Overview of the DST vision for the sector: Marine & Antarctic Research Strategy

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Presentation by DST
B3: Kick-Start Workshop
23 July 2015

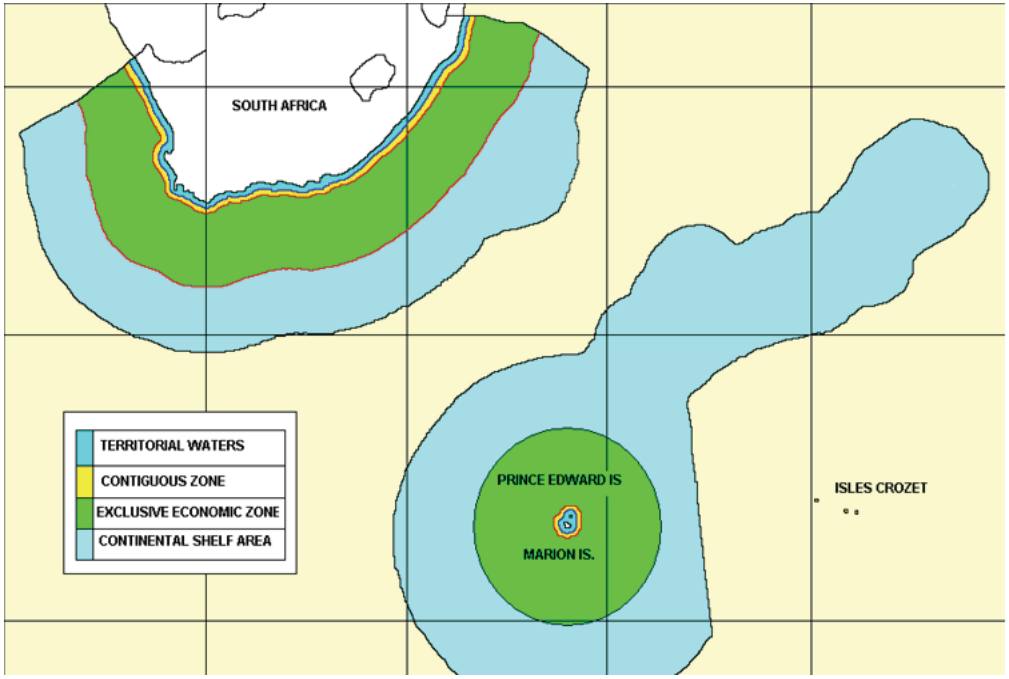
science & technology
Department:
Science and Technology
REPUBLIC OF SOUTH AFRICA

Overview

- Strategic context – geographic advantage, environmental management
- Vision, mission, objectives
- Development of strategy
- Foundation of research plans
- Framework and thematic priorities
- Implementation of strategy
- Way forward

Strategic perspectives (1/2)

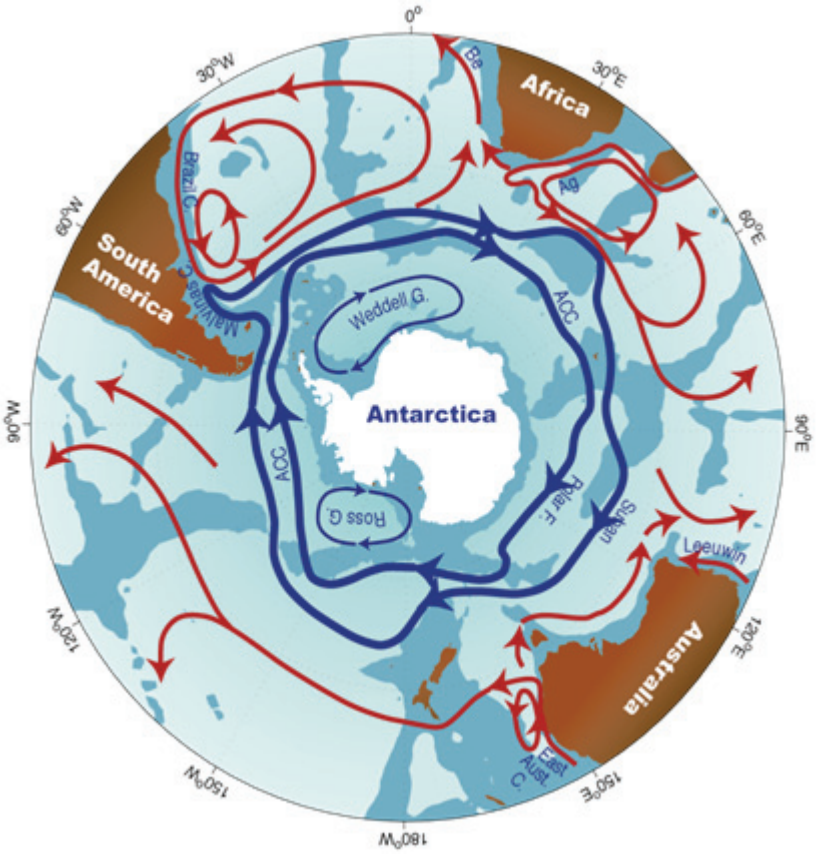
- SA is surrounded by the ocean on 3 sides and has a coastline of 3924 km long.
- The coastline includes South Africa's sovereign possessions of Prince Edward and Marion Islands (collectively called the Prince Edward Island Group).
- Prince Edward Island coastline 32 km, Marion Island 134 km.
- The size of SA Exclusive Economic Zone (EEZ) is 1,553,000 square km.
- Indications are that a successful Continental Shelf claim will add an additional 880 000 square km to SA EEZ.



SA Navy

Strategic perspectives (2/2)

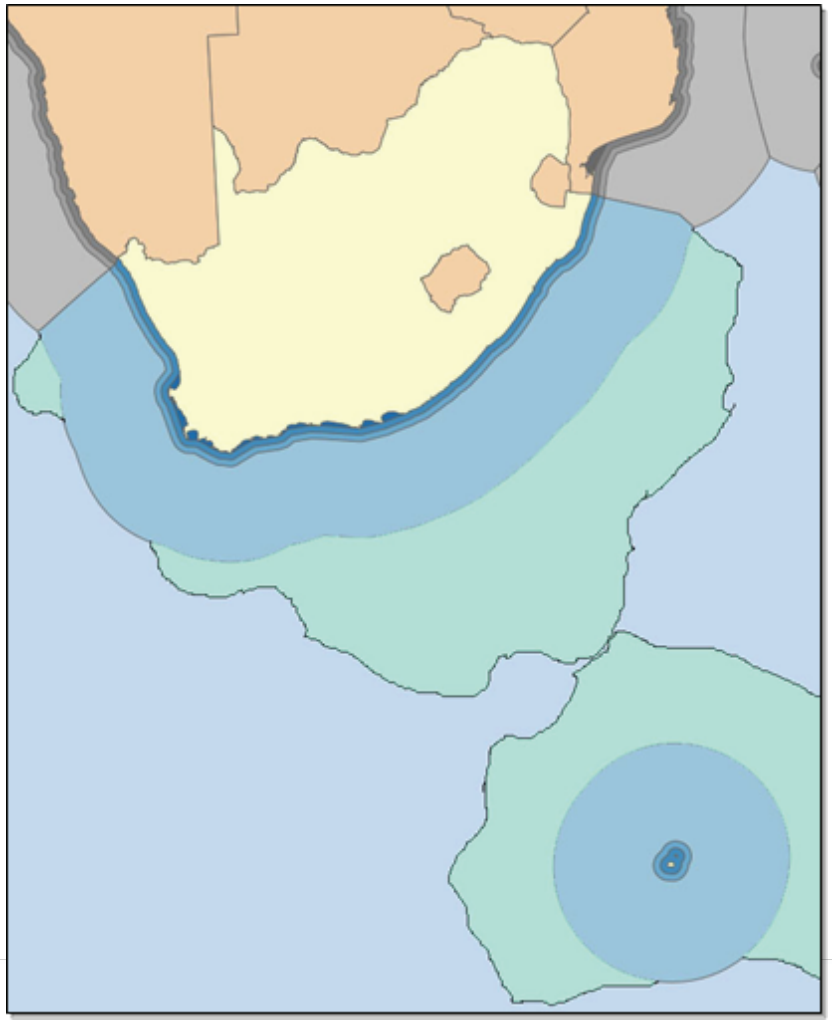
- SA occupies an important geo-strategic position in the Southern Hemisphere, being surrounded by three great oceans – the Indian Ocean, South Atlantic Ocean & Southern Ocean.
- SA is the only African nation with a foothold in Antarctica, and therefore bears a responsibility to serve as a channel for broader African research in the Antarctic region.



Ansorge et al.

More ocean space than land

Legend Land Mass EEZ Extended Continental Shelf Claim



Land Size:
1.2 mil km²

Exclusive Economic Zone (EEZ) Size:
1.5 mil km²

- South Africa is responsible for managing an **oceans space** that is **greater** than the **land territory**
- Extended continental shelf claim will **double** the size of the **ocean geographic extent**

Operation Phakisa

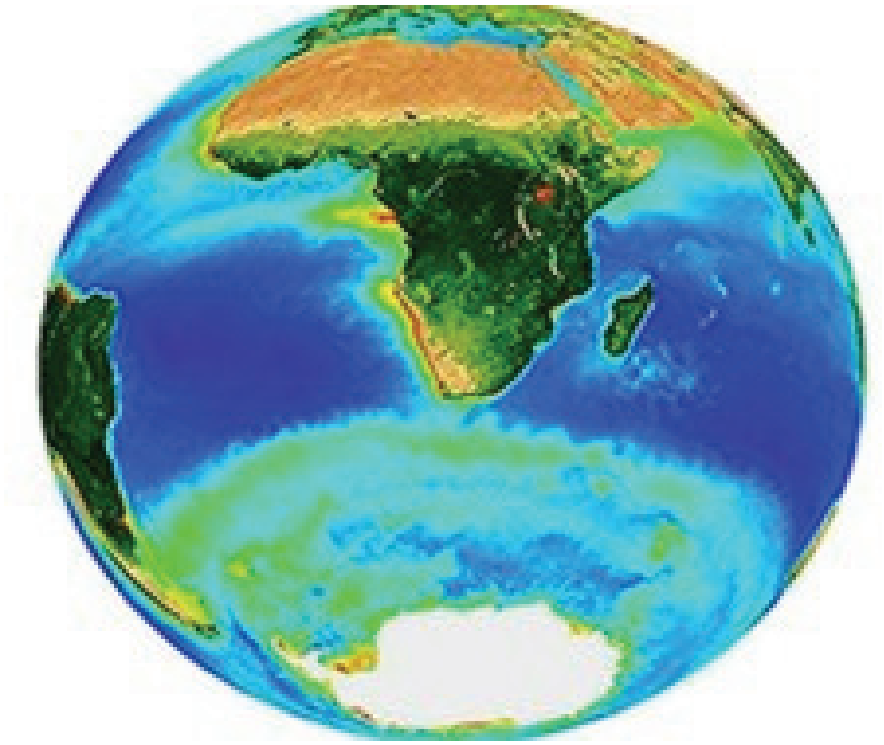
Marine and Antarctic Research Strategy (MARS)

VISION

- To create a demographically balanced marine and Antarctic research system that strives for high quality research, and development of national capacity.

MISSION

- To establish a national marine and Antarctic research system that produces maximum human capital, innovation, economic growth, and increased international profile and influence.



Monteiro

Strategic Significance

- Promotion of fundamental and applied research
- Capitalise on geographic advantage
- Ensure availability of long-term data for environmental management
- Development of the necessary human capital base aligned with national plans and instruments
- Research and development that breeds innovation and industry connectivity
- Development of critical mass of local scientists from PDIs
- Growing general public awareness and engagement that is aligned with national priorities

Objectives

- Provide a well coordinated governance system for marine and Antarctic research activities
- Ensure sustainability of marine and Antarctic resources
- Develop a marine and Antarctic human resource pool
- Improve the quality of life for South Africans derived from the oceans economy
- Create a society informed on the value of marine and Antarctic research initiatives
- Contribute towards the creation of employment derived from innovation

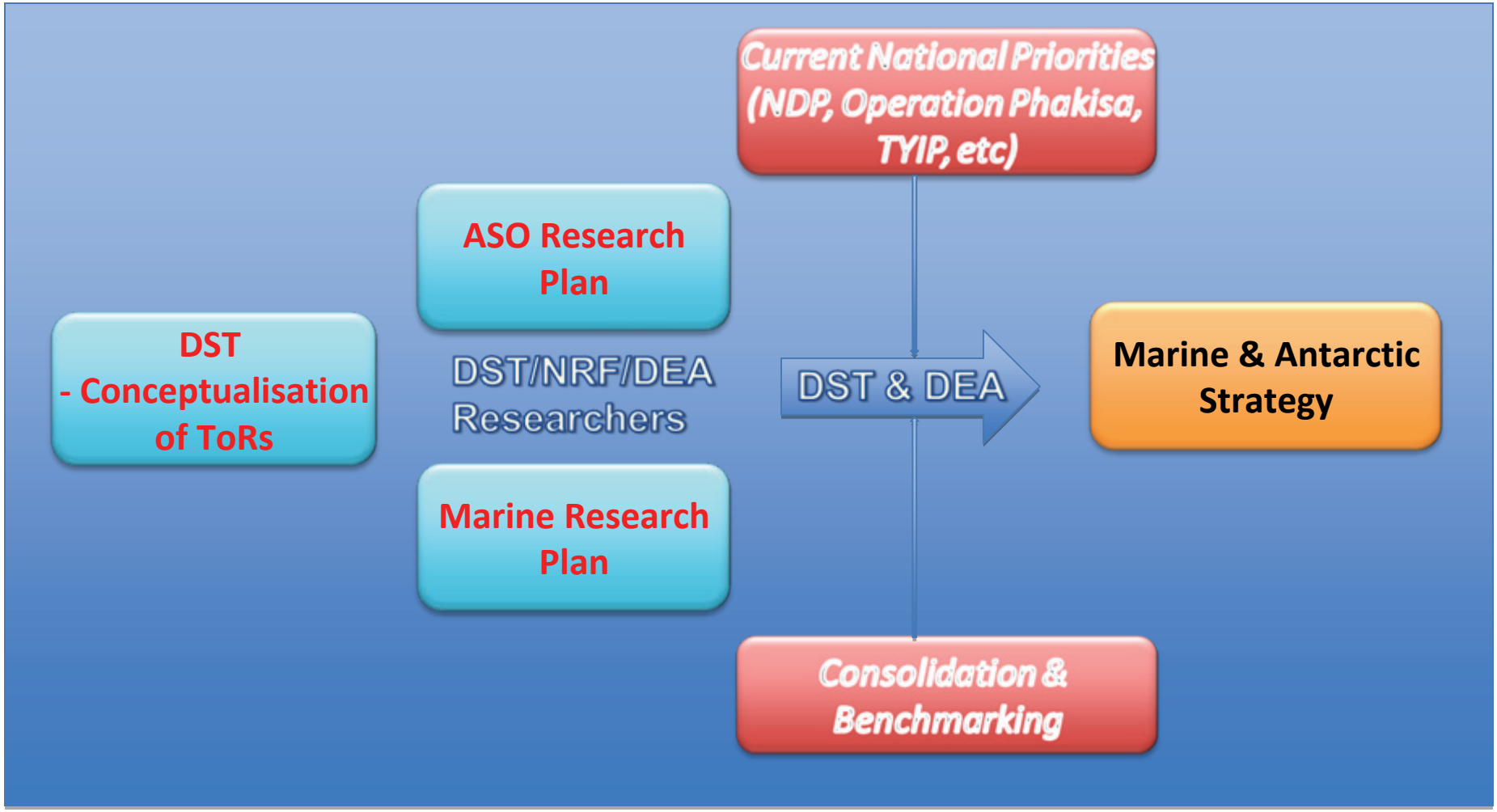
Developing MARS (1/3)

- MARS constructed bottom-up, finalised top-down
- Research themes were developed in broad consultation with the marine and Antarctic research community
- Developed separate Research Plans for Marine and Antarctic and Southern Oceans sectors
- Consolidated research plans into MARS

Developing MARS (2/3)

- Developed in conjunction with DEA
- MARS has its core in the development of capabilities in marine and Antarctic research in line with the NDP
- MARS also considers current international trends and priorities:
  - understanding the role of biodiversity in maintaining ecosystems functionality,
  - the relationships between human pressures and ecosystems, and
  - the impact of global climate change on marine ecosystems.

Developing MARS (3/3)



Marine Research Plan (1/2): terms of reference

- To develop a single comprehensive national marine and coastal research agenda as part of the overarching Marine & Antarctic Research Strategy
- To identify and prioritise mechanisms for optimising marine and coastal research funding using existing instruments
- Identify areas of marine research that require new instruments

Marine Research Plan (2/2): focus areas

Marine Research Plan
Research themes focus on South African Geographic Advantage along the EEZ (including the Continental shelf area claimed)

Oceans and marine ecosystems under global change

- Seasonal, inter-annual and decadal climate projections in Southern Africa

Ecosystems, Biodiversity and Biodiscovery

- The response of coastal & marine ecosystems and ecosystem services to global and climate change
- Biodiscovery and biotechnology

Coastal and marine resources, society and development

- Sustainable coastal and ocean development: vulnerability, risks and responsibility
- Marine Technology

Antarctic & Southern Ocean Research Plan (1/2): terms of reference

- To enable research (activities) to make a difference, and to deepen its output and networks
- To ensure SA authority on issues relating to Antarctica and the Southern Ocean
- To enhance development of a research agenda that generates appropriate knowledge
- To enable SA to satisfy national imperatives and obligations in the Antarctic Treaty System

Antarctic & Southern Ocean Research Plan (2/2): focus areas

ASO Research Plan
Research themes focus on South African National Antarctic Programme (SANAP), Antarctica and the Sub-Antarctic Islands (PEMI) advantage

Earth Systems
- A window into Geospace
- Southern Ocean in the Coupled Ocean
- Ocean Currents
- Carbon-Climate Links and GEOTRACES

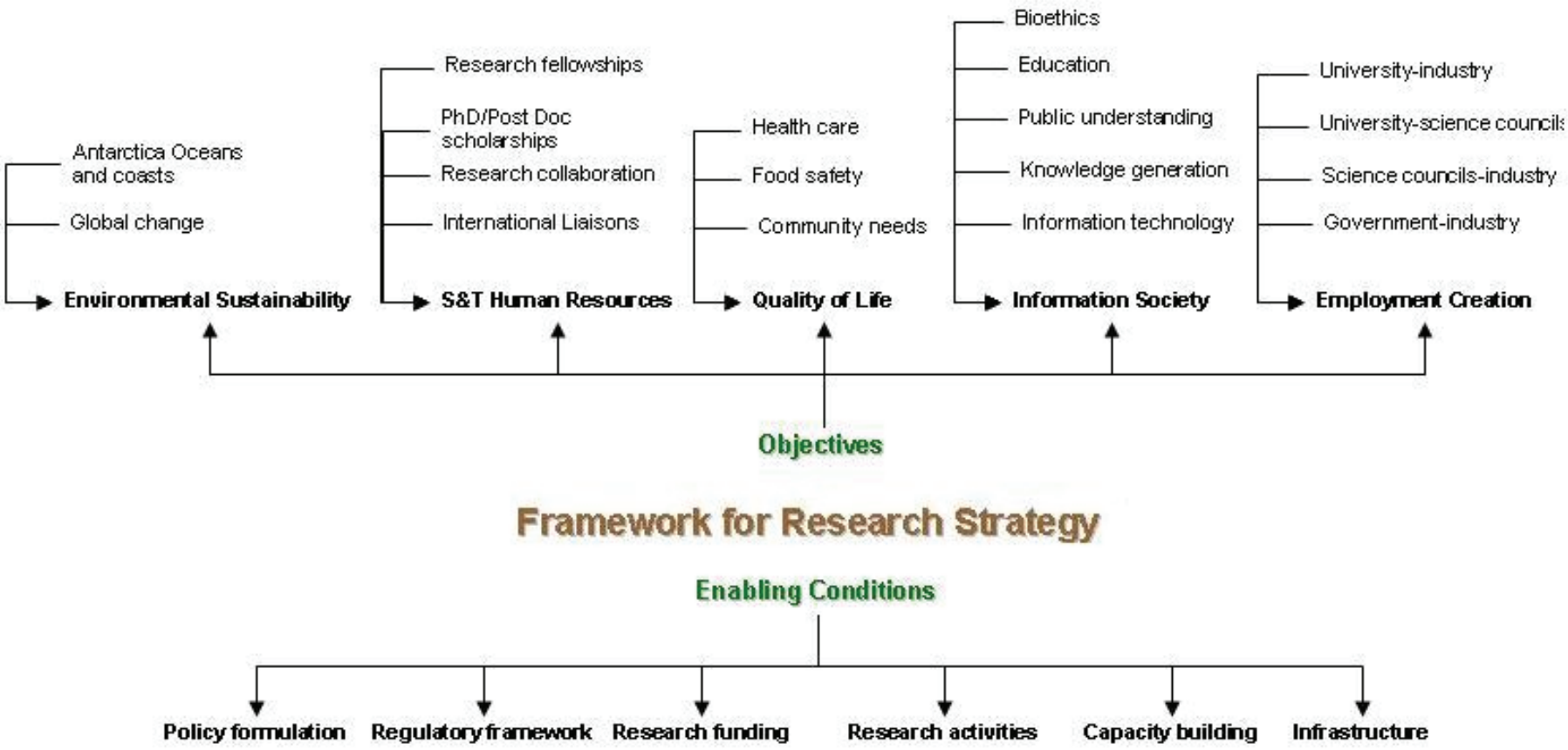
Living Systems
- Ecosytem functioning and the response to global change
- Biodiscovery and biotechnology

Human Enterprise
- Geopolitics, international and national law and policy
- Palaeosciences and human history

Innovation: ASO Technology & Engineering

PEMI = Prince Edward & Marion Islands

MARS framework of strategic drivers



MARS thematic priorities

- Oceans and marine ecosystems under global change
- Earth systems observations
- Ecosystems, biodiversity and biodiscovery
- Innovation and development
- Human Enterprise

MARS thematic priorities unpacked (1/3)

Oceans and marine ecosystems under global change

- Understanding modes of ocean variability across temporal and spatial scales
- Developing a regional observations network.
- Developing end-to-end modelling and operational prediction capabilities
- Establishing global, regional and coastal system indicators
- Delivering robust &useful information to society
- Reconstructing past climate changes

Earth Systems Observations

- Usage of South African space science in Antarctica, as a window into geospace
- Understanding the links between ocean-atmospheric physics, ocean iron availability, trace element biogeochemistry and ocean productivity
- Understanding large scale ocean circulation and global climate

MARS thematic priorities unpacked (2/3)

Ecosystems, Biodiversity & Biodiscovery

- Understanding modes of ocean variability across temporal and spatial scales
- Developing a regional observations network.
- Developing end-to-end modelling and operational prediction capabilities
- Establishing global, regional and coastal system indicators
- Delivering robust &useful information to society
- Reconstructing past climate changes

Innovation and development

- Sustainable coastal and ocean development
- Oil& Gas, Fisheries, Mining and Mariculture
- Energy management
- Development of technology and vessel design
- Development of energy exploration capacity
- Development of links to ecotourism
- Antarctic Waste management

MARS thematic priorities unpacked (3/3)

Human Enterprise

- Geopolitics, international and national law and policy;
- Usage of the resource and to develop and refine human History and Palaeosciences;
- Antarctic arts, architecture and literature;
- Social Adaptation and Human Impact

How MARS will make a difference

MARS will provide a platform for coordination of marine and Antarctic research, addressing national priorities and capacity development through structured funding.

This strategy will also ensure that there is improved value for money by establishing structured planning around the national priorities such as Operation Phakisa initiatives.

Delivering the Strategy (1/6)

Intervention 1: Coordination and Governance:

•DST to establish to a steering committee to guide the implementation of this strategy in partnership with the DEA, DAFF and other key stakeholder departments.

The committee will

•be responsible for leveraging resources and provide policy leadership on implementing the strategy;

•appoint a reference group of experts from the research community to serve in scientific and advisory bodies;

•seek to ensure that scientific research informs policy decisions; and

•establish a system to ensure that logistical needs for researchers are managed to be in line with receptive capabilities of the line departments and research entities.

Delivering the Strategy (2/6)

Intervention 2: Human Capital Development and Transformation

•In line with the SET HCD strategy, MARS will provide a platform for balancing demographics, e.g., through

- customisation of existing HCD instruments such as the Professional Development Programme (PDP), the Internships Programme, Post-doctoral Fellowships, Freestanding NRF Bursary programme and the grant-holder linked bursary programme.

•Strategic transformation interventions to be implemented for redress include the following:

- focused recruitment and training of black students in broad Antarctic and marine research programmes;
- strong support for existing transformation programmes at historically disadvantaged institutions, such as the Phuhlisa Programme for marine sciences that is implemented through the African Coelacanth Ecosystems Programme; and
- Development of a mentoring programme to provide support to young researchers.

Delivering the Strategy (3/6)

Intervention 3: Research Capacity Development

•Research groups and consortia are critical for development and maintenance of research excellence. There are several pockets of expertise that already exist that need to be nurtured to be able to attract the new generation of researchers.

•Existing instruments to be customised to address growing research capacity in marine and Antarctic research.

- **On-boarding:** Emerging researcher development programmes, post-doctoral fellowships, Career Advancement programme, Thuthuka programme, and the unrated researcher programme, ACEP-Phuhlisa, SANAP development.
- **Established researchers:** SARChI, CoE, NRF-Rated researchers, SANAP & ACEP

•The Antarctic and marine research domain specifically depends on the availability of strong technical capacity. There is a requirement to build a strong technical base to support the expanding research needs.

Delivering the Strategy (4/6)

Intervention 4: Public Awareness and Engagement

•Existing research suggests that there is “a very low level of understanding of basic concepts and principles related to the marine environment”.

•The marine environment is considered by the public to be a very complex and emotive subject.

•A key action here will be to develop platforms to engage with the public in discussion

- involve two-way exchanges that would raise the importance of Antarctica and the ocean the impact of our actions on them.

•Marine & Antarctic public engagement plans to be crafted or amended in line with the new DST Science Engagement Strategy.

Delivering the Strategy (5/6)

Intervention 5: Infrastructure and Research Platforms

•Rich suite of platforms and infrastructure is available for Antarctic and broader marine research, but it is necessary to coordinate access to them to avoid duplication of resources.

•Governmental support and appropriate funding for both science and the necessary logistic support will provide future national and international opportunities for early career and established researchers working in the region.

•The effective management of training, and logistics and technical support is imperative.

- Strong technical capacity will ensure Antarctic countries do not use SA as a point to ship-out their equipment for servicing, but could utilise SA expertise to provide the services at a significantly reduced costs (in line with projections of the Operation Phakisa “Marine Transport & Manufacturing” laboratory).

Delivering the Strategy (6/6)

Intervention 6: Data Management

•Provision of proper centralized management of data emanating from the ocean, Antarctica and the Islands is critical.

•Such centralized data management would be invaluable in sustaining and advancing scientific inquiry, and would undoubtedly increase opportunities for learning and innovation.

•As part of the data dynamics of the ocean and Antarctic Research, an Antarctic and Ocean Data Management System and centre should be established. The centre will function primarily to:

- identify and manage existing databases, and keep records of their content, purpose and restrictions of use;
- identify gaps, and in so doing initiate processes to address such gaps, either through new collection efforts, or through new database creation.

•The centre will also function as a platform to provide the necessary information for the marketing of South African activities in the oceans and Antarctic regions.

Finalisation of MARS

In parallel

A: Approval to gazette the Strategy for broader public inputs → Presentation to Cabinet jointly by Ministers of Science and Technology and Environmental Affairs

B: Development of implementation plan in consultation with broad partners

... so what?

- Availability of long-term research data for sustainable environmental management
- Maximising international research impact from geographic advantage
- Improved demographics and expanded capacity of oceans and Antarctic research community
- Technology development and transfer, economic development
- Enhanced public awareness of importance of science and research to environmental management

Many thanks for your interest ....