ZACube-2
pioneering South Africa’s indigenous capability in maritime domain awareness solutions for Africa

56th Session of the Scientific and Technical Subcommittee
UNOOSA, 19 February 2019
Agenda

• African maritime domain

• South African maritime domain

• South African “ZACube” nanosatellite missions

• Future constellations
African maritime domain

- Africa is a vast continent.
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African maritime domain

- Its coastline spans \( \frac{3}{4} \) of the circumference of the Earth.
- 38 African countries are coastal or island states.
- Half of its over 100 port facilities handle containers and various forms of cargo.
African maritime domain

2050 Africa Integrated Maritime Strategy

• *Africa’s inland waters, oceans and seas are under pressure.*

• *International trade is very critical to many African economies, with over 90% of Africa’s imports and exports conducted by sea.*
The overarching vision of the 2050 AIM Strategy is to

- foster increased wealth creation from Africa’s oceans and seas by
- developing a sustainable thriving blue economy in a
- secure and environmentally sustainable manner.
African Space Programme

40
AUC objectives

35
serviced by
space applications
African Space Programme
South African Maritime Domain

Operation Phakisa

- Presidential priority initiative
- Government, civil society, private sector, academia and other stakeholders plan together and collaborate in unlocking the economic potential of South Africa’s Oceans
### South African Maritime Domain

#### Operation Phakisa focus areas

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South African Maritime Domain

Operation Phakisa **focus areas**

1. Marine Transport and Manufacturing
   - Small Harbour Development
2. Offshore Oil and Gas exploration
3. Aquaculture
4. Marine Protection Services and ocean Governance
5. Coastal Tourism
South African Maritime Domain

MPSG focus area

National Oceans and Coastal Information Management

Decision support tools for:
- Marine spatial planning
- Coast flood hazard
- Harmful algae bloom
- Water quality
- Sea state
- Marine domain awareness
South African Maritime Domain

OCIMS MDA decision support tool **Integrated Vessel Tracking**

- Synthetic aperture radar
- Satellite based AIS
South African Maritime Domain

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Satellite MDA applications **AIS and VDES**

**AIS**
- Automatic tracking systems used for vessel traffic services
- Now also satellite based
- Provides
  - identification
  - position
  - course
  - speed
  - etc

**VDES**
- AIS+
- Higher bandwidth
- Maritime machine to machine communications
  - Ship-ship
  - Ship-shore
  - Ship-satellite
It is up to us to ensure that Africans are not only treated as consumers of technology, but also as developers and managers of innovation.

Honourable Mr Cyril Ramaphosa, President of the Republic of South Africa
South African “ZACube” missions

- Strengthening and expanding existing Human Capacity Development programmes like the satellite engineering programme at the Cape Peninsula University of Technology.
- Manufacturing, integrating, testing and launching EOSat1 and ZACUBE-2.
- Manufacturing and launching South Africa’s first indigenous cube satellite constellation to provide automatic identification system services to Operation Phakisa and the African continent.
South African “ZACube” missions

ZACube-1, launched 21 November 2013, Africa’s first!
South African “ZACube” missions

ZACube-2, launched 27 December 2018
South African “ZACube” missions

ZACube-2, launched 27 December 2018

- Primary payload:
  - AIS receiver
- Secondary payload:
  - K-line camera for forest fire detection
- Communications
  - VHF, UHF, S- and X-bands
  - 3-axes stabilisation
South African “ZACube” missions

ZACube-2 AIS data
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Future constellations

MDASat, 2019 - 2022
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