



**United Nations / South Africa
Symposium on Basic Space Technology
“Small satellite missions for
scientific and technological advancement”**

Programme

Hosted By



Co-sponsored by



**Stellenbosch, South Africa
11 – 15 December 2017**

Honorary Committee:

S. Di Pippo	Director, Office for Outer Space Affairs, United Nations
J.D. Woerner	Director General, European Space Agency
The Hon. J. Fubbs	Chair, Parliamentary Portfolio Committee for Trade and Industry
V. Munsami	Chief Executive Officer, South African National Space Agency
S.Zikode	Deputy Director-General, Department of Trade and Industry
H. Mudau	Chief Director, Department of Science and Technology
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The Hon. N. Maseko	Chair, Parliamentary Portfolio Committee for Science and Technology
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N.Majaja	Chief Director, Department of Trade and Industry
Arnold Schoonwinkel	The Vice-Rector Learning and Teaching, Stellenbosch University
Jan De Villiers	Mayoral Member for Infrastructure

Programme Committee:

J. Barrington Brown	New Space Systems, South Africa
S. Copiso	South African National Space Agency
N. Hedman	Office for Outer Space Affairs, United Nations
C. Loo	International Telecommunication Union
N. Majaja	Department of Trade and Industry
P. Maruping	Square Kilometer Array
V. Matlou	Department of International Relations and Cooperation
I. Makoloi	Department of Science and Technology
P. Martinez	University of Cape Town
L. McKinnell	South African National Space Agency
K. Moroka	Department of Science and Technology
S. Mostert	Space Commercial Services, South Africa
C.Khuzwayo	SpaceTeq
Y. Okumura	Office for Outer Space Affairs, United Nations
J. Puig-Suari	California Polytechnic State University, USA
H. Steyn	University of Stellenbosch
L. St-Pierre	Office for Outer Space Affairs, United Nations
R. van Zyl	Cape Peninsula University of Technology
N. Tsatsi	Department of Trade and Industry

Exhibition:

J. B. Brown	New Space Systems, South Africa
S. Copiso	South African National Space Agency
I. van Zyl	Cape Peninsula University of Technology
L. de Witt	New Space Systems, South Africa

Local Organizing Committee:

F. Majola	Department of Science and Technology
K. Moroka	Department of Science and Technology
H. Steyn	University of Stellenbosch
A. Sangoni	South African National Space Agency
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Saturday, 9 to Sunday, 10 December 2017

Pre-Symposium Hands-on Workshop: HEPTA, with Nihon University and UNISEC

By invitation only, for a reduced number of participants.

http://forth.aero.cst.nihon-u.ac.jp/HEPTA/top_en.html

Monday, 11 December 2017

Morning

09:30 *Initiate Transfer to Symposium Site*

10:00 Registration

10:30 Welcome / Opening ○ *Arnold Schoonwinkel, Stellenbosch University*
Remarks ○ *Niklas Hedman, United Nations Office for Outer Space Affairs*
 ○ *Val Munsami, CEO SANSA*
 ○ *Jan de Villiers, Mayor's Office*
 ○ *Mmboneni Muofhe, DDG DST*

11:30 Keynote Addresses

11:30 Space science and technology in South Africa *Humbulani Mudau , DST*
– an overview

12:00 Role of small satellites in workforce *Jordi Puig-Suari, Cal Poly / Tyvak*
development

12:30 Q&AS for Media

13:00 *Lunch*

Afternoon

14:30 Symposium Introduction

14:30 Introduction to UNISPACE+50 *Niklas Hedman, United Nations Office for Outer Space Affairs*

14:50 United Nations Basic Space Technology *Daniel Garcia Yarnoz, United Nations Office for Outer Space Affairs*
Initiative, Objectives of the 2017 Symposium
and Practical Arrangements

15:10 A Historical Overview of the University of *Willem Herman Steyn, Stellenbosch University*
Stellenbosch's Satellite Projects over the past
25 years

15:30 *Coffee/Tea Break*
Poster Session/Exhibit

16:00	<u>Session 1: Space Technology Development and Capacity-Building with a focus on Africa</u> <i>Chairperson: Willem Herman Steyn, Stellenbosch University</i> <i>Rapporteur: Asanda Sangoni, SANSA</i>	
16:00	Space technology development in Nigeria	<i>Francis Chizea, NASRDA</i>
16:15	Inputs from the African Regional Centre for Space Science and Technology Education- in French Language	<i>Djamal Djebouri, CRASTE-LF</i>
16:30	CubeSats: Providing a pathway for developing countries to access space	<i>Charles Mwangi, Kenya Space Agency</i>
16:45	Space technology development in South Africa	<i>Amal Khatri, SANSA</i>
17:00	Q&A	
17:15	<i>Adjourn</i>	
17:30	<i>Reception - Welcome cocktail</i> <i>Venue: STIAS</i>	

Tuesday, 12 December 2017

Morning

- 8:30 *Transfer to Symposium Site*
- 9:00** **Session 2: Small Satellite Missions in Support of Key Scientific Projects and Questions**
Chairperson: Val Munsami, Chief Executive Officer, SANSA
Rapporteur: Sias Mostert, SCS Aerospace Group
- 9:00 Overview of Japanese Lunar CubeSats *Onur Celik, JAXA*
EQUULEUS and OMOTENASHI
- 9:15 South Africa's contribution to the Netherlands *Francois Malan, Space Advisory Company*
China Lunar Explorer (NCLE)
- 9:30 Potential synthetic aperture radar applications *Mike Inggs, University of Cape Town*
of small satellites
- 9:45 The Nanosat C-Br Program *Otavio Durão, National Institute for Space
Research*
- 10:00 Stellar Gyro - an innovative new approach to *James Barrington Brown, New Space Systems*
achieving high pointing accuracy in eclipse
- 10:15 ESAT: Educational Satellite developed by *Ignacio Barrios Tascón, Universidad
Politécnica de Madrid/Theia Space*
Theia Space
- 10:30 *Coffee/Tea Break*
Poster Session/Exhibit
- 11:00** **Session 3: Applications of Small Satellite Missions**
Chairperson: Francis Chizea, NASRDA
Rapporteur: Siyabonga Copiso, SANSA
- 11:00 Providing satellite-powered data analytics to *Narayan Prasad Nagendra, University of
empower lives of farmers Erlange- Nuremberg*
- 11:15 MIRT-SAT1 Proposal (1st Mauritian Infrared *Faraaz Shamutally, Mauritius Research Council*
and Telecommunications Satellite)
- 11:30 FireSat - A UK-Africa collaboration for *Pamela Anderson, Clyde Space Ltd*
enhanced detection of fires using nanosatellite
technology
- 11:45 HEAD-1 satellite providing in-orbit *Kammy Brun Chan, China HEAD Aerospace
operational data for maritime surveillance Group*
- 12:00 Q&A
- 12:15 *Lunch*

Afternoon

13:45

Session 4: Small Satellite Projects for Engineering Education Part 1

Chairperson: Igor Belokonov, Samara National Research University

Rapporteur: Natalia Indira Vargas Cuentas, Universidad de Ciencias y Humanidades

13:45

Pan African University

Mmampei Chaba, DST

14:00

Small Satellite Missions at the Satellite Research Center at Nanyang Technological University in Singapore

Amal Chandran Ramachandran Nair, Nanyang Technological University

14:15

CPUT Satellite Programme - national and regional perspectives

Robert van Zyl, Cape Peninsula University of Technology

14:30

New Zealand CubeSat Programme

Jim Hefkey, University of Auckland

14:45

Q&A

15:00

Coffee/Tea Break

Poster Session/Exhibit

15:30

Panel Discussion

Young African Space Engineers (YASE) in the Global Space: Opportunities and Challenge

Panel Moderator & Speakers

Moderator: Taiwo Tejumola, Kyutech

Joseph Quansah, All Nations University

Mohamed Edries, National Authority for Remote Sensing and Space Sciences

*Sophia Njeri Murage, The University of Nairobi/
Kenya Space Agency*

Leehandi de Witt, SGAC

17:00

Adjourn

Wednesday, 13 December 2017

Morning

08:30 *Transfer to Symposium Site*

9:00 Session 4: Small Satellite Projects for Engineering Education Part 2

Chairperson: Igor Belokonov, Samara National Research University

Rapporteur: Natalia Indira Vargas Cuentas, Universidad de Ciencias y Humanidades

9:00 Sustaining the Vision from GHANASAT-1 into GHANASAT-2 *Joseph Quansah, All Nations University*

9:15 Pico-Satellite Training Kit HEPTA-Sat: Hands-on Practices for Space Engineering *Masahiko Yamazaki, Nihon University*

9:30 Development of the Tunisian SUPCOM spatial program *Riadh Abdelfattah, University of Carthage*

9:45 Pakistan National Student Satellite Project for Space Engineering Education *Shakeel ur Rehman, SUPARCO*

10:00 Q&A

10:15 *Coffee/Tea Break*
Poster Session/Exhibit

10:45 Session 5: Regulatory and Legal Issues and Long-Term Sustainability of Outer Space Activities Part 1

Chairperson: Pontsho Maruping, South African Council for Space Affairs.

Rapporteur: Tomas Hrozensky, Matej Bel University

11:00 Regulatory and Legal Issues of Small Satellites *Niklas Hedman*
United Nations Office for Outer Space Affairs

11:15 An Introduction of Questionnaires on Small Satellites distributed in the Legal Subcommittee *Yukiko Okumura*
United Nations Office for Outer Space Affairs

11:30 Africa in Space: Legal Issues and Responsibilities related to Space Technology Development Programmes *John Olusoji, African Regional Centre for Space Science and Technology Education*

11:45 Small Satellites Related Regulations in South Africa *Nomfuneko Majaja, DTI*

12:00 Long-Term Sustainability of Outer Space Activities: Status of discussions in COPUOS and relevance for small satellite activities *Peter Martinez, University of Cape Town*

12:15 Q&A

12:30 *Lunch*

Afternoon

14:00

Session 5: Regulatory and Legal Issues and Long-Term Sustainability of Outer Space Activities Part 2

Chairperson: Pontsho Maruping, South African Council for Space Affairs.

Rapporteur: Tomas Hrozensky, Matej Bel University

14:00

Radio Frequency Spectrum Issues relating to Small Satellites

Linden Petzer, Radio and Satellite Communications, DTPS

14:15

Frequency Registration for Small Satellite Missions – ITU Workshop

Chuen Chern Loo, International Telecommunication Union

15:15

Coffee/Tea Break

Poster Session/Exhibit

15:45

Session 6: Other Aspects of Small Satellites

Chairperson: Laras Tusilowati, LAPAN

Rapporteur: Luis Monge Solao, ACAE

15:45

The problem of disposing CubeSats from Low Earth Orbits

Antonio Prado, INPE

16:00

The Design of a Ground Control Segment for a CubeSat development programme in Accra Ghana

Frederick Agyemang, Ghana Space Science and Technology Institute

16:15

Development of a satellite tracking ground station for the nSight-1 Cubesat mission

Francois Visser, Space Advisory Company

16:30

Research on High Performance Micro –nano Satellite for Earth Observation and Space Detection

Danying Fu, DFH Satellites Co., LTF (Chinese Academy of Space Technology)

16:45

Samanaú.SAT: Low cost environmental data collecting systems platform

Moisés Souto, Federal Institute of Education

17:00

Q&A

17:15

H2020 Space Call for RSA Researchers

DST NCP

18:30

Adjourn - Transfer to the hotel

Thursday, 14 December 2017

08:30 *Transfer to Symposium Site*

9:00 Session 7: International Experiences and Opportunities

Chairperson: Otavio Durão, INPE Narayan Prasad Nagendra, University of Erlangen-Nuremberg

Rapporteur: Narayan Prasad Nagendra, University of Erlangen-Nuremberg

- 9:00 The KiboCUBE Programme *Masanobu Tsuji, JAXA*
- 9:15 UNISEC-Global Challenge: How can we contribute to Sustainable Space Development? *Rei Kawashima, UNISEC-Global*
- 9:30 Celebrating 25 years of international collaboration around the nSight 1 mission *Sias Mostert, SCS Aerospace Group*
- 9:45 BIRDS Satellite Project as a Model for Capacity Building and International Cooperation towards Sustainable Space Program in Africa *Taiwo Tejumola, Kyutech*
- 10:00 Q&A

10:15 *Coffee/Tea Break*

10:45 Session 8: Poster Session

Chairperson: Riadh Abdelfattah, University of Carthage

Rapporteur: Mohamed Edries, NARSS

12:30 *Lunch*

Afternoon

14:00 Session 9: Way Forward

Moderators: Niklas Hedman, UNOOSA and Humbulani Mudau, DST

- 14:00 Symposium Review and discussion of forthcoming future activities under the Basic Space Technology Initiative and on the observations and recommendations to be included in the report to the United Nations Committee on the Peaceful Uses of Outer Space and to feed into the UNISPACE+50 process *All Symposium Participants*

Poster Presentations

No.	Name1	Name2	Institution	Poster Title
UN-01	Mariz	Dief	Zewail city for Science and Technology	Struggles facing developing countries in entering Space Industry
UN-02	Senior	Shimhanda	Namibia University of Science and Technology	The benefits of becoming a space-faring nation and potential satellite applications in Namibia
UN-03	Inumoh	Lawrence	NASRDA	Nano-Satellites Ground Station Configuration and Operation: Nigeria Experience
UN-04	Di	Zhang	Shenzhen Aerospace Dongfanghong HIT Satellite Ltd	A new remote sensing microsatellite platform
UN-05	Manoel Jozeane	Mafra de Carvalho	INPE	The New Brazilian Environmental Data Collection System
UN-06	Abdelkarim	Ahmed	University of Khartoum	Small satellite project for engineering education
UN-07	Natalia Indira	Vargas Cuentas	Universidad de Ciencias y Humanidades	Forest monitoring of TIPNIS - Bolivia, with the use of a small satellite with a multispectral camera
UN-08	Kai	Yoshihara	Nihon University	Estimation method for residual magnetic torque of Nano-satellite
UN-09	Christopher	Luwanga	SGAC	Why Countries Must Invest in Space Technology
UN-10	Mudessir Temam	Imamu	Fikadu Consulting Group	Role of Space Technology for Agriculture Production and Productivity
UN-11	Tomas	Hrozensky	Matej Bel University, Slovakia	Perspectives for common single legal and regulatory regime for space activities in countries members of Visegrad Group in Central and Eastern Europe (Czech Republic, Hungary, Poland, Slovakia)
UN-12	Smita	Francis	Namibia University of Science and Technology	Display of project sanctioned and approved by the UK space agency Capacity Development in Namibia using Nanosatellites
UN-13	Chidinma Joy	Iroka	NASRDA	Women and the Girl-Child in the Science, Technology, Engineering and Mathematics (STEM) Education
UN-14	Kechil	Kirkham	University of Cape Town	Small Satellite Application Design and responsiveness to end-user needs.
UN-15	Mabunda	Arthur	Cape Peninsula University of Technology	High Voltage DC-DC Converter for Ionic Micro Thruster Application

No.	Name1	Name2	Institution	Poster Title
UN-16	Louis	Feng	University of Cape Town	MEDUSA - Mechanism for Entrapment of Debris Using Shape memory Alloy
UN-17	Turcia	Busakwe	Space Advisory Company	On-Going HCD Activities with a Focus on Achieving Operational Capability with Nano-Satellite Programs
UN-18	Mike	McGrath	UAE University	The International Satellite Program in Research and Education (INSPIRE): An Overview
UN-19	Riddhi	Maharaj	University of Cape Town	In-Situ Resource Utilization of Lunar Regolith to Produce Silicon for Use In Photovoltaic Material to Support a Long-Term Human Presence on the Moon
UN-20	Jürgen	Lüdemann	Stellenbosch University	Sub-pixel image registration on an embedded satellite platform
UN-21	Barbara	Ojur	University of Cape Town	F.L.A.S.H.I - Fast-response Lightning And Sprite High-frequency Imager
UN-22	Bas	Martens	University of Cape Town	Fast-response Lightning And High-frequency Imager (FLASHI) A Space Mission Engineering Approach and Feasibility Study
UN-23	Carl	Eriksen	University of Cape Town	Fast response Lightning And Sprite High-frequency Imager - F.L.A.S.H.I.
UN-24	Luis	Monge Solano	Central America Association for Aeronautics and Space, ACAE	Project IRAZU the First Central America Satellite, a Store & Forward Cubesat Mission for Environmental in Costa Rica
UN-25				