United Nations / Brazil
Symposium on Basic Space Technology
"Creating Novel Opportunities with Small Satellite Space Missions"

Final Programme

REV 2.1

Co-hosted by

Co-sponsored by

Natal, Brazil
11 – 14 September 2018

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09-10 September 2018

Pre-Symposium Hands-on Workshop: *CTEE/PG-ETE/INPE Technology Capacity Building Group, INPE Space Technology and Engineering Graduate Studies (For a limited number of selected participants - Invitation only)*

Tuesday, 11 September 2018

Morning

08:15	*Transfer to Symposium Venue*	
09:00	**Registration**	
09:30	Welcome / Opening Speeches	○ *Agamenon Henrique de Carvalho Tavares, Federal Institute of Rio Grande do Norte (IFRN)* ○ *Natercia Rodrigues, United Nations Office for Outer Space Affairs* ○ *Francisco Antônio de Pontes, Administrative Director, IFRN Campus Natal Central* ○ *José Daniel Diniz Melo, Vice-Rector, Federal University of Rio Grande do Norte (UFRN)* ○ *José Raimundo Braga Coelho, President, Brazilian Space Agency (AEB)*
10:00	**Keynote Addresses**	
10:00	R&D and the plans with small sat missions	*Ricardo Galvão, National Institute for Space Research (INPE)*
10:30	The Scintillation Prediction Observation Research Task (SPORT) mission: An international science mission using a CubeSat	*James Spann, National Aeronautics and Space Administration (NASA)*
11:00	**Symposium Introduction**	
11:00	UNOOSA Promoting Peaceful Uses of Outer Space	*Natercia Rodrigues, United Nations Office for Outer Space Affairs*
11:20	United Nations Basic Space Technology Initiative, Symposium Objectives and Programme Overview	*Medeni Soysal, United Nations Office for Outer Space Affairs*
11:40	Overview of small satellites initiatives at the Brazilian Space Agency	*Rodrigo Leonardi, Brazilian Space Agency*
12:00	*Lunch*	

Afternoon

13:30	**<u>Session 1.1: Small Satellites and Capacity-Building in Basic Space Technology with a Focus on Latin America and the Caribbean</u>** *Chairperson: Xinsheng Wang, School of Astronautics, Beihang University* *Rapporteur: Mariia Terekhova, Yuzhnoye State Design Office*	
13:30	The Application of Small Satellites in Research and Teaching	*Charles Swenson, Utah State University*
14:00	Development of the Satellite Mission Libertad-2: A project for empowering the science and technology in Colombia and Latin America	*Sergio Sánchez Sanjuán, Universidad Sergio Arboleda*
14:15	Space Sector Activities in Bulgaria-Opportunities for R&D and Business activities through developing small satellite projects	*Vesselin Vassilev, CASTRA*
14:30	The Agile Development of the SPORT Spacecraft	*Luis Eduardo Loures da Costa, Instituto Tecnológico de Aeronáutica (ITA-DCTA)*
14:45	Q&A	
15:00	Coffee Break / Poster Session P1.1/ Exhibition	
15:30	**<u>Session 1.2: Small Satellites and Capacity-Building in Basic Space Technology with a Focus on Latin America and the Caribbean</u>** *Chairperson: Nelson Schuch, INPE Southern Regional Space Research Center* *Rapporteur: Maria Cecilia De Faria, Universidade Federal de Minas Gerais*	
15:30	APSCO SSS Project and Space Education for B&R Cooperations	*Xinsheng Wang, School of Astronautics, Beihang University*
15:45	Project IRAZU the first Central America Satellite, paving the way for the Space Industry in Costa Rica	*Luis Monge Solano, Central America Society for Aeronautics and Space (ACAE)*
16:00	İTÜ-SSDTL Contributions to National and International Space Technology Development and Capacity Building with CubeSat and CanSat	*Alim Rüstem Aslan, Istanbul Technical University*
16:15	Design and Implementation of Space Environment Simulator for CubeSat and PocketQubeSat	*Eber Cayo, Universidad Católica San Pablo*

16:30	Overview of the AeroCube Program and Applicability to Basic Space Technology Capacity Building	*Kathryn Fricks, The Aerospace Corporation*
16:45	Microsatellite μSAT-3 Development	*Luis Murgio, Dirección General de Investigación y Desarrollo de Fuerza Aérea Argentina*
17:00	Q&A	
17:15	*Adjourn*	
18:00	***Reception - Welcome Cocktail*** *Venue: Imira Plaza Hotel*	

Wednesday, 12 September 2018

Morning

08:30	*Transfer to Symposium Venue*	
09:00	**<u>Session 1.3: Small Satellites and Capacity-Building in Basic Space Technology with a Focus on Latin America and the Caribbean</u>** *Chairperson: Alim Rüstem Aslan, Istanbul Technical University* *Rapporteur: Babudi Busakwe, Space Advisory Company*	
09:00	AztechSat-1, an educational model for space systems development	*Carlos Duarte Muñoz, Agencia Espacial Mexicana*
09:15	FACT, A Project for SmallSat building capacity	*Kamel Besbes, Centre for Research on Microelectronics and Nanotechnology*
09:30	Examples and Lessons Learned From The BST Capacity Building Program	*Abdul M. Ismail, Berlin Space Technologies*
09:45	The SUCHAI missions: scientific and technology motivations	*Marcos Diaz, University of Chile*
10:00	Opportunities and challenges to apply small satellites and other space technology in support of the Sustainable Development Goals	*Danielle Wood, Massachusetts Institute of Technology (MIT)*
10:15	Q&A	
10:30	*Coffee Break / Poster Session P2.1/ Exhibition*	
11:00	**<u>Panel Discussion</u>** Best Practices, Lessons Learned and Challenges in Small Satellite Capacity-building	***Moderator**: Charles Swenson, Utah State University* ***Rapporteur:** Kathryn Fricks, The Aerospace Corporation* *Nelson Schuch, INPE Southern Regional Space Research Center* *Masa Nagasaki, Space BD Inc.* *Lucas Fonseca, Airvantis/Garatéa* *Abdul M. Ismail, Berlin Space Technologies*
12:30	*Lunch*	

Afternoon

14:00	**<u>Session 2.1: Evolving Capabilities and Operational Applications of Small Satellite Missions</u>** *Chairperson: Danielle Wood, Massachusetts Institute of Technology (MIT)* *Rapporteur: Miguel Heredia Rospilloso, Bolivian Space Agency*	
14:00	The Next Challenge : Pico-Satellite Formations	*Klaus Schilling, University of Wuerzburg*
14:30	Farm 4.0: Delivering Agriculture Solutions At The Intersection Satellite Big Data, Cloud Computing, Machine Learning And IoT Technology	*Narayan Prasad Nagendra, SatSure*
14:45	Lean Small Satellite Missions Require Lean Access to Space	*Joseph Casas, NASA*
15:00	Analysis of glacial volume change in snow-capped of Bolivia and Peru with the use of a small satellite	*Natalia Indira Vargas Cuentas, Universidad de Ciencias y Humanidades*
15:15	Q&A	
15:30	*Coffee Break / Poster Session P2.2/ Exhibition*	
16:00	**<u>Session 2.2: Evolving Capabilities and Operational Applications of Small Satellite Missions</u>** *Chairperson: Joseph Casas, National Aeronautics and Space Administration (NASA)* *Rapporteur: Natalia Indira Vargas Cuentas, Universidad de Ciencias y Humanidades*	
16:00	A Multinational CubeSat for Forest Monitoring	*Luis Zea Gonzalez, Universidad del Valle de Guatemala*
16:15	A 3U CubeSat for Earth Observation and Electric Propulsion Technology Demonstration	*Paolo Gessini, University of Brasilia*
16:30	The development and application of remote sensing microsatellite	*Qin Yuan, Shenzhen Aerospace Dongfanghong HIT Satellite Ltd.*
16:45	BrightSkies - Taking a Breath from Air Pollution	*Marc Bernabeu, Innovative Solutions in Space B.V. (ISIS)*
17:00	Art in Orbit: Solar Reflectance and Propulsion with Cubesats	*Jose Garcia, Noosfera Projects*
17:15	Q&A	
17:30	*Adjourn*	
19:30-22:30	***Symposium Dinner and Folk Show (for all participants)*** *Venue: Tábua de Carne – Via Costeria Restaurant*	

Thursday, 13 September 2018

Morning		
08:30	*Transfer to Symposium Venue*	
9:00	**<u>Session 2.3: Evolving Capabilities and Operational Applications of Small Satellite Missions</u>** *Chairperson: Klaus Schilling, University of Wuerzburg* *Rapporteur: Narayan Prasad Nagendra, SatSure*	
9:00	LECX: a cubesat experiment to detect and locate X-ray cosmic explosions	*Joao Braga, INPE*
9:15	Mission Concept Review of an International Cooperative Space Project - A Mesoamerican CubeSat	*Adolfo Chaves Jimenez, School of Electronics, Costa Rica Institute of Technology*
9:30	Small satellites developed by Yuzhnoye SDO for scientific researches	*Volodymyr Maslyey, Yuzhnoye State Design Office*
9:45	State of the Art survey of European science and research space missions based on Small Satellites	*Igor Alonso Portillo, GomSpace*
10:00	Small Satellites Systems Engineering and Artificial Intelligence	*Raghava Murthy Dantu, Vel Tech Rangarajan Dr Sagunthala R&D Institute of Science and Technology*
10:15	Q&A	
10:30	*Coffee Break / Poster Session P3.1/ Exhibition*	
11:00	**<u>Panel Discussion</u>** Evolving Capabilities, Present and Future of Small Satellite Operational Applications	***Moderator**: Joseph Casas, NASA* ***Rapporteur**: Daniel Garcia Yarnoz, International Space University* *Klaus Schilling, University of Wuerzburg* *Danielle Wood, MIT* *Johan Erasmus, Innovative Solutions In Space B.V. (ISIS)* *Danilo Miranda, Visiona Space Technology S.A.* *Igor Alonso Portillo, GomSpace*
12:30	*Lunch*	

Afternoon

14:00	**<u>Session 3.1: Legal and Regulatory Issues Related to Small Satellites</u>** *Chairperson: Alvaro dos Santos, Advocacy-General of the Union in São José dos Campos* *Rapporteur: Marcia Alvarenga dos Santos, National Institute for Space Research (INPE)*	
14:00	Small Satellites amount to Large Debris: Regulating the Surge in Small Satellites for a Sustainable Space Environment	*Kiran Nair, McGill University, Faculty of Air and Space Law*
14:15	Studying The Generation And Propagation Of Space Debris By Launching And Tracking Small Satellite Clusters	*Marcelo Souza, INPE*
14:30	Small Satellites: The Brazilian National Space Law and Policy Challenges	*Ana Cristina Galhego Rosa, Dipteron UG*
14:45	Frequency Registration for Small Satellites Workshop	*Xiuqi Wang, ITU Radiocommunication Sector (ITU-R)*
15:15	Q&A	
15:30	*Coffee Break / Poster Session P3.2/ Exhibition*	
16:00	**<u>Session 3.2: Legal and Regulatory Issues Related to Small Satellites</u>** *Chairperson: Kiran Nair, McGill University, Faculty of Air and Space Law* *Rapporteur: Ana Cristina Galhego Rosa, Dipteron UG*	
16:00	Registration of Space Objects with the United Nations	*Natercia Rodrigues, United Nations Office for Outer Space Affairs*
16:30	Remote Sensing And Aerial Photography: The Conflict In The Brazilian Legislation	*Alvaro dos Santos, Advocacy-General of the Union in São José dos Campos - CJU-SJC*
16:45	The Space Governance Of Small Satellites And The Sustainability Of Outer Space Activities	*Tatiana Viana, Sapienza University of Rome*
17:00	Small Satellites And Challenges Of International Law: Dialogues Between Public And Private	*Inez Lopes Matos Carneiro de Farias, University of Brasilia*
17:15	Q&A	
17:30	*Adjourn*	

Friday, 14 September 2018

08:30	*Transfer to Symposium* Venue	
9:00	**<u>Session 4: Evolution of a Local Data Collection System into an International Cubesat Constellation-based Environmental Data Collection Initiative</u>** *Chairperson: Fatima Mattiello-Francisco, National Institute for Space Research (INPE)* *Rapporteur: Otavio Durão, , National Institute for Space Research (INPE)*	
9:00	Fostering Environmental Data Collection with GOLDS Constellation	*Fatima Mattiello-Francisco, INPE*
9:10	CubeSat Payload for Environmental Data Collection	*Jose Duarte, INPE*
9:20	MCU Robust onboard computer for CubeSat applications	*Silveira Jarbas, Federal University of Ceará*
9:30	Using Samanaú Platform for environmental data collecting integrated to GOLDS	*Moisés Souto, IFRN*
9:40	Q&A	
10:00	*Coffee Break / Poster Session P4.1/ Exhibition*	
10:30	**<u>Final Session: Review and Way forward</u>**	***Moderator**: Natercia Rodrigues, United Nations Office for Outer Space Affairs*
10:30	Symposium Review and Discussion -Future activities under the Basic Space Technology Initiative -Observations and Recommendations to be included in the report to the United Nations Committee on the Peaceful Uses of Outer Space	*All Symposium Participants*
11:30	**<u>Closing Session</u>**	
11:30	Closing Remarks	○ *Adriana Cursino Thomé, INPE* ○ *Medeni Soysal, United Nations Office for Outer Space Affairs*
12:00	*Lunch*	
13:00	Transfer to the Hell's Barrier Launch Site for the Field Trip / Transfer to the Airport for Early Flights	

Poster Sessions and Presentations

Important Notes:

- The timeframes indicated in the following tables show the **poster sessions during which the presenters are expected to be next to their posters** for presentation and discussion.
- In order to provide flexibility for **stand-up discussion** with poster presenters**, a dedicated board is reserved for each poster for the whole duration of the symposium.**
- Posters should be ready on the poster boards **before the morning sessions of the indicated day**. The boards that are assigned to posters will be marked with the poster numbers (PXX).

DAY 1: Tuesday, 11 September 2018 (Poster Session P1.1)

No.	Surname	Name	Institution	Poster Title
P01	Carrara	Valdemir	Instituto Tecnológico de Aeronáutica (ITA-DCTA)	Precise 3 axis attitude control for SPORT cubesat
P02	Busakwe	Babudi	Space Advisory Company	A Compact Model For Space Capacity Development
P03	Lopez Telgie	Alejandro	University of Concepcion	Contributing to the engineering curriculum reform through the development of a nano-satellite program
P05	Camargo	Lazaro	National Institute for Space Research (INPE)	On Board Software for Scientific Payloads on Nanosatellites
P06	Marinho	George	Universidade Federal do Rio Grande do Norte (UFRN)	Thermal Contact Resistance: A Possibility In Nanosat Protection
P07	Bertachini de Almeida Prado	Antonio Fernando	INPE	Orbit Propagation And Decay In Cubesat's Implementing Rotational Attitude And Variations In Drag Coefficient
P08	Caballero	Ada	Comisión Nacional de Actividades Espaciales (CONAE)	Microwave Remote Sensing from Small Satellite (MR3S)
P09	Heredia Rospilloso	Miguel	Bolivian Space Agency	Bolivian Endeavours for Space Innovation
P10	Martins Filho	Luiz	Federal University of ABC (UFABC)	Software Testing Of An Autonomous Redundant Attitude Determination System For Cubesats
P11	Bezerra	Eduardo	Universidade Federal de Santa Catarina (UFSC)	IAA Latin American CubeSat Workshop

P12	Rodriguez Gonzalez	Santiago	Centro de Investigaciones Aplicadas - Direccion General de Investigacion y Desarrollo (CIA-DIGID)	On-Board Computer System for Microsatellite μSAT-3
P14	Abdelkarim	Ahmed	University of Khartoum - Space Research Center	U of K Small Satellite Mission Impact on Sudan Development and Its Role in Sudanese Engineers Capacity Building
P15	Da Silva	Wellington	UFRN	Small Microstrip Antennas For CubeSat

DAY 2: Wednesday, 12 September 2018 (Poster Sessions P2.1 and P2.2)

No.	Surname	Name	Institution	Poster Title
P16	Burroni	Tomás	School of Science and Technology, National University of San Martín	LabOSat: an electronic platform to perform experiments on satellites.
P17	Belinco	Nicolas	GAIyANN-CNEA	Facilities for Space Technology at Argentinian National Atomic Energy Commission (CNEA)
P18	Brito	Marcos	CIA-DIGID	Attitude Control System And 6dof Simulation For Microsatellite μSAT-3 Development
P19	Salazar Pérez	Eduardo	Instituto de Ciencias Nucleares (UNAM)	Ground Control Software For The ATON Stratospheric Platform
P20	López Espinosa	Leonardo	UNAM	ATON stratospheric platform for space technology tests
P21	Slongo	Leonardo	UFSC	FloripaSat - Empowering Students On Space Application Field
P22	González Reyes	Reinaldo	UNC Hydraulics Laboratory and FAA Applied Research Center	Energy Power System For The Micro-Satellite μsat-3
P24	Olufemi	Afolabi	Federal University of Technology, Akure	Infrastructural Development And Fabrication Of Some Cubesat Sub-Systems
P25	Morales	Pablo	Universidad Nacional de Cordoba (UNC)	High G Resistant Nanosatellite: Nsat
P26	Prystupczuk	Pablo	UNC	Design, Structure And Implementation Of Energy Power System For The Microsatellite uSAT-3
P27	Carpignano	Gustavo	DIYSATELLITE	Pocketqube, The Next Little Thing By Come
P28	Slongo	Artur	INPE Southern Regional Space Research Center	NANOSATC-BR2 - Assembly, Integration And Tests
P29	Vitulich	Carlos	Centro de Investigaciones Aplicadas (DGID)	Pulsed Plasma Thruster Development for Small Satellites Applications in Argentina
P30	Stalder Díaz	Diego	Paraguayan Space Agency	The Paraguayan Space Agency

No.	Surname	Name	Institution	Poster Title
P31	Almeida	Danilo	Instituto Nacional de Pesquisas Espaciais	Mission Operation Concept Analysis for the NanosatC-BR2 using INPE's Satellite Simulator
P32	Tavares	Felipe	INPE	Conceptual Design A Detector Relativistic Electrons And Protons On Van Allen Radiation Belt: Embedded In A Cubesat Platform
P33	Rezende	Julio	UFRN - FAPERN	Satellite Research In Brazil
P34	Murcia Piñeros	Jhonathan	INPE	Atmospheric Influence In Orbital Decay Of Cubesats
P35	Campos	Eduardo	UFRN	Nanosatellites Attitude Estimation And Control Using Norm-Constrained Extended Kalman Filter And Quaternion PD-Like Controller.
P36	Couto Oliveira	Geraldo Magela	Federal Center for Technological Education of Minas Gerais (CEFET-MG)	Using CubeSat and CanSat for Space Education in Brazil
P38	Menezes	Renan Guilherme	Instituto Tecnológico de Aeronáutica	An approach based in MBSE to the GARATÉA-L mission
P39	Ibarra Gonzalez	David	Universidad Autónoma del Estado de México	User-Centered Design For The Development And Selection Of Technology To Control Atmospheric Preservation Variables Of Vital Electronic Systems Of Small Satellites In Micro Gravity And Outer Space
P40	Ferreira	José	Universidade de Brasilia	Compact Permanent Magnet Hall Thrusters Development for Future Brazilian Space Missions
P41	De Faria	Maria Cecilia	Universidade Federal de Minas Gerais	Aerospace Engineering Undergraduation Course in UFMG - Perspectives of uses of Problem Based Learning
P42	Moraes	Deniel	INPE	NANOSATC-BR2 - Analysis of Payload Duty Cycle change during its operational life time.

DAY 3: Thursday, 13 September 2018 (Poster Sessions P3.1 and P3.2)

No.	Surname	Name	Institution	Poster Title
P43	de Macedo Neto	Valdir	UFRN	Conceptual Study Of A Multiuse And Reusable Earth And Space Observation Platform
P44	Nazzi	Fabio	UNC	Image Acquisition System for microsatellite μSat-3
P45	Vendittozzi	Cristian	University of Brasília	Origami Deployable Deorbiting System
P46	Santilli	Giancarlo	University of Brasília	Remote Sensing based on Cubesats: is there any added value ?
P47	Chaves Jimenez	Adolfo	School of Electronics, Costa Rica Institute of Technology	Mission Concept Review of an International Cooperative Space Project - A Mesoamerican CubeSat
P48	Kim	Young Soo	Korea Astronomy & Space science Institute	An Optical Telescope Design for Light-weight Cubesats
P50	Garcia	Oswualdo	Instituto Tecnologico y de Estudios Superiores de Monterrey	Small Satellites: Generating Climate Solutions
P51	Karanja	Faith	University of Nairobi, Department of Geospatial and Space Technology	What the First Kenya University Nanosatellite Precursor Flight 1KUNS-PF means to the Country
P53	Garcia Yarnoz	Daniel	International Space University	Self-Inflatable Deployable Structures For De-Orbiting Cubesats
P54	Naccarato	Kleber	INPE	Monitoring Environmental Variables And Earth System Phenomena From Space Using Nanosatellite Technology
P55	Vieira	Denis	ITA-DCTA	Thermal Analysis of the SPORT Spacecraft
P56	Costa	Cesar	Centro de Gestão e Estudos Estratégicos	Towards the 1000th CubeSat

P60	Ojeda Bueno	Jorge Humberto	Ministry of Foreign Affairs, Republic of Colombia	Payloads For Small Programmes On Security Monitoring Within National Jurisdictions - An Opportunity for Cooperation
P61	Alvarenga Dos Santos	Marcia	INPE	The Dove Satellite as a Precursor of the Small Satellıtes and Their Environmental Impact in Outer Space
P62	Mafra de Carvalho	Manoel Jozeane	INPE	New Brazilian Environmental Data Collection System – NewSBCDA
P63	Vitorino	Bruno Augusto	IFRN	Samanaú.TX - Low Cost Data Collect Transmitter
P64	Rodrigues	Alessandra	INPE	Description of the Attitude Determination and Control Subsystem of CONASAT Project
P65	Jotha	Lúcio	INPE	Natal City Multi-Mission Station
P66	Silva Filho	Jose	Laboratório de Engenharia de Sistemas de Computação (LESC)	Column-Line-Code in Firmware for On-Board Computer
P67	Matias	Aryel	INPE	Low Cost Data Collecting Platform Linked to Integrated System Of Environment Data (SINDA)