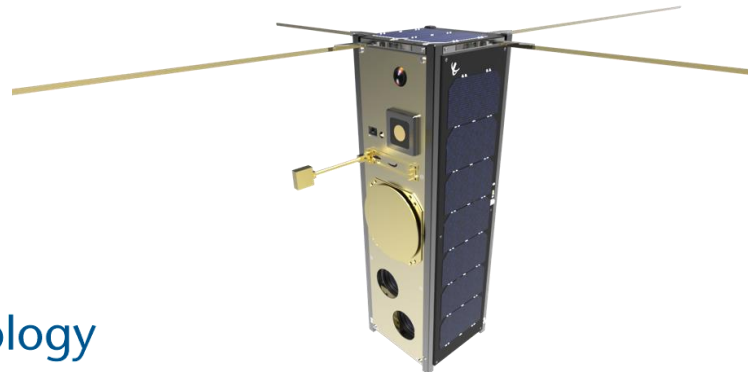# ZACube-2, a South-African Maritime Domain Awareness and fire detection demonstrator mission

15th Annual CubeSat Developers Workshop

San Luis Obispo, 30 April – 2 May

Leon Steenkamp, Robert van Zyl

Cape Peninsula
University of Technology

F'SATI
French South African Institute of Technology

# CPUT Satellite Programme





- The only University of Technology in the Western Cape
- The largest university in the Western Cape, 32 000 students
- Merger of two technikons in 2005 – we are only 12 years young!
- Diverse students population: 87% black
- Satellite programme established in 2009
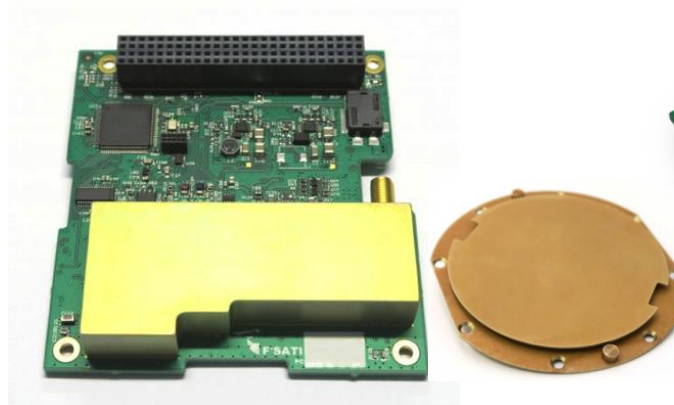
# Workshops
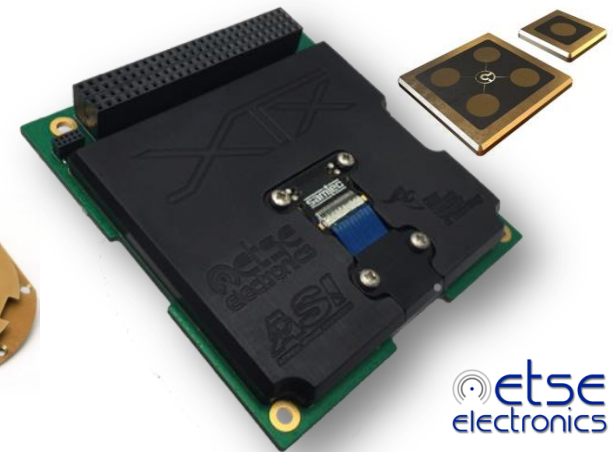
# Facilities

# What we do

## Technology innovation | Subsystems Payloads Missions



UHF/VHF and UHF/UHF Transceivers
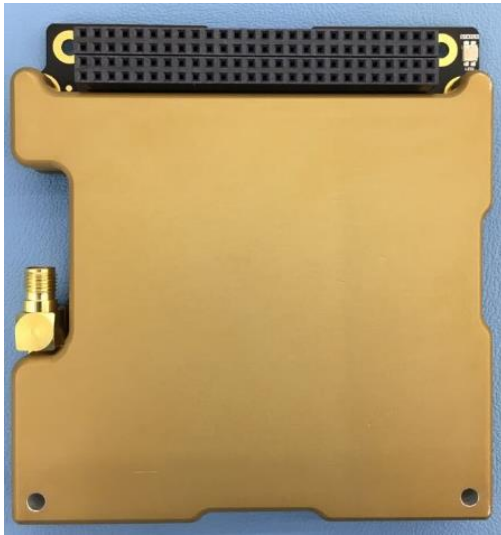(Amateur and commercial)

S-band Transmitter and Antenna
(Amateur and commercial)

X-band Transmitter and Antenna
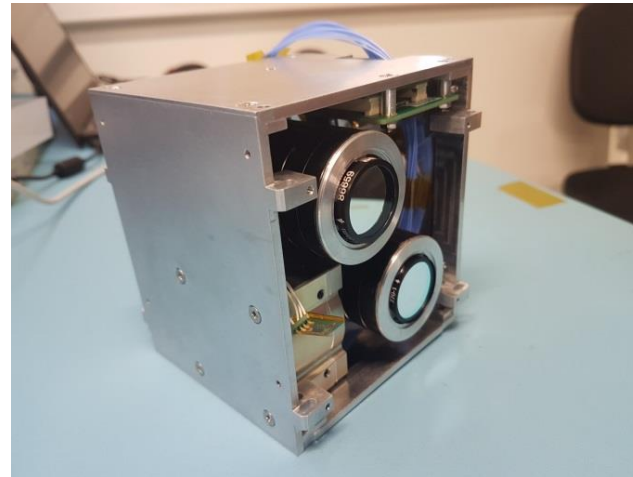(Commercial)

# What we do

## Technology innovation | Subsystems Payloads Missions



**StoneThree**
Venture Technology

SDR for ship tracking AIS/VDES receiver (Phakisa)



**CSIR**
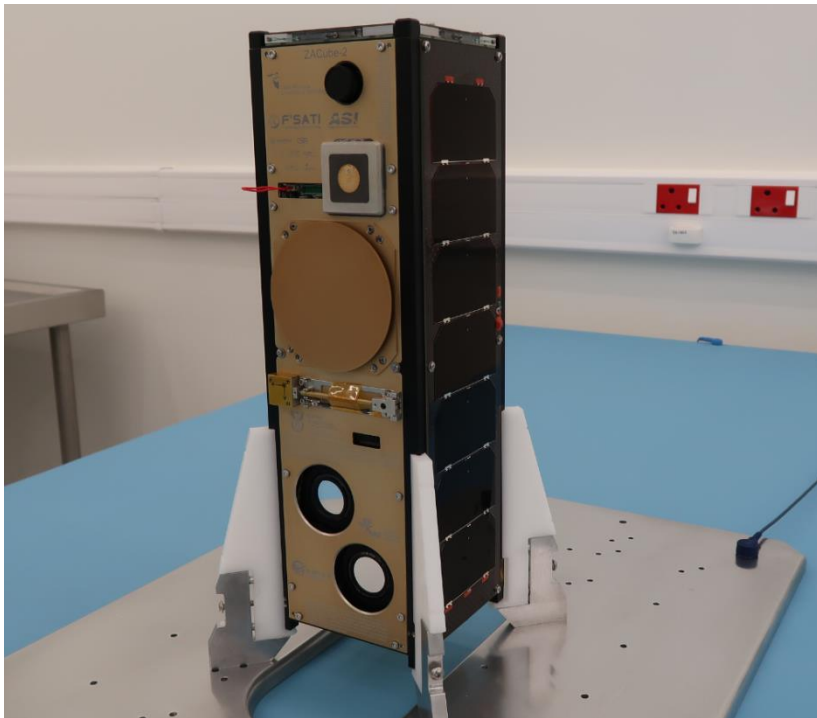our future through science

Fire detection camera (ZACube-2)

# What we do

## Technology innovation | Subsystems Payloads Missions
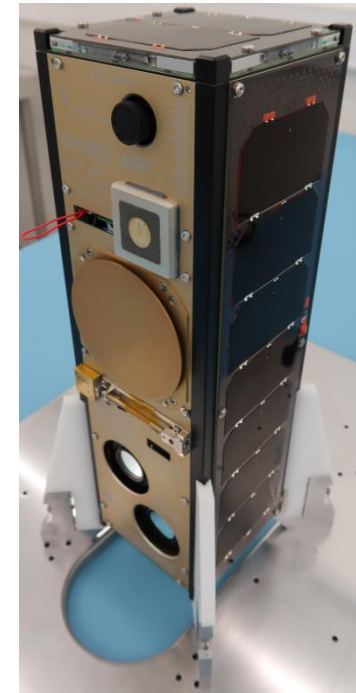


ZACube-2 (Launch mid-2018)





ZACUBE-1 / "TshepisoSAT"
Launched 21 November 2013

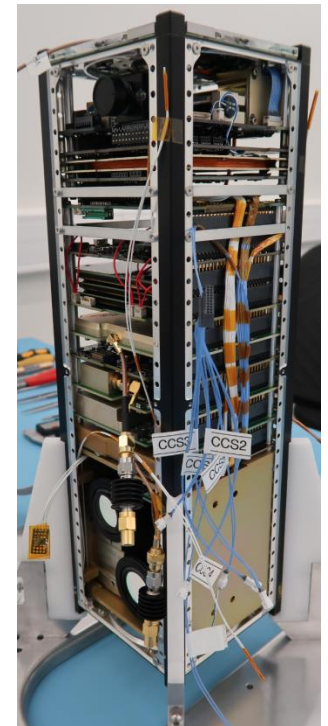# Phakisa Phase 1 | ZACube-2

## Mission Objectives

- Precursor to MDASat constellation

- Technology demonstration of **AIS/VDE** message reception using the primary payload

- Technology demonstration of a **medium resolution imager** payload
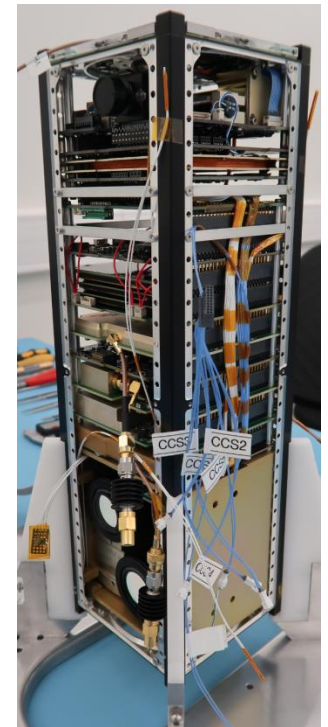
# Phakisa Phase 1 | ZACube-2

- Software Defined Radio AIS/VDES receiver

- K-line fire detection imager

# Phakisa Phase 1 | ZACube-2

- CPUT UHF/UHF telemetry and tele-command transceiver (UTRX)

- Two CPUT payload data transmitters
  - S-band HSTX   (10 Mbit/s)
  - X-band XTX     (50 Mbit/s)

- CubeSpace ADCS 3-Axis stabilised

- Spaceteq MCS        DENEL SPACETEQ

- In-flight reprogrammable

Cape Peninsula University of Technology

science & technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

sansa
SOUTH AFRICAN NATIONAL
SPACE AGENCY

NRF National Research Foundation

OPERATION PHAKISA
planning | implementation | growth

# Phakisa Phase 2 | MDASat

- Maritime Domain Awareness constellation

- Collection of statistical data in the South African maritime zone, with a special focus on vessel detection.

- The primary geographic focus is the coastal waters of South Africa but also offers MDA expansion to a global scale.
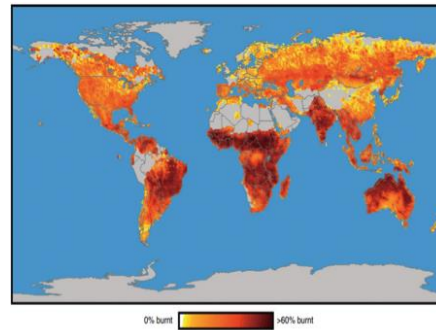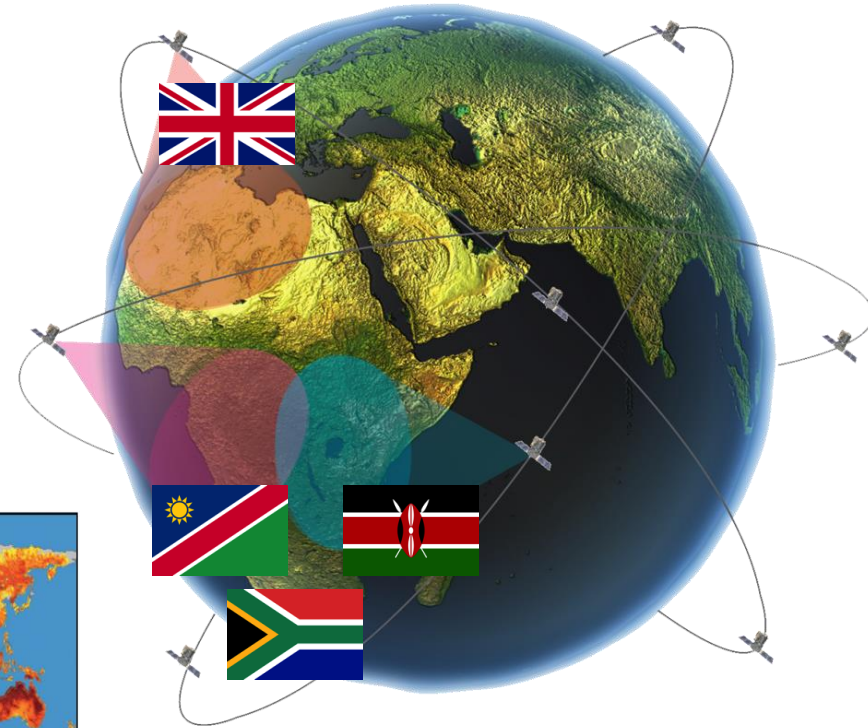
# Phakisa Phase 2 | Partners

# FireSat

- UK Space Agency International Partnership Programme
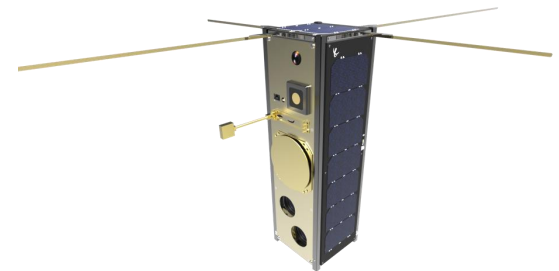- Global fire detection services

# Thank you

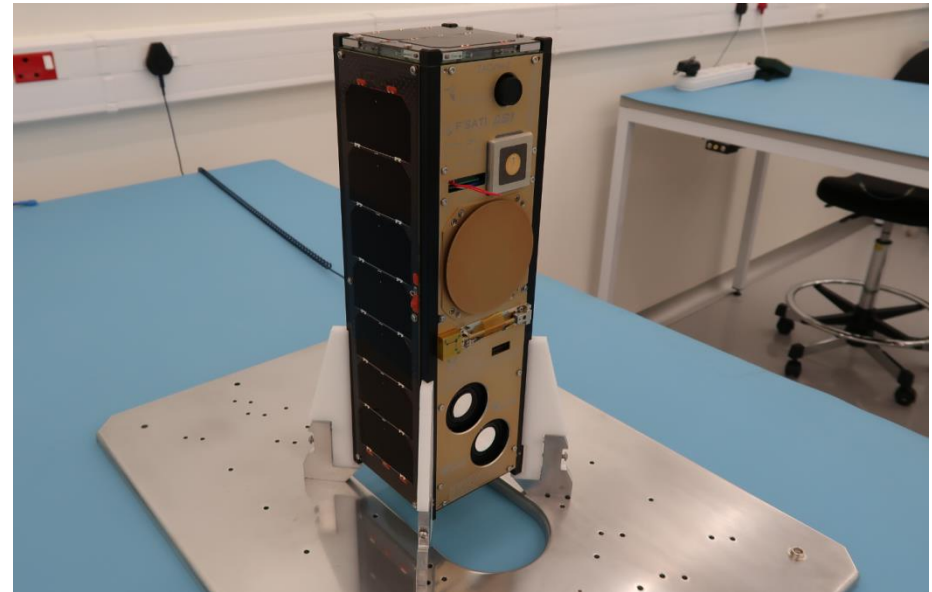🐦 fsatispace

http://www.cput.ac.za/fsati
French South African Institute of Technology

Cape Peninsula
University of Technology

F'SATI
French South African Institute of Technology