for Brazil

At crossroads

Young People

- Hands-on in Aerospace Courses
- Access to Space for Technology Development
- Consolidating a Small Sat culture in Brazil
- Projects instead of theory: the garage satellites
- Real problem solving and hackatons can and should be recognized as curriculum



Brazilian Space Camps: **the CVT (*)** Program

Curricula Innovation

Natal/Brazil



- Small scale complete space missions such as cansats assembly and testing.
- Vehicles assembly and launch, with payload recovery.
- Small satellites data reception and analysis.
- 3D printers: students can produce a prototype at the time and an observatory, for solar activity and night observation.

(*) CVT: a Brazilian Space Camp that will start its activities in November 13th, 2017. It is an educational center for “hands on” development towards space.

Conclusion

Capacity-Building in Space in the 21st Century happens through connecting **Human Needs to Space solutions** in order to meet **sustainability**.



Thank you!
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