

# UNISEC Southern Africa Region Activities



By

Willem Jordaan – South Africa PoC

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November 2024

# UNISEC-SAR Members

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## Founding

- Stellenbosch University (SU)
- Namibian University of Science and Technology (NUST)
- Cape Peninsula University of Technology (CPUT)
- Angola (Angolan National Office for Space Affairs)



## Joined

- University of Cape Town (UCT)
- Nelson Mandela University (NMU) - 2022
- **NEW - Botswana International University of Science & Technology (BIUST) - 2023**



# UNISEC-SAR History

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- Local Chapter UNISEC-SAR founded as one of 12 original UNISEC-Global members at 2<sup>nd</sup> Global Meeting in 2014
- Founding members: NUST (Namibia), NOSA (Angola), SU (South Africa), CPUT (South Africa)
- UNIGLO Meetings – All
- CLTP
  - 3 – Smita Francis – Namibia
  - 4 – Zolana Joao – Angola
  - 6 – Ivandro Rodrigues – Angola
  - 11 – Arno Barnard – South Africa
  - 12 – Rut Shiwambi
- HeptaSat
  - UN Workshop – SU 2017
  - SU 2023
- Nano-Sat Symposium and UNISEC Global Meeting – SU 2024

# UNISEC-SAR History

- Student teams in:
  - MIC1 – Semi finalists
  - MIC2 – First prize, Cat2 (CPUT), Student prize (SU)
  - MIC3 – IAA Award (SU), Finalist (CPUT)
  - DDC1 – Finalist (SU), Finalist (UCT)
  - DDC2 – Finalist (SU)
  - MIC5 – Finalist (SU)
  - MIC8 – Finalist (SU)

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# CPUT - SA

- MDA-Sat Constellation – First 3 Satellites Launched 13 Jan 2022

- Upgraded AIS receiver payload from ZACube-2:
  - Over the air upgrades
  - Raw data capture for diagnostics and signal interference
  - Long Range AIS via two channels
  - More effective messaging scheme to optimize the use of the data transmitter's bandwidth.

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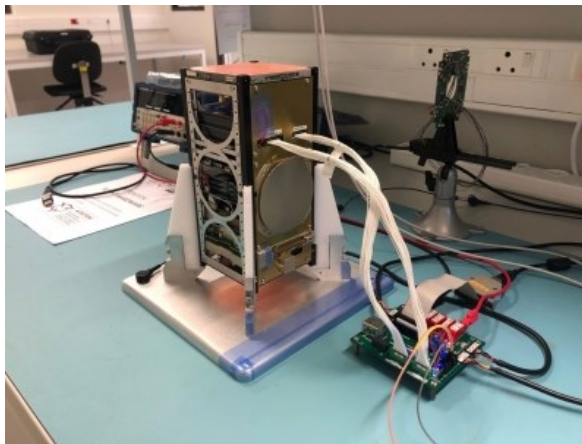
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# UCT - SA



- Offers MPhil in Space Studies
- Focus not only Satellite Engineering but also on regulation, space law aspects and orbital debris
- Recent research towards Synthetic Aperture Radar (SAR) for Small Satellites

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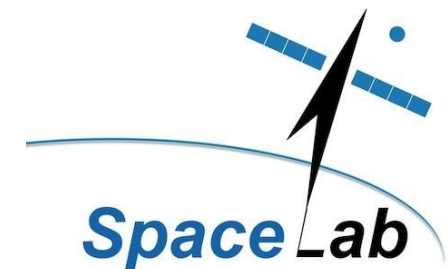
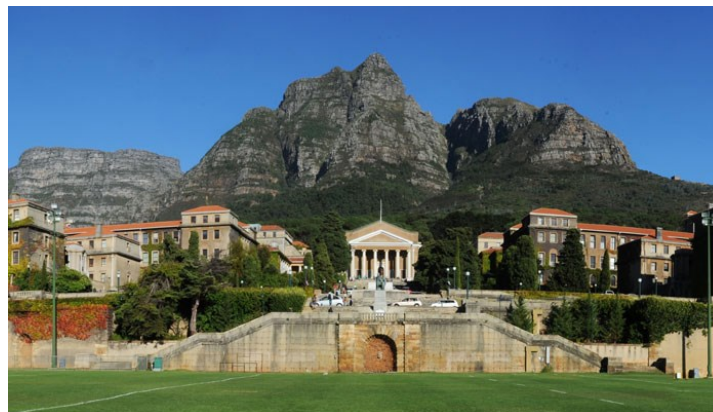
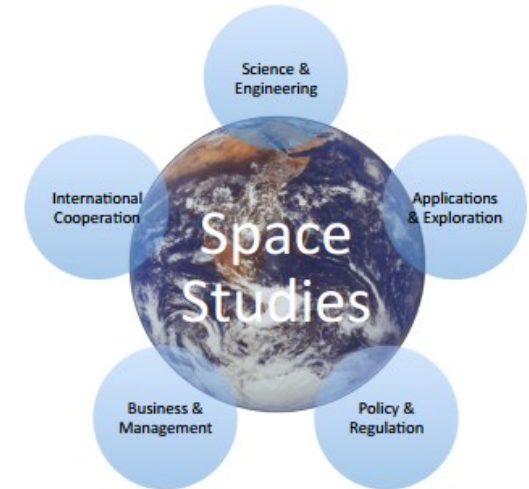
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# Angola - NOSA

- Zolana on LinkedIn: “After four years of hard work and setbacks, today, October 12, we successfully launched satellite ANGOSAT-2. The Solar panel rotated to the sun, and we fully control ANGOSAT-2. All satellite subsystems are nominal, and we will keep you posted”

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# NMU - SA

- 16 Years working in Radiation effects mitigation
- Space based FPGA systems

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NELSON MANDELA  
UNIVERSITY

Mechatronics



# Botswana International University of Science & Technology – New Member

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- BotSat1



# SU - SA



- 30 Years of satellite development
- Offers MEng (Research), PhD in Satellite systems
- Research Focus on Satellite hardware, Control Systems, Radiation effects testing
- Graduates are satellite engineers in most South African space companies

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# SU - SA

- Current conceptual mission = DockSat
- 2021 - 2<sup>nd</sup> place in the IAF-CSA Space Universities CubeSat Challenge
- 2021 - Presented at the 12th European CubeSat
- 2023 - Paper at IEEE Aerospace
- Demonstrate the in-orbit undocking and docking of satellites
- Require propulsion, accurate attitude control, pose estimation, custom docking mechanism
- Generates Masters and PhD projects

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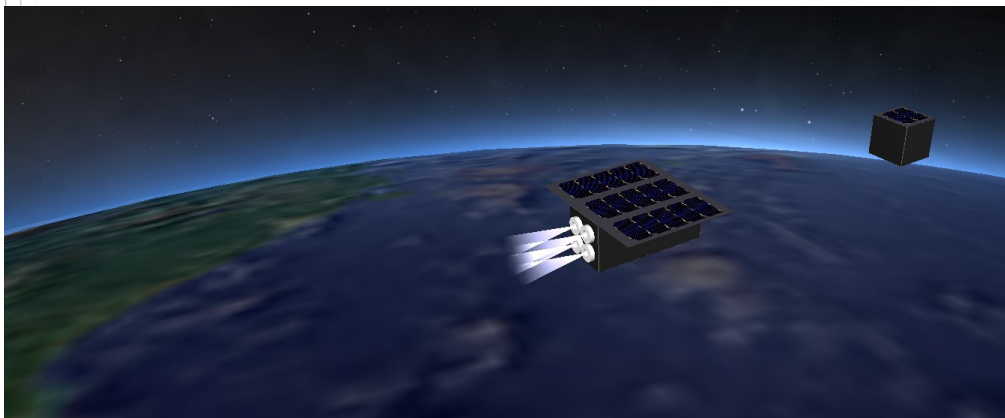
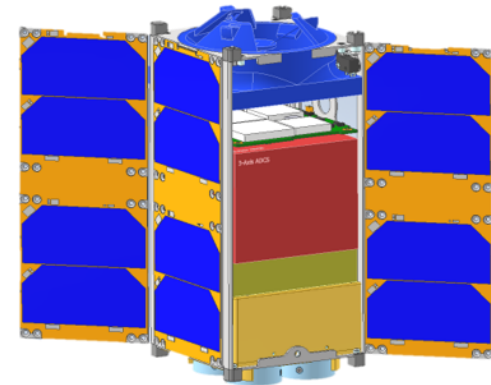
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# SU - SA



- Working on a number of PocketQube satellites
- It is a nice a low-barrier to entry target
- Able to be launched and deployed in many ways including high-altitude balloon, sounding rocket or orbital launch
- **Main mission: Develop a satellite-based relay station for IOT network for ground-based sensors**

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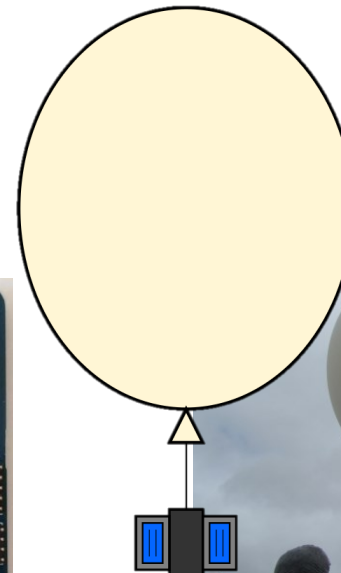
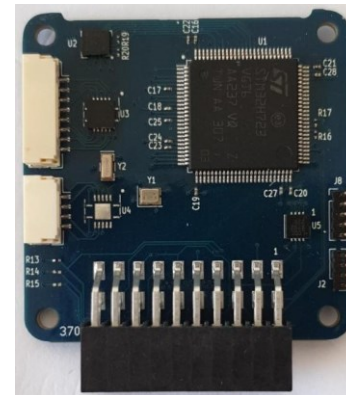
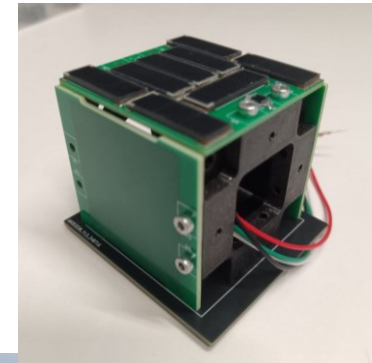
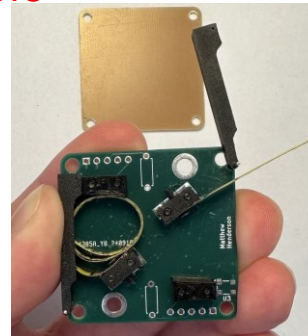
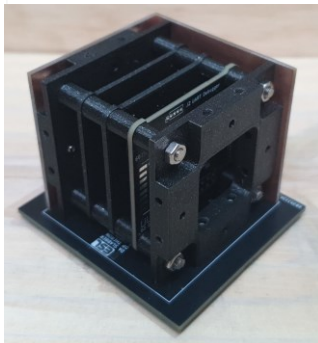
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# SU - SA



- Developed and hosting short courses
- Focuses on satellite mission design
- Contract experts from industry to assist in presenting topics
- In the past three years we have trained 90 local satellite engineering professionals

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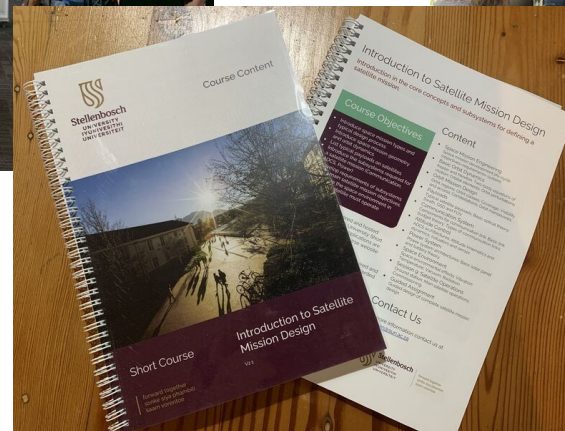
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# Recent UNISEC-Global Activity

- Host of 22<sup>nd</sup> UNISEC-Global Virtual Meeting: 18 Jun, 2022



**22nd Virtual UNISEC-Global Meeting**  
Host: UNISEC-SAR (South African Region)  
Time: 22:00 - 24:00 JST  
June 18, 2022

Moderator & Opening Remarks: **Arno Barnard**, Stellenbosch University

**PRESENTATIONS**

- Ivandro Rodrigues**, GGPEN-Angolan Space Office  
Topic: GGPEN Satellite Activities
- Robert van Zyl**, AAC SPACE AFRICA  
Topic: The Africa we want - how can nanosatellites contribute
- Mike-Alec Kearney**, CEO CubeSpace Satellite Systems  
Topic: TBD (Pre-recorded Presentation)
- Khalid Manjoo**, CEO of Astrofa Technologies  
Topic: Astrofa's 2020 Space Internship Program - A model for skills development and uptake into the Space sector
- Johan Erasmus**, ISISPACE South Africa Branch Manager & Systems Engineer  
Topic: ISISPACE Enabling offerings for HCD and Mission Success

**BREAKOUT SESSION**  
All Participants  
Moderator: TBC

**ANNOUNCEMENT & CLOSING**  
**Rei Kawashima**, UNISEC-Global  
and those who have announcements

*Theme: Satellite Engineering Training in Southern African Regions: The impact of Universities, Industry, and Government*

[HTTP://WWW.UNISEC-GLOBAL.ORG/VIRTUAL-MEETING.HTML](http://www.unisec-global.org/virtual-meeting.html)

- Participant at CLTP12: Aug 21 - Sep 1, 2023



**CLTP12**  
THE 12<sup>th</sup> CANSAT LEADER TRAINING PROGRAM

August 21-September 1, 2023  
Nihon Univ., Japan

**Participation fee**  
Academic: 550,000 yen (about 4,075 USD)  
Corporate: 1,100,000 yen (about 8,150 USD)

**Application Due**  
1) For a Partial Scholarship  
May 23, 2023  
2) For Self-Funded  
June 1, 2023

- Participant at CLTP11: 17 - 31 Aug, 2022



**CLTP11**  
THE 11<sup>th</sup> CANSAT LEADER TRAINING PROGRAM

Hands-on training  
**August 17-31, 2022**  
Nihon Univ., Japan

**Participation fee**  
Academic: 390,000 yen (about 3,100 USD)  
Corporate: 600,000 yen (about 4,700 USD)

**Application Due**  
18, May 2022

**Notification**  
8, June 2022

- Host of HEPTA-Sat training: Oct 30 – Nov 1, 2023



**HEPTA-SAT**  
3-day course

HEPTA-Sat Hands-on Training

Oct 30, 31, Nov 1, 2023  
Stellenbosch University, South Africa

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# Recent UNISEC-Global Activity

- Host of 13th Nano-Sat Symposium and 10th UNISEC-Global Meeting:  
18 Jun, 2022

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**Micro/Nano/Pico Satellite: Innovations in Architecture,  
Technologies and Education**

# Thank you



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## UNISEC-SAR POCs



Willem Jordaan  
South Africa



Arno Barnard  
South Africa



Smita Francis  
Namibia



Zolana Joao  
Angola