



RLS- Sciences Conference in São Jose dos Campos

27-31st May, 2019

Overview

From 27 to 31 May, 2019, 115 RLS-Sciences participants from across the partner regions met at the invitation of the São Paulo Research Foundation (FAPESP) in São José dos Campos, São Paulo. This marked the first ever dedicated RLS-Sciences Conference. Previously, RLS-Sciences have met all together in conjunction with the biennial Regional Leaders Summits, and independently per project. This year's RLS-Sciences Conference served as an important bridge between political RLS conferences: the 9th Regional Leaders Summit in 2018 in Québec City, Québec and the 10th Regional Leaders Summit, which will be held in 2020 in Linz, Upper Austria.

Researchers from across the partner regions and from all four RLS-Sciences themes met for five days at the National Space Institute (INPE) Integrated Testing Laboratory (LIT) campus. Each group had two days for internal working meetings, presentations, and brainstorming, with a third day being dedicated to inter-project exchanges, overall RLS-Sciences development discussions, and inputs from the scientific side for the next Regional Leaders Summit in 2020, in Linz, Upper Austria on the theme, "Smart Regions". Participants were then invited to join technical site visits held over two days, including trips to the testing facilities of LIT, an ethanol plant, aerospace company Embraer, and the National Center for Research in Energy and Materials.



Visit to Raizen, an ethanol plant (Photo Credit: Cristiane Bergamini)



Visit to LIT, where satellites are tested

Throughout the conference, there were joint activities which brought all participants together. The conference opened with a lecture from the President of Brazil's National Council for Scientific and Technological Development, João Azevedo, who discussed the challenges of science, technology, and innovation in Brazil. A keynote presentation at the end of the first day from Himilcon Carvalho, Director for Space Technology at Visiona, discussed possibilities for space research across themes. All researchers came together for a "Smart Regions" session, which included inputs from each project. Young researchers from all four topics were given the chance to join a 48 hour challenge, created and supported by Simon Barnabé, Université du Québec à Trois Rivières, to brainstorm future innovative ideas for the region of São Paulo in the next decade. The young researchers presented the result, "[Sãotellites](#)" to all participants in the final session.



Opening Session of the conference



Young Researcher 48H Challenge Presentation, "Sãotellites", Maximilian Kadziach

Review the programme [here](#).



Digitalisation and Aerospace

The aerospace and digitalisation researchers held their sessions jointly, which offered additional opportunities for cross-thematic discussions. Presentations topics included:

- Satellite navigation
- Flight management systems
- High-fidelity simulations and reduced order modelling
- Rocket combustion
- Autonomous aerial vehicles
- Electric aerospace
- Digitalization and aerospace
- Machine learning
- Regional AI activities: São Paulo and Québec

In addition, a “mini-course” was given on the topic of “Smart Materials and Structures”. This input will support the development of future e-Learning courses as part of the Global Aerospace Campus project. The inaugural e-learning course, which is being developed by Munich Aerospace, will open in the autumn of 2019 to all interested participants (registration is available by emailing: e-learning@munich-aerospace.de). The group also held a brainstorming session on future summer school sites and topics, as well as the next themes for the second and third e-Learning courses, which will include inputs from across the regions as well as from industry. The group also shared ideas for potential joint research groups.

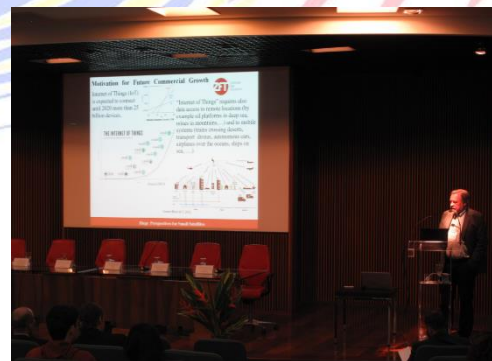
In digitalisation, an overview from a regional perspective was offered on artificial intelligence both in São Paulo and Québec. These inputs, along with presentations about machine learning, provided context and inputs for the next Expert Dialogue on Digitalisation.

Small Satellites

The project group made key progress together on “TIM”, including discussions on possible additional applications, such as agriculture, once they are in orbit in 2021. The group is now looking at a formation of up to 12 pico-satellites, and is intensively preparing for all satellites from the partner regions to be ready at the end of 2020. Additional aspects, such as cameras, testing facilities, and mechatronic components are key aspects, and are being supported through regional commitments. The partners also discussed possibilities for a “TIM2”. The project demonstrates the concrete cooperation on Earth reaching new heights as partners work towards launch.



*The project group brainstormed additional applications for the pico-satellites
(Photo Credit: Prof. Klaus Schilling)*



Klaus Schilling presents on the Internet of Things

The group also held a mini-course on small satellites, and heard presentations covering the range of research being conducted in São Paulo on small satellites, as well as key presentations from from Bavaria, Québec, and Western Cape.



Energy

The Energy Network had two days full of exchanges on a variety of interlinking topics, including climate change and energy, biofuels, smart energy grids and storage, and energy efficiency. The exchanges also addressed topics such as interdisciplinarity in research, and the social acceptance of new energy technologies.



The Energy Network researchers



Stéphanie Simard, UQTR, presented a proposed Smart Energy Network in Québec

The group also discussed the progress of their Joint Roadmap, including the status of the SWOT analysis of the energy transition in the regions, which is being conducted under the leadership of the Energieinstitut JKU Linz, and a feedback round on the pilot matchmaking database for researchers on solar energy, developed and coordinated under the leadership of GreenCape. The group will continue to progress along the Joint Roadmap, and is looking to develop joint project proposals in the coming months.

48 Hour Young Researcher Challenge

Training young researchers and offering opportunities for their participation in international scientific work is a core aspect for all topics in RLS-Sciences. Young researchers were invited by FAPESP to participate alongside advanced researchers. In addition, the young researchers were invited to participate in a cross-thematic challenge, answering the question, "How can RLS regions contribute to the São Paulo of tomorrow (in 10 years) from an aerospace, digitization, energy and satellite perspective?". This challenge was coordinated and supported by Simon Barnabé, Université du Québec à Trois Rivières. The students were asked to work together across their disciplines to develop a proposal answering the challenge. Their presentation of "Sãotelites" can be viewed [here](#).

Smart Regions

Ahead of the 10th Regional Leaders Summit in Linz, Upper Austria, RLS-Sciences came together to discuss how the projects could contribute to the conference topic of "Smart Regions". Presentations from each RLS-Sciences theme were given, with examples of ongoing projects which address multiple dimensions of the "smart" concept. Examples included using small satellites to support regions in planning for renewable energy, logistics, or secure data transfer, distributed energy production and use between villages, smart campuses, urban air mobility, and engineering the Earth from space.

RLS-Sciences operates under the framework of the multilateral political cooperation of the Regional Leaders Summit (RLS). The genesis of scientific cooperation in RLS came from the 6th RLS Conference in Sao Paulo in 2012, where the heads of government asked researchers from all seven regions to work together on a renewable energy pilot initiative. In 2016, this cooperation was expanded to include digitalization, aerospace, and small satellites, and RLS-Sciences began. RLS-Sciences covers topics which are of key importance for the regions. In continuity with the previous editions in 2016 and 2018, RLS-Sciences offers an important perspective and insights on the theme of the next political summit, "Smart Regions". In this framework, researchers from all four RLS-Sciences topics worked to ensure that a contribution from the scientific and research perspectives is prepared ahead of Linz 2020.