

ENABLING THE BLUE ECONOMY THROUGH SPATIAL INFORMATION SYSTEMS

The South African National Oceans and Coasts Information System

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Phakisa Vision



Environmentally Sustainable & Responsible Growth

Oceans Economy is part of the **Nine Point Plan** launched by President J Zuma in February 2015, for **Growing the South African Economy**

South Africa's **ocean economic potential** ranges between **R129 and R177bn by 2033***, with between **800 000 to 1 million jobs*** created



Projected GDP contribution and job potential were determined, reflecting economic realities at the time with certain underlying assumptions

Phakisia Focus areas

1



- Marine Transport and Manufacturing

2



- Offshore Oil and Gas Exploration

3



- Aquaculture

4



- Marine Protection Services and Ocean Governance

5



- Small Harbours Development

6



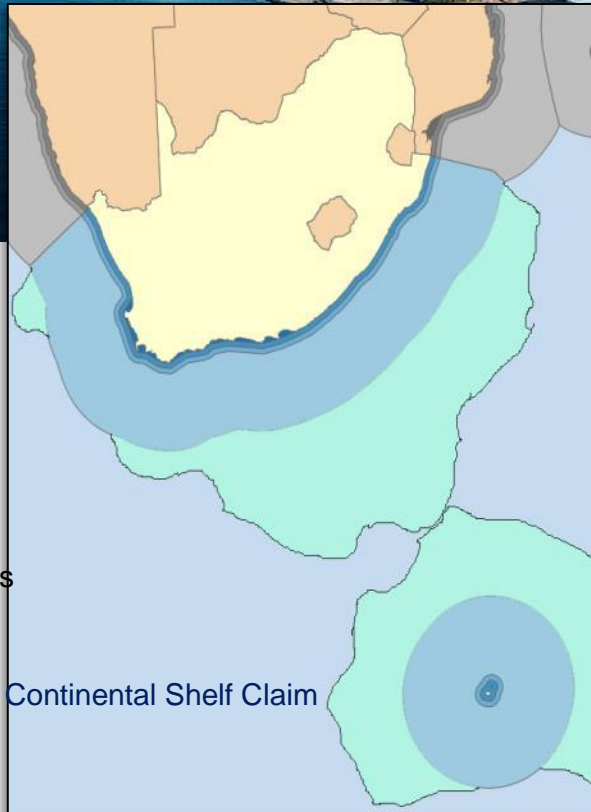
- Coastal and Marine Tourism

Sector Values and Economic Goals

South Africa's ocean economic potential ranges between R129 and R177 bn by 2033, with between 800 000 to 1 mn jobs created

	GDP, R billion		Jobs, 000	
	2010	2033	2010	2033
Marine transport and manufacturing	16	42-61	15	40-56
Tourism	15	25-35	90	150-225
Offshore oil and gas	4	11-17	0.4	0.8-1.2
Construction	8	20-21	162	390-407
Renewable energy	0	14-17	-	0.9-1.1
Fisheries and aquaculture	7	10-16	30	170-250
Communication	4	7-10	19	35-52
Desalination	0	0.1-0.1	0	1.6-1.6
Marine protection services	-	-	-	-
Total	54	129-177	316	788-1,004

South Africa Oceans Challenge



Land Size:

1.2 million km²

Exclusive Economic Zone (EEZ) Size:

1.5 million km²



South Africa Oceans Challenge

With such a large ocean jurisdiction, effective governance will be challenging given the size and complexity

~3,900 kilometres of coastline



~20 key departments and institutions in the marine environment with distinct roles and maritime policies



~50 national acts regulating marine governance



4 coastal provinces with their own socio-economic context and development goals



Ocean Observations | Introduction



More and More ... data is processed and represented in some form of map, however the pace and change in the real-world requires enhanced processing to provide real-time and real-world context to the observations.

The South African shelf seas, the South Atlantic, Indian and Southern Oceans are a vast, remote and in some places inhospitable domain. Effective governance requires the availability of a broad range of information for this large, remote and rapidly changing area.

Satellites are the only way of quickly and routinely providing such information

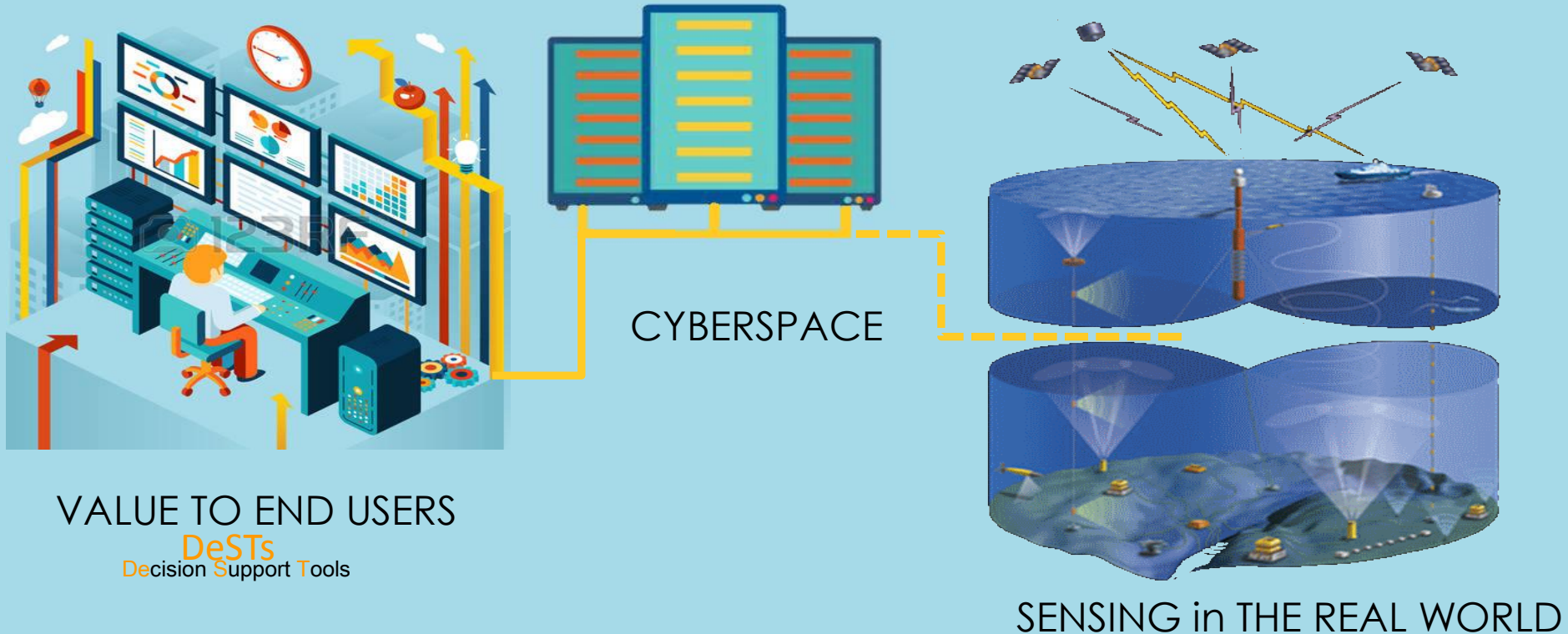
Ocean Observations | **strategic view**

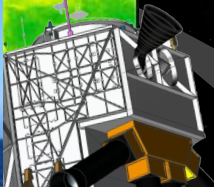


- Monitoring of the Southern Oceans, in the 1.3m Km² that form the SA EEZ, has been a concentrated effort for many years though not systematically or co-ordinated
- A range of **remote sensing analytics and in-situ measurements** are performed regularly, though not yet operationally in the oceans around the South African coastline and in the oceans between South Africa and the Antarctic
- **Localised Mature and demonstrable solutions** exist for
 - Monitoring Marine and Coastal ecosystems
 - Operational Maritime Domain Awareness (ship traffic, pollution, security)
 - Understanding the Oceans role in the Carbon Cycle
 - Observing the biological and biogeochemical marine and freshwater ecosystems

Decision Support Value Chain

underpinned by operational linked sensing and modelling systems

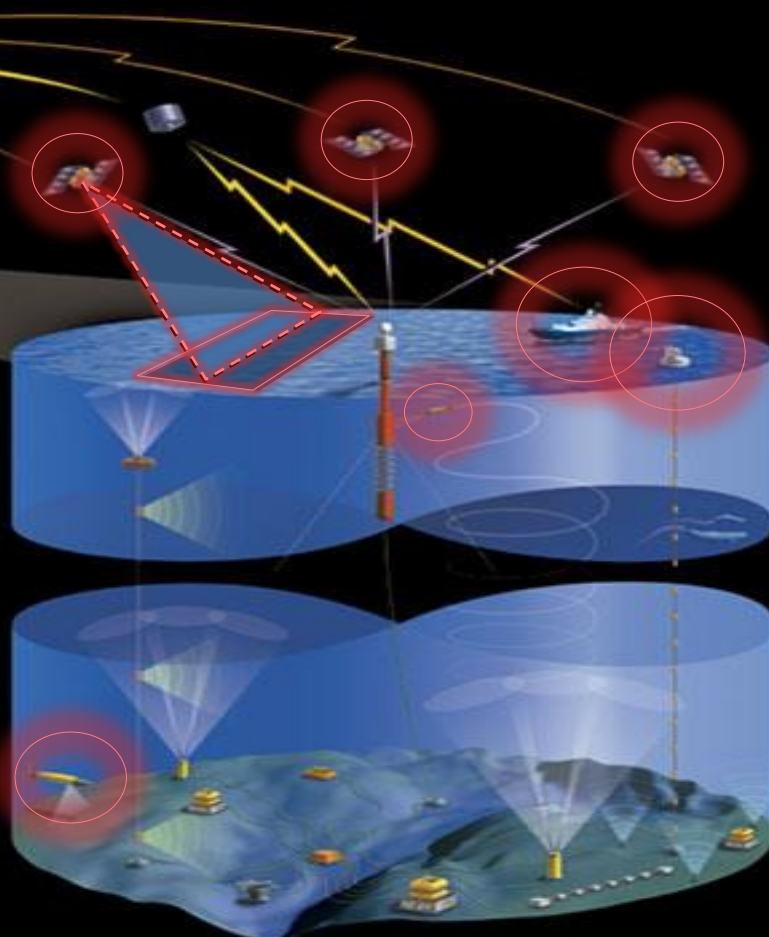




In the last 2 years: 8 gliders deployed, cumulative 32 months glider time at sea, cumulative travel to Brazil and back – all controlled from 3000 km away

**SA's ocean robotics capabilities:
Southern Ocean Seasonal Cycle Experiment (SOSCEX)**

Many many contributors...
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EO/Spatial Data

Advanced SDI

Analytics

User Experience



Geo-Spatial
Processing Platform
SDI
Data Repository
Security



HABs



MPA
Alerting



Hazard lines



Environmental
Variables



Near Shore
Ops at sea



Vessel
Tracking



Oily Bilge
detection



Media
Monitoring



OCIMS and SEAFAR

Early Benefit Assessment



2015



2016



2017

Annual contribution to GDP: R200M
Retail Price: ~US\$38-42/kg
Economic value of Event: R114M
57% of annual GDP contribution

Annual contribution to EC GDP: R500 M
Retail Price: ~US\$1200/ton
Economic Effect of 2016 Event: R70M
14% of annual GDP contribution

Annual contribution to GDP: R1.02 Bn
Retail Price: ~US\$1200/ton
Economic Effect of 2017 Evnt: R70-R140M
10% of annual GDP contribution

200 tons

Tons of lobster die after red tide
Cape Town - Two hundred tons of West Coast rock lobster - starved of oxygen because of the red tide - have died at Stans Bay after a mass 'walkout'.
On Wednesday, warning of 20 tons of lobster were stranded in Stans Bay, the latest casualties since the start of the red tide about 10 days ago.
About 30 tons of lobster walked out on Monday and more than 70 tons on Tuesday.
The fisheries branch of DAFF said on Wednesday about six tons of live lobster had been rescued on Monday, but the bulk of the stranded lobsters had died and were being collected and dumped at a municipal dumping site.
Rescued lobsters were removed and released in areas on the West Coast unaffected by red tide.

600 tons of looted squid on trawlers
By MIKE LOEWE on May 24, 2016 in News - 0 Comments

Share this article

Three foreign-owned fishing trawlers allegedly looted 600 tons of lucrative South African chokka (squid) valued at R70-million as well as tons of fish from Eastern Cape waters.

ROCKY SEAS: Indonesian fishermen stand on their boat at East London harbour yesterday morning. Picture: STEPHANIE LLOYD

Abagold in red tide sales alert
The abalone farming firm is still assessing red-tide damage.

Unlabeled abalone farming vessels are still assessing damage.

Monstrous red tide is the largest ever

Protecting the fishing industry

Annual contribution to Provincial GDP: \$50 Million
Retail Price: ~US\$3000/ton
Economic Effect of 2016 Event: \$2M 4% of annual GDP contribution



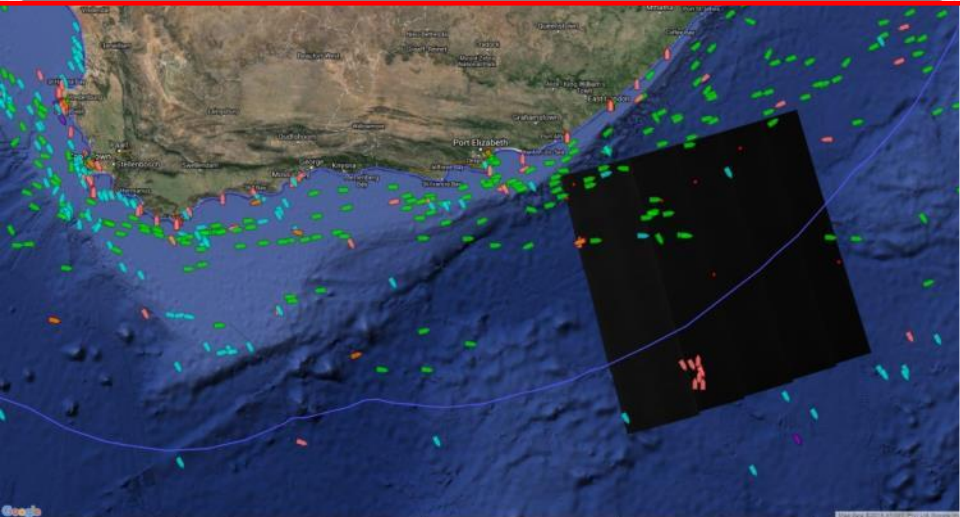
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HOME NEWS + OPINION + SPORT LEISURE + WEDDINGS CLASSIFIEDS

600 tons of looted squid on trawlers

By MIKE LOEWE on May 24, 2016 in News · 0 Comments



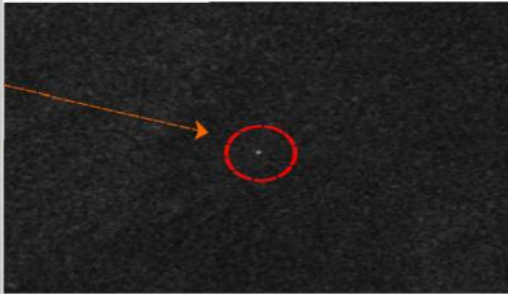
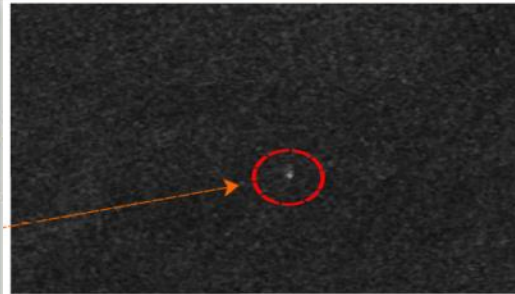
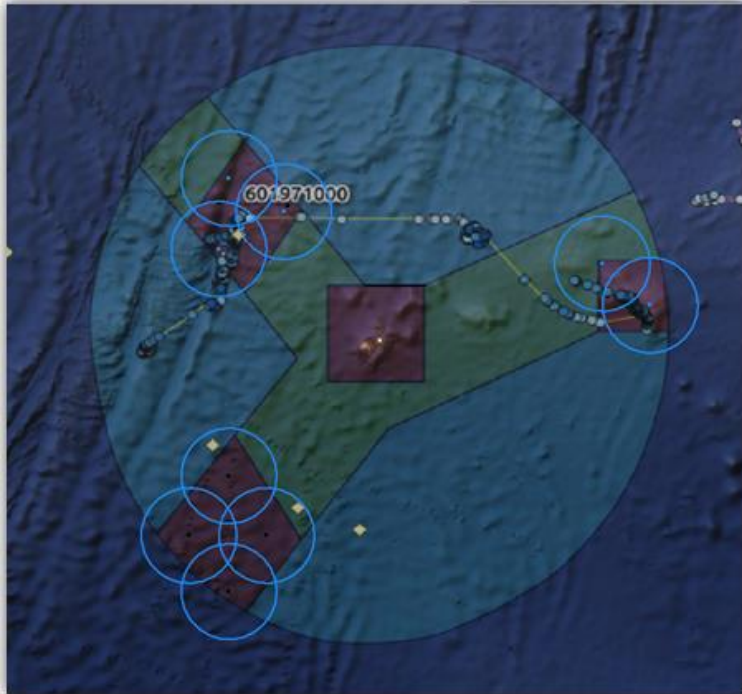
- Vessels detected in SA EEZ using AIS
- Remote Sensing analytics flagged the vessels as being unauthorised and violating RSA regulations
 - AIS Spoofing
 - No fishing permits
- Radio interaction with Ship led to them turning AIS off and trying to flee SA EEZ
- SAR data used to detect Dark targets in the area
- Spatial Notification System fed locations to intercept vessel

Tracking Illegal Fishing



AI Detection of Vessels

Dark vessels detected on 10/07 200km South of Island



10/06 – 12/07

10

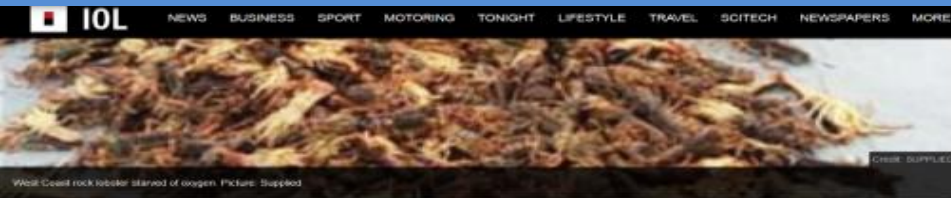
Total number of dark vessels (no AIS) detected within the Marion Island EEZ

Marion Island is a declared special nature conservation park and Sovereign South African Territory

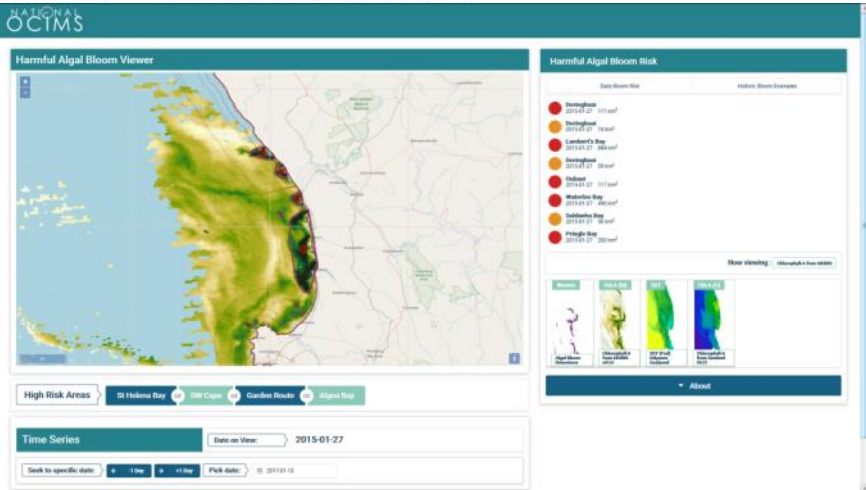


Preserving the Rock Lobster

Annual cont to GDP: \$20M Retail Price: ~US\$38-42/kg
Economic value of Event: \$11.4M 57% of annual GDP cont



Tons of lobster die after red tide
SCITECH/SCIENCE/ENVIRONMENT / 12 February 2015 at 11:02am
By Melanie Gosling
Cape Town -Two hundred tons of West Coast rock lobster – starved of oxygen because of the red tide – have died at Elands Bay after a mass “walkout”.



- Remote Sensing algorithms using a fused product of Sea Surface Temperature, Met Data and Ocean Color
- Routine ingest of satellite data and local processing
- Automated spatial notification system constantly forecasts for intercepts between the HABs and Marine Spatial Plans to determine risk levels
- Alerts sent to end users eg Aquaculture (fish farms), Env Protection Agencies, Local Municipalities

Preventing Economic loss to Aquaculture

BusinessDay

WORLD NATIONAL POLITICS COMPANIES ECONOMY BUSINESS WORK

COMPANIES

DIVIDEND SKIPPED

Abagold in red tide sales alert

The abalone farming venture warns shareholders it is still assessing red-tide impact

20 MARCH 2017 - 06:05 by MARC HASENFUSS

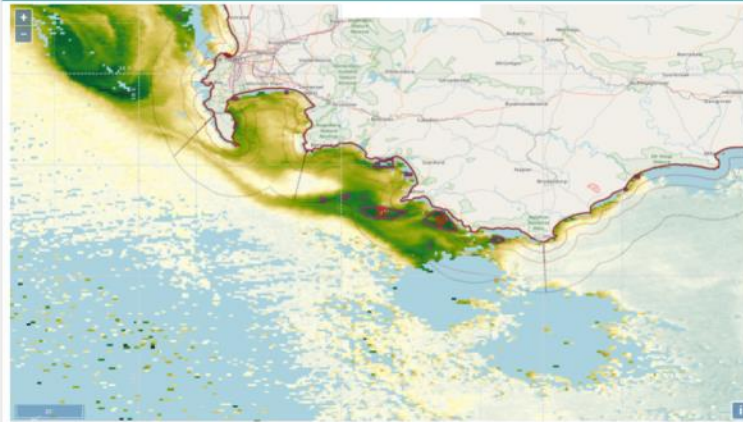


Picture: RAPPOORT/STEVE EGGINGTON/GALLO IMAGES

Unlisted abalone farming venture Abagold has warned shareholders it is still assessing the effect of a recent red-tide

NATIONAL OCTIMS

Harmful Algal Bloom Viewer



High Risk Areas

St Helena Bay or SW Cape or Garden Route or Algoa Bay

Time Series

Date on View: 2017-01-16

Seek to specific date:

← -1 Day

+1 Day →

Pick date:

2017-01-13

Harmful Algal Bloom Risk

Daily Bloom Risk Historic Bloom Examples

- Doringhaai 2017-01-16 495 km²
- Lambert's Bay 2017-01-16 246 km²
- Doringhaai 2017-01-16 495 km²
- Walker Bay 2017-01-16 83 km²
- Oudbaai 2017-01-16 67 km²

Now viewing: Chionochytl A from MOSES



About

CSIR
our future through science

Integrated Maritime Products Multi-Sensor Monitoring of Environment and Security

1. 230km long slick detected 20:40 21st February by SAR sensor

2. Path of polluting vessel *Salvage Champion* from AIS data

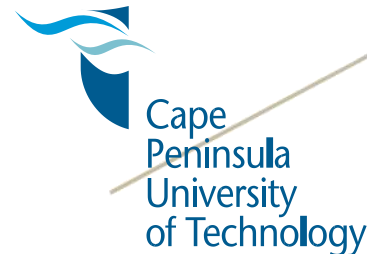
3. 230km long slick detected 07:49 22nd February by MERIS sensor, 18km downstream from initial location

Integration of Synthetic Aperture Radar, AVISO, Ocean Colour and AIS vessel identification data in a Google Earth environment for a maritime pollution incident example

ZACUBE-2 – Nano Satellite

- 3U platform
- Launch Q1/2018
- Flexible Software Defined Radio to enable connectivity M2M
- SDR will allow reception of AIS message and will be VDES capable
- **Medium resolution imager**

Funding from DST and SANSA acknowledged.



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French South African Institute of Technology



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Biodiversity for Life

South African National Biodiversity Institute



Saldanha Bay Water Quality Trust



iSimangaliso Wetland Park



FishFORCE
Fisheries Law Enforcement Academy



WSU
Walter Sisulu University

A scenic view of a coastline with waves crashing against a rocky shore, with mountains in the background. The text is overlaid on the image.

Africa – 38 Coastal States.
AU Integrated Maritime Strategy
2050 – Estimates \$1 Trillion/annum



Scale Up

Towards achieving the Africa Blue Economy Supported by GMES-Africa

co-designed decision-making services to promote sustainable management of marine resources, improve marine governance, and stimulate growth of the blue economy in the South and East African regions