Space Policy 30 (2014) 115–120

Contents lists available at ScienceDirect

Space Policy

journal homepage: www.elsevier.com/locate/spacepol

Viewpoint

South Africa's national space policy: The dawn of a new space era

V. Munsami

Department of Science and Technology, South Africa, Private Bag, X894, Pretoria, 0001, South Africa

ARTICLE INFO

Article history:
Received 8 April 2014
Accepted 5 May 2014
Available online 16 June 2014

Keywords:
Space
Policy

ABSTRACT

South Africa has made significant advances in attempting to organise and formalise its space sector with the prime focus of leveraging the benefits of space science and technology for socio-economic growth and sustainable development. A particular instrument in this regard is the National Space Policy, which provides for a set of strategic objectives and guiding principles in terms of how stakeholders, both state and non-state actors, should organise and conduct themselves within the framework of a national space programme. The National Space Policy aims to improve the level of co-ordination and co-operative governance in the space sector that in the past has been fragmented and disorganised, and to further develop a domestic space industrial base. The foundation for a sustainable national space programme hinges critically on the participation of the domestic industry in the national space agenda and thereto the creation of a supportive regulatory environment is necessary. This paper provides insight into the main tenets of South Africa's National Space Policy with the aim of highlighting the key policy directives.

1. Introduction

South Africa possesses an inherited space capability for satellite and launch vehicle development and manufacturing from the previous apartheid era. The satellite and launch vehicle programme, at that time, revolved around the GreenSat programme, a reconnaissance military satellite, which was terminated due to mounting international pressure. The pressure was intended to force South Africa to disarm its nuclear weapons programme and elevate the sensitivity on dual use technology and the associated threat it poses to international peace and security. South Africa succumbed to this pressure in the early 1990s and in the process terminated core activities related to its space programme given the connotation and associated linkages to its nuclear weapons programme.

The facilities used for the GreenSat programme are still intact and functional. The satellite assembly, integration and test facility, called Houwteq, has been used for the assembly, integration and testing of South Africa's latest micro-satellite, called SumbandilaSat. The launch facility, called Overberg Test Range, is currently being used for the testing of small-scale military missiles and this is provided as a service to both local and international clients. Hence, the seed for a formal space programme exists, albeit in most instances with outdated technology, and therefore in need of upgrading and/or retrofitting with modern technology.

In addition to the GreenSat programme, South Africa has been engaged in many other space activities, particularly in the field of astronomy, space physics, and remote sensing. The National Research and Development Strategy [1] identified astronomy and South Africa's presence in Antarctica as a geographic advantage. The latter is relevant in that South Africa is the only African country to have such a presence in Antarctica and which presence provides a window into space, given that the magnetic field lines in the magnetosphere, and by implication the field potentials of space phenomena occurring along such magnetic field lines, map onto the polar caps. In addition, South Africa has, since the 1970s, been actively involved in remote sensing initiatives in support of decision-making activities.

It is mainly through the positioning of astronomy and space science as a geographic advantage and the realisation of the value proposition of remote sensing for effective decision making, that space science and technology has been identified as a sector in need of development. The underlying motivation is to leverage the benefits of space science and technology for socio-economic development, as South Africa embraces the transition from a natural resource based economy to a knowledge-based economy. This approach marks a policy shift from the former apartheid focus on space for military applications to the current post-democracy focus on civilian applications geared towards sustainable development within the context of transitioning to a knowledge-based economy.

E-mail address: val.munsami@dst.gov.za.

http://dx.doi.org/10.1016/j.spacepol.2014.05.003
0265-9646/

The South African space sector is currently poised at a critical juncture, with a number of approved instruments set to transform the space landscape. These instruments include.

- An approved 10 Year Innovation Plan [2] for the country, in which space science and technology has been identified as one of five grand challenges;
- An approved National Space Policy [3] that provides a guiding framework for a national space programme;
- An approved National Space Strategy [4] that provides the strategic focus for the national space programme; and
- Adoption of the South African National Space Agency Act [5] that makes provision for the establishment of the South African National Space Agency (SANSA).

These instruments have been necessitated by the lack of coordination and appropriate governance structures to promote space activities in the country. This lack has often reduced the impact of space activities amidst duplication and the blurring of roles and responsibilities among various stakeholders and institutions. This systemic weakness was thus underpinned by a lack of a guiding framework for space activities and the notable absence of a central implementing agency. The former led to the development of a National Space Policy and the latter to the establishment of SANSA. The focus of this paper is on the National Space Policy, in which the policy objectives and principles are highlighted.

2. The need for a national space policy

South Africa has a variety of institutions/programmes that play a significant role in the scientific study, exploration and utilisation of space. Examples of South African programmes and initiatives in the space area include:

- The Southern African Large Telescope, which is the largest single optical telescope in its class in the southern hemisphere; while in neighbouring Namibia, the High Energy Stereoscopic System, an array of gamma-ray telescopes, is the largest such facility in the world. South Africa together with eight African partner countries, conjointly with Australia, has also won the bid to host the majority share of the Square Kilometre Array (SKA), arguably the most important and most exciting project proposed for radio astronomy in the past 50 years.
- South Africa already has a rich heritage of supporting solar system exploration at its Hartebeesthoek station. The Hartebeesthoek Radio Astronomy Observatory was originally built in 1961 as a tracking station for probes that were sent to explore the solar terrestrial environment. The tracking station, built by the National Aeronautics and Space Administration, was then known as the Deep Space Instrumentation Facility.
- South African space physicists, working at the SANSA Space Science Centre, the South African base in Antarctica and at various universities, seek to understand the complex plasma environment of the Earth's magnetosphere, shaped by the interaction of the solar wind with the magnetic field of the Earth.
- South Africa's National Disaster Management Centre seeks to ensure that disaster risk reduction measures and strategies are factored into the Integrated Development Plans of local municipalities. The centre uses satellite imagery extensively to create vulnerability indices and GIS maps.
- The SANSA Space Operations Centre is a telemetry, tracking and command ground station that provides support for polar orbiting and geostationary satellites to space agencies and aerospace companies around the world. The Centre also maintains an archive of satellite imagery taken by a variety of satellites dating back to 1978, which is a feeder into the SANSA Earth Observation programme.
- In 2005, South Africa embarked on a 3-year integrated capacity building and satellite development project. The programme entailed the local procurement of a mission ready satellite, which activities spanned research, development, manufacturing and capacity building. The satellite, named SumbandilaSat, was launched in September 2009 and positioned in a Low Earth Orbit (LEO) to enable the capture of high-resolution (2.5 m) imagery that was used for agricultural and environmental management applications.

These initiatives, although not exhaustive, situated in academia, science councils, national facilities, government departments and industry, reflect the broad competencies, facilities and supporting technologies in astronomy, space physics, satellite applications and satellite engineering. The existing infrastructure and skilled workforce, both inside these facilities and in the wider industry supporting them, is seen as a basis for strengthening and developing a core national capability that could effectively serve the space needs of the country. However, in order to accomplish this feat it was necessary to enforce structural reforms in the space landscape to ensure coordination and convergence of the space activities within the country. At the highest level, this required a national framework, namely a National Space Policy, which would guide the activities within the space landscape through a set of core objectives and principles.

3. Policy rationale and the key legislative frameworks

Historically, the policy rationale for governments to pursue space activities has primarily been for one of three reasons, namely [6]:

1. *National security* – space provides a plethora of dual use technologies that can be used to bolster national defence systems; for example, space launch vehicles can double as missile delivery systems;
2. *National prestige* – leading the space race, especially during the cold war, has been associated with national pride; for example, when President Kennedy issued a directive to 'landing a man upon the moon and returning him safely to Earth'; and
3. *Scientific knowledge* – the quest to explore other celestial bodies, the origin and evolution of the universe; for example, the Hubble telescope which is seen as an important instrument in the discipline of optical astronomy.

Of late, there has been an increasing appreciation of the value proposition of space applications towards addressing socio-economic challenges [7]. It is this rationale that has spurred many countries, including South Africa, towards formalising national space programmes. In particular to developing countries, the realisation of the importance of space science and technology in addressing societal challenges is a key policy driver and national space programmes are thus seen in light of the broader public good. Remote sensing is considered core to domestic space programmes and is seen as critical for the provision of geospatial information for decision making among all tiers of government and civil society [8].

In the South African context, government has been focussing on national initiatives that have a potential to address national priorities, which at the highest level relate to wealth creation and impacting the quality of life of its citizens. In this regard, South Africa has become reliant on a host of space-based products and services focused on remote sensing, satellite communications, and navigation, timing and positioning. Although space applications developed for domestic civilian use is closely aligned to national priorities, it