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# UNISEC Southern Africa Region Activities

by  
Prof Herman Steyn



UNIVERSITEIT • STELLENBOSCH • UNIVERSITY

Electronic Systems Laboratory  
Department of Electrical & Electronic Engineering  
Stellenbosch University

December 2019

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## UNISEC-SAR Members

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



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# Southern Africa and UNISEC

- SU & CPUT are established
- UCT has grown substantially
- NUST and Angola have great potential for growth
- Involved in UNISEC competitions
  - 1x semi-final MIC
  - 5x finalist MIC
  - 3x finalist DDC



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# CPUT

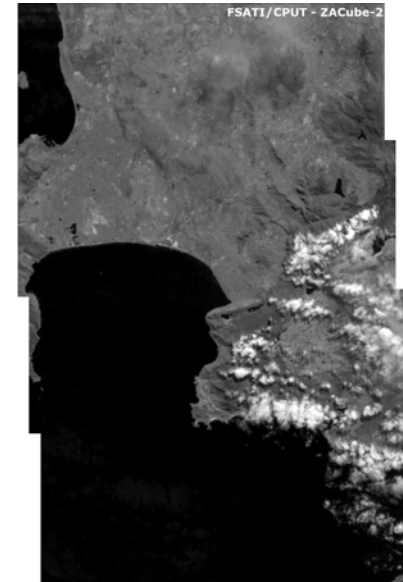


Cape Peninsula  
University of Technology

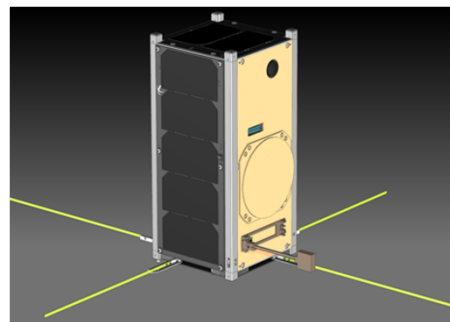
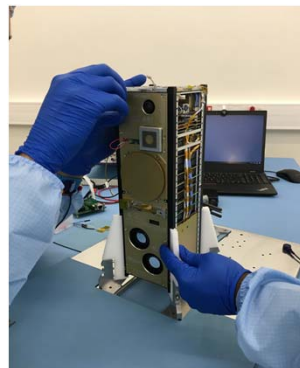
## ZACube-2

- Launched 27 December 2017
- Successfully commissioned and operated from the CPUT ground station with back up support by ground stations at Spaceteq and SANSA
- The 3U CubeSat is a technology demonstrator of two payloads:
  - Software define radio AIS receiver
  - Novel K-line medium resolution imager for forest fire detection
- Stellenbosch University supplied the ADCS
- **MDASat-1 (maritime domain awareness)**
- Constellation of 3x 2U CubeSats that will be launched in 2020
- Provide AIS services for vessel tracking in the South African EEZ

Both missions are funded by the South African Government.

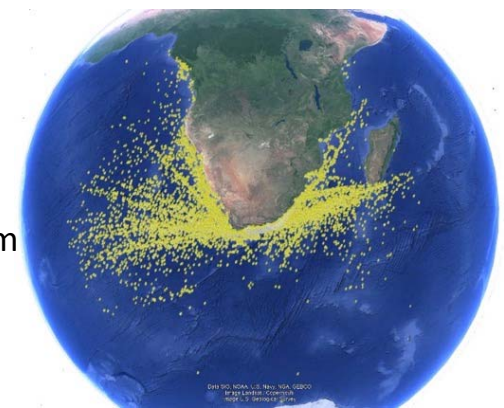


K-line image of  
Cape Town



ZACube-2 MDASat-1

ZACube-2 AIS  
messages from  
23 payload  
sessions



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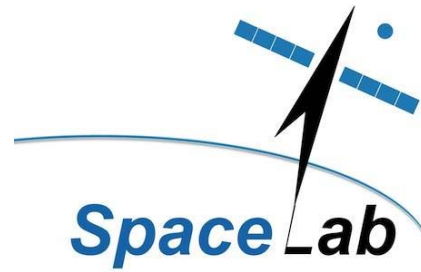
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**UCT**



- Offers MPhil in Space Studies
- Focus not only Satellite Engineering but also on regulation, space law aspects and orbital debris
- 14 papers presented at IAC 2017
- Student won award for best individual proposal at ESA's Sentinel Smallsat S3 Challenge







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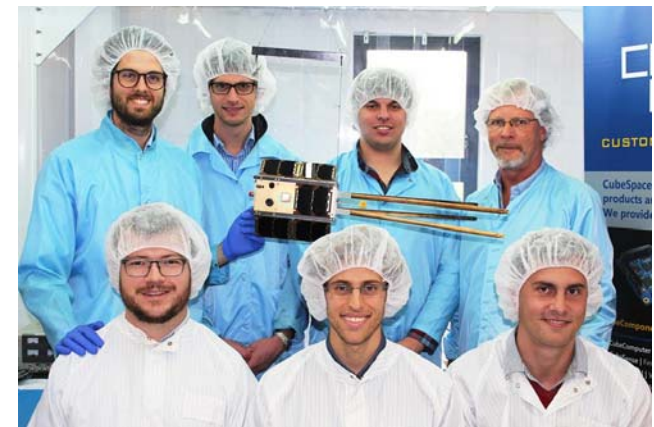
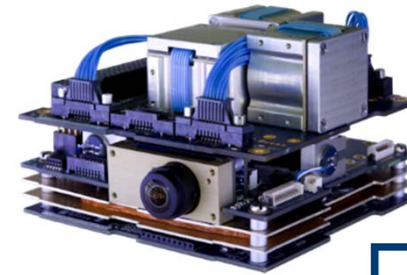
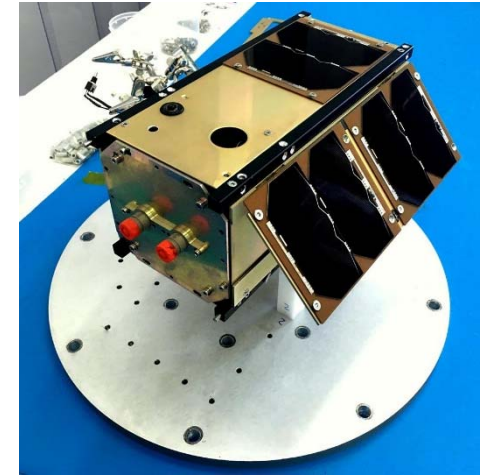
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# Stellenbosch University - CubeSpace

- All engineers are past UNISEC – MIC competition participants
- Focuses on ADCS and space radiation research
- Continue to develop ADCS CubeSat components which are sold through CubeSpace
- Started as QB50 Mission contribution
  - Stb Univ's ZA-Aerosat
  - Design/Components for nSight-1
  - ADCS supplied for 15 teams
- Involved in interesting international projects including RemoveDebris



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# HEPTA Workshop



- Held prior to the UN-BSTI Conference in Stellenbosch on 9 – 11<sup>th</sup> December 2017
- Facilitated by Prof Yamazaki and Dr Yoshihara from Nihon University
- 18 Participants, 9 local from Unisec SAR, 9 international students







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# NIST CANSAT Workshop



NAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY



- Held 17-19<sup>th</sup> April 2018 at Namibia Univ of Science and Technology
- Facilitated by Prof Kim Sangkyun (Unisec) and Dr Smita Francis (NUST & NIST)
- Workshop for students and faculty from Electrical Engineering Dept





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# Angola CANSAT Course/Workshop

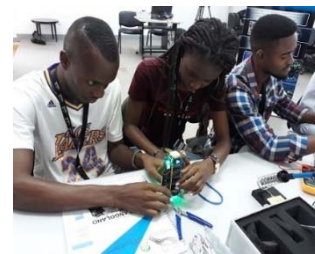
- Held 17<sup>th</sup> May -20<sup>th</sup> June 2019 in Luanda Angola (5 weeks)
- Facilitated by specialists from the Angolan National Space Office (GCPEN) and international experts
- 116 Participants from 28 National HEI



“10 Cansats launched by helicopter at 500 m altitude, and telemetry successfully received”



1<sup>st</sup> -Two weeks course on (space mission and satellites)



3<sup>rd</sup> One week-Cansat testing



2<sup>nd</sup> One week- design and integration



4<sup>th</sup> Three days-Helicopter Cansat launch



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# Thank you

## UNISEC-SAR POCs



Arno  
Barnard



Zolana  
Joao



Smita  
Francis