



the dti

Department:
Trade and Industry
REPUBLIC OF SOUTH AFRICA

NATIONAL SPACE POLICY

Dec 2008

Published by: The Government of the Republic of South Africa

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1 Foreword

BY THE HONOURABLE MINISTER OF TRADE AND INDUSTRY

It gives me great pleasure to present South Africa's new National Space Policy, to give direction to the space arena of the Republic. Space-related services today cover literally everything from A to Z, from Agriculture to Zoology. Map-making, our daily communications by mobile phone and the Internet, disaster management and recovery, urban planning, combating crime, resource-monitoring, and our international peacekeeping responsibilities, all involve space-based products and services. Space systems therefore provide vast socio-economic benefits, and it is our obligation as space stakeholders, to spread the word in an understandable manner to the general public.

South Africa has already made its presence felt in the global space arena, as Africa's leader in astronomy. Our newly built modern telescope, the Southern African Large Telescope (SALT) in Sutherland, in the Northern Cape, contributed over R60 million in contracts to the industry, and helped us develop new manufacturing capacities. This was a worthy pilot run of what could be possible.

South Africa is proud to be one of the two countries short-listed to host the multi-billion dollar international mega telescope project known as the Square Kilometre Array (SKA). Involvement in high-tech projects, such as the SKA, will strengthen the diversification and competitiveness of our industry as we continue to develop our knowledge-based economy.

A number of South African companies form part of global aerospace supply chains. One of our companies has already provided sub-systems, which will be incorporated in the design, development and building of micro-satellites in other countries, to be launched by yet other countries.

This shows that our country, like other developing nations, is steadily proceeding towards the knowledge economy, which requires sophisticated technological skills and capabilities to manufacture innovative products of world quality. Now is the time for South Africa to increase the number of local innovations, and develop space-related products and services that will strengthen our international trade and industry on a significantly larger scale. We need to co-ordinate and assist our industries' efforts to leverage their competitive potential to become part of hi-tech international supply chains. In so doing, South Africa will add value through providing sub-systems and system integration to global products and services by respected brand names.

Sustainable economic development requires that we do not remain primarily a provider of raw materials, mostly dependent upon others for hi-tech services. The space enterprise provides opportunities for us to move up the value chain, to diversify our exports, and retain, at home, highly skilled engineers and other professionals.

The world nowadays is a giant global village, in which South Africa is expected to play a leading role in the advancement of space science and technology. The universe is, in fact, an unbounded arena, with infinite opportunities for regional, continental and international co-operation.

Mandisi Mpahlwa

MINISTER OF TRADE AND INDUSTRY

2 Executive Summary

South Africa is critically reliant on space science and technology. Space-based systems deliver information and services that protect lives and the environment, enhance prosperity and security, and stimulate scientific, industrial and economic development. The National Space Policy provides over-arching guidance for the development of appropriate space capabilities and utilisation of space system applications to contribute to economic growth, reduction of poverty and the creation of knowledge. This Policy also provides guidance to South African public and private sector stakeholders in the space arena, to inform South African participation in domestic and international space activities, and promote improved co-ordination and co-operative governance.

South Africa will thus develop and maintain a robust set of space capabilities in order to meet its national requirements. These capabilities shall be supported by the necessary human capital, infrastructure, industrial base, and appropriate research and development activities.

South Africa is committed to being a responsible user of the space environment and will ensure that all public and private sector activities are conducted in accordance with appropriate international best practices and relevant international treaties. The Space Affairs Act (No. 84 of 1993) strategically guides and regulates all space activities in the country. As such, the National Space Programme and any space activities undertaken by public or private sector entities are subject to the provisions of this Act.

The promotion of a domestic space industry is one of the cornerstones of the Space Policy. This will be achieved by maximising the participation of domestic industry in the national space agenda, and creating a supportive regulatory environment. The domestic industry shall be encouraged to pursue appropriate

strategic international industrial partnerships, as one of the means of enhancing industrial competitiveness.

Capacity-building initiatives will be pursued to ensure that South Africa develops the requisite human capital to support national space activities, including the development of space application products and services. The Policy also promotes enhanced space awareness at all levels of society, as a means to build public understanding of the societal benefits of space science and technology.

South Africa will encourage co-operation with other nations in respect of the mutually beneficial and peaceful uses of outer space, with a focus on extending the benefits of space technology to the African continent, through the pursuit of co-operative activities with other African countries.

This National Space Policy will be implemented through relevant government departments and agencies by means of co-ordination and co-operative governance, to optimise the use of resources whilst **the dti** will monitor and evaluate that implementation.

3 Introduction

This document presents South Africa's National Space Policy. The Policy intends to provide guidance to all South African public and private sector stakeholders in the space arena, to inform South African participation in space activities and promote improved co-ordination and co-operative governance. The guiding principle of the Policy is to support and promote relevant scientific research, capacity-building, innovation, and industrial development, with the aim of utilising space applications to contribute to economic growth, reduction of poverty, and the creation of knowledge.

The Space Affairs Act strategically guides and regulates all space activities in South Africa. The National Space Programme and any space activities undertaken by public or private sector entities are thus subject to the Space Affairs Act. Section 2 of the Act mandates the Minister of the Department of Trade and Industry (**the dti**) to determine the general policy on space affairs to be followed by the Republic. The Minister may determine the policy after consultation with the South African Council for Space Affairs, and with the concurrence of other Ministers charged with the administration of any law, which in the opinion of the Minister, relates to space affairs, including the Minister of Finance.

South Africa is increasingly reliant on space-based systems for a variety of services and applications, such as communications, navigation, meteorology, natural resources management, environmental monitoring, and disaster management. South Africa has been an active participant in the global space arena since the dawn of the space age. The last three decades of the 20th century saw space technology finding increasing application and relevance in daily life, to the point where space applications have become an indispensable part of the modern information society.

The public sector of the South African space arena comprises a number of government departments and their agencies, as well as the National Space Agency, all of which have independent administrations with their own policy frameworks for guiding decisions on the pursuit and funding of space-related activities. The country's increasing reliance on space technology and participation in international space-related scientific activities necessitates a more co-ordinated and strategic approach to space activities.

4 Policy Statement

South Africa has a variety of institutions and programmes that play a significant role in the scientific study, exploration and utilisation of space. Science councils, national facilities, academia, government departments and industry, have broad competencies in satellite applications and engineering, space science, and their supporting technologies. These initiatives, however, are not conducted in a well-co-ordinated manner, as they are managed by different administrations, posing challenges for a strategic and cohesive focus within this field.

Moreover, the country is critically reliant on space science and technology, as space-based systems deliver information and services that protect lives and the environment, enhance prosperity and security, and stimulate scientific, industrial and economic development. In order to maximise the benefits of space science and technology for sustainable development, South Africa requires a guiding framework in the form of a policy and a central institutional framework (an agency) that will streamline the development and maintenance of a set of appropriate, efficient and robust space capabilities. These capabilities will be realised through co-ordination and co-operative governance, in addition to partnerships and linkages with other nations in areas of mutual interest, for the peaceful uses of outer space.

5 Policy Principles

The pursuit of space activities in South Africa is informed by the overarching principle that these contribute to the country's economic growth and social development. To this end, national space activities shall be guided by the following principles:

- South Africa is committed to utilising outer space for peaceful purposes and the benefit of all humankind.
- South Africa is committed to developing and maintaining a robust and appropriate set of space capabilities, services and products to support national priorities through co-ordination and co-operative governance.
- South Africa is committed to being a responsible user of the space environment and will ensure that all public and private sector activities are conducted in accordance with national legislation and appropriate international best practices, in addition to relevant international treaties.
- South Africa is committed to promoting research and development in space science and technology.
- South Africa is committed to fostering the development of the domestic industry towards greater levels of national self-sufficiency and international competitiveness in space technology, and its applications through utilising domestic commercial space capabilities and services to the maximum extent possible.
- South Africa is committed to co-operation with strategic nations in mutually beneficial and peaceful uses of outer space, with a focus on extending the benefits of space technology to the African continent through the pursuit of co-operative activities with African countries.

6 Policy Objectives

The objectives of this Policy are to:

- Improve co-ordination throughout the South African space arena to maximise the benefits of current and planned space activities, avoid or minimise duplication of resources and efforts, and organise existing initiatives, programmes and institutions into a coherent network for all providers and users of space systems.
- Promote capacity-building initiatives, both as a means towards effective participation in the space arena, as well as to develop capacity in space science and technology, and science and technology in general.
- Facilitate the provision of appropriate and adequate space capabilities to support South Africa's domestic and foreign policy objectives.
- Foster a robust science and technology base in research institutions and the higher education sector.
- Promote the creation and implementation of a supportive regulatory environment to facilitate industrial participation in the space arena, in accordance with domestic law and South Africa's foreign policy objectives and international obligations.
- Promote the development of an appropriate and competitive domestic commercial space sector in order to provide the industrial base to meet the nation's needs for space technology.
- Promote improved co-operation with other nations in the mutually beneficial peaceful uses of outer space.
- Promote greater awareness and appreciation, at all levels of South African society, of the relevance and benefits of space science and technology.

7 General Implementation Guidelines

This National Policy will be implemented through relevant government departments and agencies, in accordance with the following guidelines.

7.1 *Co-operative Governance*

Space-related activities in South Africa cut across all spheres of government and its agencies. This is a necessary feature of the space arena and reflects the wide range of space applications in modern society. However, in order to optimise the utilisation of government resources and maximise the benefits of space applications to society, improved co-ordination and co-operative governance are both critical.

In terms of the Space Affairs Act, **the dti**, supported by the South African Council for Space Affairs, is the lead department with respect to policy and regulatory aspects of space activities, as well as bilateral and multilateral agreements relating to the space arena. Within its mandate, **the dti** is also responsible for the development of a Space Industrial Framework to provide an industrial development focus, identifying niche areas, markets and all other possibilities for the South African industry to thrive within this advanced manufacturing field. In executing these functions, **the dti** will liaise, as appropriate, with other government departments mandated to administer acts relating to space activities, services and products.

The Department of Science and Technology (DST) is the lead Department for the implementation of the National Space Programme, under which the national space agency resides. In implementing the National Space Programme, the Space Agency is guided by this Policy. The Department of Communications takes the lead on communications matters and the Department of Foreign Affairs supports and facilitates international co-

operative space related activities, in conjunction with the relevant line department.

The National Treasury plays a key role in committing financial resources for the implementation of this Policy by the various government departments and Space Agency. This vital role cannot be over-emphasised. The strategic long-term development of appropriate space capabilities to deliver socio-economic benefits will require significant and sustained commitment of the necessary financial resources.

In order to facilitate improved co-ordination and co-operative governance, it will be necessary to:

7.1.1 Increase Intra-Government and Inter-Agency Co-Operation –

The socio-economic challenges that may be served by space technology require a co-ordinated effort for more efficient use of resources to deliver the benefits of space capabilities to the nation. This should be achieved through inter-departmental fora, involving the relevant experts, or through the establishment of focal points in the various government department clusters, at all levels of government, as appropriate. These fora should be used in the formulation of the criteria for implementing the National Space Programme. Greater inter-disciplinary co-operation among various public sector institutions and agencies is encouraged to maximise synergies. In particular, greater co-operation among the various domains of basic space research and Earth observation should be strongly encouraged and facilitated.

7.1.2 Optimise the Use of Resources –

While redundancy is essential to mitigate risk in the space and ground segments of space systems, this should not be used as the rationale for the duplication of existing facilities

and programmes. The establishment of new space capabilities should take careful account of existing institutional arrangements and capabilities to optimise inter-institutional co-operation and minimise the unnecessary duplication of costly facilities. Where appropriate public sector facilities may exist, which would be very costly to duplicate in the private sector, consideration should be given to making these facilities accessible to the private sector, as appropriate. The utilisation of space-derived data should also be optimised through interventions such as facilitating access to data, processing tools and training for applications, developers and end users, as appropriate. In order to stimulate to the greatest extent possible the utilisation of Earth observation data, all such data procured by any sphere of government or agency shall be made available through a multi-government licence to any government department or agency, and to publicly-funded research and educational institutions. The development of applications involving the merging of space and non-space data sources will also be promoted to maximise the benefits derived from space data.

7.2 Developing Adequate Space Capabilities

In order to develop adequate and appropriate space capabilities, it will be essential to address the following:

7.2.1 Address National Capability Requirements.

The required space capability will be driven by government requirements in scientific, technical and industrial areas, as well as future requirements derived from the strategic analysis of the national imperatives. Such requirements shall address the following areas in the South African economy:

7.2.1.1 Manufacturing Capability.

The goal at this level is to establish an industrial base that will provide the required space manufacturing capabilities to South Africa. The development of space systems requires sophisticated technical and industrial capabilities, which will have to be developed locally or acquired through strategic partnerships. One such area pertains to improving industrial processes and quality standards to meet global space system requirements. A key capability to be built up is in the area of space systems procurement skills. In respect of operational space systems, the country will have to acquire capabilities relating to spacecraft life-cycle management and space situational awareness. Moreover, the development of space application products and services will require the creation of additional capabilities in industry. The higher education sector can play a role in creating professional training opportunities with international partners to address these capability gaps.

7.2.1.2 Economic Enabling of Space Technology.

The primary goal at this level is to acquire the appropriate space-based system to ensure South Africa's economic independence.

Assured access to space will be another critical capability for the South African Space Programme. To ensure the capability to launch space systems as and when required, South Africa should pursue, through commercial means or strategic partnerships, at least two independent, comparable lines of access to space.

7.2.1.3 Space Science and Technology Research Capability.

The above capability should be complemented by the development of local scientific research capacity in this area, making use of existing infrastructure, to build up the relevant expertise within the country. The ultimate goal at this level is to be a provider of critical space technology to the international space community, making South Africa amongst, if not, the leaders in the space arena.

7.2.1.4 Build Human Capital.

South Africa must develop significant numbers of space professionals skilled in the many space science, engineering, and operational disciplines vital to establishing and maintaining national space capabilities. This encompasses not only the capabilities associated with ground and space segments of space systems, but also the capabilities associated with the development of

relevant products and services for various end-users. Strategic interventions for capacity-building will include greater use of Information Communication and Technology (ICT) for training, harnessing networking opportunities, and building strategic partnerships.

7.3 Strengthening the Space Science and Technology Base

A strong science and technology base is essential for supporting South African space capabilities. Scientific and industrial space research is a strong driving force for new technology developments, with many subsequent applications of benefit to the sustainable development of our economy, society and the environment. Therefore research and development activities in space science and technology should form one of the cornerstones upon which the National Space Programme is built. In particular, publicly-funded research and development activities should support the pursuit of knowledge creation, as well as new and improved space capabilities.

The existing capabilities in science councils, national research facilities, and other scientific institutes falling under various agencies, should be used to maximum effect in the National Space Programme. The university research community represents strength in the system, which should be harnessed through the provision of targeted research and development programmes, in co-operation with established research institutes, as appropriate. These two players, research institutes and tertiary-level institutions, will ensure

exposure of students to space science and technology, thereby contributing to the capacity-building goal of this Policy.

7.4 Developing and Fostering National Space Infrastructure

Modern information infrastructure is as important for the development of the knowledge-based economy as traditional infrastructure was to the development of industrialised economies. In the 21st century, countries capable of utilising space systems will enjoy considerable advantage over those that do not. Therefore it is imperative to develop and foster appropriate infrastructure in South Africa. In this regard, the country possesses infrastructure for ground segment operations of space systems. In addition, South Africa boasts facilities for satellite assembly, testing and integration, as well as facilities to support flight testing and space launch activities. These facilities represent significant investments that should be reinvigorated and harnessed, as appropriate, in support of the National Space Programme.

The infrastructure required for space activities is costly and highly specialised. It should therefore be utilised in an optimal manner by both public and private sector users. These facilities also require a steady level of usage in order to maintain adequate levels of expertise, safety and quality. Hence, the Space Programme should provide a measure of stability to these facilities by providing a baseline for continuity of demand.

7.5 Promoting a Domestic Space Industry

A robust domestic space industry is critical for South Africa to develop and maintain appropriate space capabilities. The following measures are envisaged in this regard:

7.5.1 Development of an Industrial Framework

For the country to unlock industrial opportunities within this sector, there is a need to conduct research to establish the the core and potential competencies, identify challenges, and propose strategic recommendations for its growth. **the dti** will undertake this research in the near future to support the National Industrial Policy Framework's (NIPF's) vision of long-term intensification of the country's industrialisation process and movement towards a 21st century knowledge economy, which requires a very strong technology base. This is intended to enhance industrial development; strengthen manufacturing capabilities, and provide support for industry and related services, thus leading to industrial growth.

7.5.2 Building Capacity in the Domestic Industry

In order to build an industrial base to support South Africa's requirements for space technology, public sector space projects should be conducted with South African private sector participation to the maximum extent possible. Government and its agencies are encouraged, where possible, to outsource space activities to private industry. Programme management will maximise the development of products and services to be supplied by the private sector to governmental customers. In particular, public-private partnerships will be explored and promoted wherever possible, in order to develop national commercial capabilities.

7.5.3 Creating the Right Regulatory Environment for National Space Activities

In order to allow South African industry to compete effectively in international markets, a supportive regulatory environment shall be put in place by the Council for Space Affairs to ensure predictable and orderly participation by the private and public sectors, both within the domestic and global space arena. This shall enforce compliance with regulatory provisions and applicable international obligations, while ensuring transparent and timely processing of licence and import/export applications.

7.5.4 Managing Innovation and Technology Transfer to and from the Space

Sector

In order to maximise the benefits of technology transfer into and from the space sector, there should be a strategic approach to seeking spin-off, as well as spin-in applications of space technology by those entities involved in the development and utilisation of the relevant space sector technologies. One of the ways in which this might be achieved is through partnerships among industry, the Space Agency and the DST's Technology Innovation Agency (TIA).

7.5.5 Promoting the Competitiveness of the Industry

Space activities contribute to employment creation and competitiveness in many sectors of the economy. However these benefits depend on the existence of an innovative and competitive domestic space industry. This will be achieved by creating a predictable and rational environment for innovation and industrial competitiveness.

Furthermore, South African industry needs to achieve the critical mass required in the long-term to develop and expand capacities to compete domestically and internationally, as well as access global supply chains and provide sub-systems to high-value products and services. This will be achieved through sustained institutional support of the domestic space

industry, with emphasis on advanced manufacturing processes and programmes. In the short-term, such support will focus on the socio-economic benefits to be derived from space applications, while industry may use this as an opportunity to accomplish its long-term industrial objectives.

7.6 Promoting Enhanced Space Awareness at all Levels

Broad public support for a publicly-funded South African Space Programme relies on an appreciation and understanding of the benefits of space science and technology at all levels. The Space Affairs Act mandates the Council for Space Affairs to promote space awareness and provide appropriate public information about its activities. For this reason, the Council for Space Affairs, government departments, and their agencies undertaking space science and technology activities, should work towards a sustained and integrated effort to communicate to all levels of society, the manner in which public resources are being used by the space sector for the public good. Private sector participants of publicly-funded space activities should align a component of their activities in support of this objective. All stakeholders can achieve this maximum collective impact through joint participation in nationally or internationally organised focus periods dedicated to space science and technology.

7.7 Enhancing International Co-operation

International co-operation offers good opportunities for building South Africa's strength in space technologies and applications through strategic partnerships with developed countries and other emerging space nations. South Africa will pursue mutually beneficial and appropriate international co-operation opportunities in space science and technology consistent with its foreign policy objectives and international obligations. In particular, international co-operation will be pursued in accordance with the strategic foreign policy objectives of *Strengthening the African Agenda, South-South Co-operation, North-South Co-operation* and *Global Governance*.

Promoting and enhancing co-operation with and among African countries is a foreign policy priority. South Africa shall carry out diplomatic and communications efforts to build greater awareness on the continent of South Africa's space policies and programmes, and encourage greater co-operation and utilisation of South African space capabilities by interested African nations, as appropriate. South Africa shall also actively engage with other interested African nations to pursue common interests through co-operative means and strengthen African participation in global space fora.

Areas for international co-operation include space science and exploration, Earth observation, communications and positioning, timing and navigation. These areas of co-operation will, in the first instance, be pursued through existing bilateral co-operation agreements, which include space science and technology within their scope, as well as potential new agreements yet to be negotiated with other countries. **the dti** will be the lead Department in concluding international agreements and in managing the nation's participation in multilateral space-related activities, in consultation with other governmental stakeholders in the space arena.

South Africa shall actively participate in regional and global multilateral fora for the peaceful uses of outer space, informed by this National Space Policy and the relevant legislation, and in fulfilment of its international treaty obligations.

7.8 Financial Implications

Given the critical role of space applications in the modern information society, investment in the South African space arena has not kept pace with the growth in importance of this sector. Space applications that offer broad societal benefits are in the interests of the public, and should accordingly be supported by public sector investment.

However, because of the risks, costs and lengthy timeframes associated with the development of space activities, the private sector is not in a position to take the lead in the development of this sector. Once the momentum has been established, public sector investment in space infrastructure and capabilities will create the necessary conditions for the development of private sector space activities.

South Africa's government departments and public institutions, as key users of space systems, should thus support South African efforts, not just with financial resources but also through charting a clear direction for the country to follow in the future. A possibility to consider could be through cross-subsidisation from other sectors, the latter of which may be in a better position to attract private investment, via initiatives such as space tourism.

The realisation of the extensive societal benefits envisaged in this Policy will require an increase in overall expenditure: the reprioritisation of current activities alone will not suffice. South Africa has the benefit of previous infrastructure investments in this area, but if the country is to keep pace with the rapid evolution of the global space sector, it will have to modernise and upgrade this infrastructure. Upgraded infrastructure will support the

development of new technologies and applications, in both public and private sector institutions. This will, in turn, lead to a higher level of activity in the space arena, with direct and visible societal benefits. However, sustaining this higher level of activity will require a sustained and progressive increase of budgets to match increased benefits. Failure to do so will have significant consequences for South Africa's development and its role on both regional and global levels.

8 MONITORING, EVALUATION AND REVIEW OF THE POLICY

the dti will put in place mechanisms to monitor and evaluate the implementation of this Policy. **the dti** shall review the Space Policy every ten (10) years, or at any time before then, as deemed necessary by the Minister of Trade and Industry.

9 ABBREVIATIONS AND ACRONYMS

DFA	Department of Foreign Affairs
DoC	Department of Communication
DST	Department of Science and Technology
ICT	Information Communications and Technology
NIPF	National Industrial Policy Framework
SALT	Southern African Large Telescope
SKA	Square Kilometre Array
the dti	Department of Trade and Industry
TIA	Technology Innovation Agency