

## A GLANCE AT THE EARTH OBSERVATION POLICIES AND REGULATIONS AND THE IMPACT ON DEVELOPING COUNTRIES: FOCUSING ON THE AFRICAN CONTINENT

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### Abstract

Earth Observation (EO) and Remote sensing (RS) data and information is of significant value in the area of disaster management, health, energy, food security, natural resource management, effective land use, planning, climate, water, weather, ecosystems, agriculture and biodiversity. The application of EO/RS data in developing countries is said to be underutilized due to lack of knowledge and technology and most importantly financial capability. Hardly is there a focus on the legal and policy framework enabling the dissemination of the said data to developing countries. One major difference in utilization of the EO/RS data between the developed and developing countries; is the use of the policy regulatory framework to manage the access and application of the observation data. That is, the space faring countries have enacted policy regulation that propels the proper use of the data. For instance, due to its sensitivity, remote sensing data availability is sometimes regulated. This paper seeks to discuss the impact of both national and international EO/RS data regulation to accessibility by the developing countries. It will feature the interplay between national and international policy and law regulation instruments of dominant space faring nations and how they affect the supply and demand of EO/RS data to African countries. Moreover, the paper will briefly analyze legal and policy mechanisms relating to EO in selected African countries and the role they play in ensuring that the data is accessible by its citizens. In discussing the future perspectives it will explore the options such as strengthening the legal and policy frameworks in order to achieve proper and practical economic utilization of EO applications in developing countries.

### I. Introduction

The African continent has come of age and is faster than ever adopting and integrating into the fast lane culture promoted by Western countries. It has increasingly become a consumer of many of products and services offered by space applications. Despite the bleak picture painted about the dwindling situation and economic disparities in the continent, the growth and demand for ICT/space products demonstrates the rate at which the African nations are spending. Development of money transfer schemes like MPESA<sup>1</sup> show that ICT solutions are tailored for

the direct needs of the common population. Using India which has capitalized on bringing space products to the common man as an example, the African continent has now began to ensure that the space, which was perceived as a preserve affluent, is brought to its people. The African Governments have realized that space products and services are necessary tool for the common man and powerful solution to African problems. Much has been said about the use of space for a number of solutions and has been well articulated in the Organization for Economic Cooperation & Development publication *Space 2030: Tackling Society's Challenges*.<sup>2</sup> What is left for the developing countries including African Governments is to develop systems that can practically tackle those issues. Significant developments in Africa show that the continent has taken destiny into her hands and indeed prospered in several areas including space. Although few, African space faring nations, are catching up with technologically advanced nations in space exploration. Egypt, Morocco, Nigeria, Kenya and South Africa are trailblazing the appreciation of space

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<sup>1</sup> MPESA is a money transfer service offered and pioneered by a mobile telephone service provider Safaricom Ltd in Kenya See <http://www.safaricom.co.ke/index.php?id=250> last accessed 14.09.2011. This no different from what the western governments are doing in bringing innovative space-IT solutions to people's lives for instance the maritime services offered to track containers in the sea through smart phones offered by industries such as the EADS Astrium GMBH. See EADS Astrium GmbH, Secure Satcom Systems <http://www.astrium.eads.net/en/secure-satcom-systems/> accessed 14.09.2011

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<sup>2</sup> Organization for Economic Cooperation & Development, *Space 2030: Tackling Society's Challenges*, 2005, [OECD Publishing](#).

activities in the Continent. The African countries are increasingly investing in EO/RS data acquisition, accessibility and availability. Notwithstanding these tremendous developments, many of space products are still underutilized in the African Continent. The torch countries and other African countries that have not yet arrived, peek for availability of the EO/RS products and services from the advanced states. In terms of awareness from scientific and technical perspectives, the continent has pockets of progress from embedding space education in basic science; to establishing institutions of remotes sensing *inter alia*. Access of data has been enhanced by several bi/multilateral and cooperative agreements entered with providers across the globe. Neglected however, and of paramount importance are space laws, regulations and policies that drive (EO/RS) space applications. Other dominant space faring nations are on the hand moving towards enacting national space legislation and policies to enhance their space activities.<sup>3</sup> This paper briefly gives an overview of the implications of space laws policies on development of space activities particularly EO /RS within the African Continent. It will discuss the impact of the EO/RS data regulation both internationally and nationally and to its accessibility to the developing countries. It will feature the interplay between national and international policy and law regulation instruments of dominant space faring nations and how they affect the supply and demand of EO data to African countries.

## II. EO and RS regulation around the world and opportunities for Africa

Global cooperation in environmental monitoring is on the increase and the international space community is continually investing in EO/RS space assets and enacting enhancing laws and policies. The legal provisions however depend on whether these countries own the RS satellites or are consumers of the RS products and services. The international legal framework related to RS has been driven by the United Nations space Laws passed by the UNCOPUOS and other international agreements. The Outer Space Treaty<sup>4</sup> has granted mankind, the freedom of space exploration. States and other entities

can legally substantiate the launching of remote sensing satellites under the treaty's provision.<sup>5</sup> The Outer Space Treaty and other instruments such as the Moon Agreement<sup>6</sup> also takes care of the needs of the States that do not have the capacity of launching the primary RS equipment by stipulating that the space activities shall be for the benefit and in the interests of all countries.<sup>7</sup> Most of the countries including the ones in Africa rely on this provision to enjoy products and services of space exploration in particular EO and RS. The Outer Space Treaty is only *lex generalis* from which special legal principles for RS were developed. The 1986 United Nations Principles Relating to Remote Sensing of the Earth from Outer Space (UNPRS)<sup>8</sup> were passed to ensure the RS data are be used for improvement of national resources management, environment protection and natural disaster prevention.<sup>9</sup> The UNPRS also governs the relationship between the RS satellite owners (sensing States) and States that are observed the (sensed States) who are entitled to enjoy the derivatives RS satellites data under certain conditions (without discrimination and at a reasonable cost) also stipulated in the UNPRS.<sup>10</sup> Under this justification, African States as sensed States are able to access RS data.<sup>11</sup> Although the UNPRS is of universal character and its legal status is that of UN Resolution, it has no legal force. It has been criticized for not being comprehensive enough as it contains gaps in definition and provisions. It also concerns mainly States and does not include the activities of private players. As a result of the foregoing, it has faced lot of challenges in implementation. Other relevant EO/RS international agreements including the 2000 Disaster Charter<sup>12</sup> that promotes cooperation and data exchange during disasters. The Tampere

<sup>5</sup> Other relevant provisions of the Outer Space treaty are Article VI Stipulating authorisation and supervision of space operations and Article VIII OST on applicability of national jurisdiction.

<sup>6</sup> Agreement Governing the Activities of States on the Moon and Other Celestial Bodies of 5 September 1979, 1363 UNTS 3.

<sup>7</sup> Principle II UNPRS.

<sup>8</sup> UN RES 41/65 of 3/12/86.

<sup>9</sup> UNPRS Principle I, X and Principle XI respectively.

<sup>10</sup> Principle II and XII, UNPRS respectively.

<sup>11</sup> Principle XIII, UNPRS.

<sup>12</sup> Charter On Cooperation To Achieve The Coordinated Use Of Space Facilities In The Event Of Natural Or Technological Disasters Rev.3 (25/4/2000).2. See <http://www.disasterscharter.org/web/charter/charter> accessed 14.09.2011.

<sup>3</sup> United Nations Office for Outer Space Affairs <http://www.oosa.unvienna.org/oosa/en/SpaceLaw/national/index.html> accessed 14.09.2011.

<sup>4</sup> Article I Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies of 19 December 1966, 610 UNTS 205 (Outer Space Treaty).

Convention<sup>13</sup> also obliges States to facilitate the provision of prompt telecommunication assistance to mitigate the impact of disasters. The 1995 World Meteorological Organisation Resolution 40 is also an important international EO legal instrument as it enhances free and unrestricted exchange of meteorological and related data and products. In addition to the international framework regional and national regulations and policy impact the acquisition of RS products and services within the African Continent. Space faring nations are continually enacting regulation and policies to govern their remote sensing activities. They require notification, licenses and approval for engaging in RS activities. The National Space Legislation developed space faring nation in USA (LANDSAT Acts), Canada (2005), Belgium (2005), France (2007), Germany (2007)<sup>14</sup> all have provisions that govern EO data acquisition if not specific regulation. Each country has its own unique policy of RS data and information dissemination for instance the Australian and New Zealand is based on the custodianship information.<sup>15</sup> The USA culture is founded on the open records laws inspired by the Freedom of information. In n some countries like Germany very high resolution data has to pass a certain test before being released for security reasons.<sup>16</sup>

The data rules also provide for the use, reuse, redistribution and commercialization of the data by third parties. Some countries have been criticised for having constrictive regulations and policies that have limited the use of data although properly licensed, disseminated and preserved. Consequently, such restriction has had an impact on acquisition and flow

of RS data to the jurisdiction of many developing nations including the African States.

At the regional level, the EU provided the most advanced form of regional regulation through its activities and those of the European Space Agency (ESA).<sup>17</sup> The EU is moving towards free public access of RS data for environmental resource management. The EU has anchored its space involvement its founding documents and passed a space policy. Upon which it has undertaken to invest in space assets to bring space closer to its citizens.<sup>18</sup> It is now working on pilot projects (Galileo and GMES) in collaboration with ESA. The GMES Project is to be regulated by the GMES Regulation<sup>19</sup> whose aim to promote the use and sharing of GMES information and data and provide full and open access to information produced by GMES. Another aim is to strengthen EO markets in Europe and to contribute to the sustainability of GMES data and information in supporting the European research and technology.<sup>20</sup> According to the joint principles for GMES Sentinel Data Policy, anybody can access acquired Sentinel data. No difference is made between public, commercial and scientific use and between European or non-European users. However, restrictions may be based on applicable security rules and regulations. The African nations have a window of opportunity in bettering their acquisition as there are exists cooperation opportunity envisaged by EU and Africa. The ESA data policy is also significant for the African countries especially as it underwent revision in 2010. Having been inspired by the GMES, it aligns itself with the open policy in harmony with the EU data policy adopted by the GMES participating States. ESA data policy is designe to maximise the use of EO data with an element of public good. It is based on two categories of 'free' and 'limited' datasets. 'Free datasets' cover the majority of data, which are available online for free and without any attached technical constraints. The data is granted

<sup>13</sup> Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations that came into force 8 January 2005.

<sup>14</sup> See UNOOSA, <http://www.oosa.unvienna.org/oosa/en/SpaceLaw/national/index.html> accessed 14.09.2011.

<sup>15</sup> See UNOOSA, <http://www.oosa.unvienna.org/oosa/en/SpaceLaw/national/index.html> accessed 14.09.2011.

<sup>16</sup> Act to give Protection against the Security Risk to the Federal Republic of Germany by the Dissemination of High-Grade Earth Remote Sensing Data (Satellite Data Security Act — SatDSiG) of November 23, 2007 *Unofficial Translation*, UNOOSA, <http://www.oosa.unvienna.org/oosadb/showDocument.do?documentUid=411&country=GER> accessed 14.09.2011.

<sup>17</sup> This paper will not attempt to touch on all EU/ESA EO/ RS data policies but will shade some light on the relevant ones that are useful for African continent.

<sup>18</sup> EU Commission, Enterprise and Industry, 'Bringing space down to Earth' [http://ec.europa.eu/enterprise/policies/space/index\\_en.htm](http://ec.europa.eu/enterprise/policies/space/index_en.htm) accessed 14.09.2011.

<sup>19</sup> Regulation (EU) No. 911/2010 of the European Parliament and of the Council of 22 September 2010 on the European Earth monitoring programme (GMES) and its initial operations (2011 to 2013) L 276/1.

<sup>20</sup> *Global Monitoring for Environment and Security* (GMES) <http://www.gmes.info/> accessed 14.09.2011.

electronically by online registration and user acceptance of ESA's standard terms & conditions. The 'Limited datasets' include the Synthetic Aperture Radar (SAR) data from the ERS and Envisat. The current ESA policy promotes continued and enlarged support to Earth science activities and gives incentives and conditions for private sector investment in spatial activities in Africa and globally.

### III. Legal Considerations of EO/RS data and information

Several legal considerations arise when one deals with RS data and information. If not well addressed, they may lead to restriction of the access of data as hereinafter discussed. Once RS data has been acquired, the processing usually entails value added elements to transform the data into useful information. The process of transformation usually involve the use of intellectual property rights hence the end products become of copyrighted as a matter of procedure in most jurisdictions, licences therefore need to be obtained in order to deal with the processed RS data and information. Licences are mostly procured indirectly either through official distributors or directly to end-users. In most cases the ownership and IPRs over primary data and value added products is usually retained by the authors. The aim of invoking intellectual property rights is to ensure that value added intellectual efforts is rewarded by protection and remuneration through use of licences. As already explained above, the nature of primary or raw data<sup>21</sup> is intangible thus signals and have to be processed into information. UNPRS gives varying degrees of statutory intellectual property protection depending on whether the data is primary or processed or analysed information. The policy of most Space faring States and RS data providers is that the raw data is free while processed data<sup>22</sup> is protected and sold at a reasonable cost.<sup>23</sup> One other factor that influences the dissemination of the EO/RS data is public interest and human rights. The fact that space

activities are said to be for the benefit of mankind, inspires owners of RS data to disseminate it for the good of humanity (this is however a controversial issue in space). Public interest of RS information however is not only affected by national legislation and policies but also by national and cultural aspects. Aside from public interest, there are several arguments justifying the availability of RS information to the public. Information is said not only to be a public good but essential for enjoyment of human rights. This stems from several international human rights instruments declaring that for one to be able to enjoy freedom of expression *inter alia*, they must be able to access information.<sup>24</sup> Thus, most governments have passed Freedom of Information (FOI) laws and regulations to guard against hoarding of important information to the public. Information dissemination is also influenced by cultures of different jurisdictions which have shaped the RS data distribution policy. Some countries like the USA insist that once information has been procured using tax payers' money or citizens' resources then it should be<sup>25</sup> accessible by tax payers. Proponents of this practice insist that if the public funds were used to develop and launch the RS satellites, then the data and information derived therefrom should be accessible to the tax payer.<sup>26</sup> Furthermore privacy in EO Data is a legal consideration that has shaped the access and dissemination of EO/RS data. Satellite data can potentially interfere with personal privacy rights as noticed in the battle faced by Google for its (in)famous Google Street View and Maps.<sup>27</sup> There is a need for the balance between the right to publish freely and access images and the individual's right to privacy. However, some jurisdictions advocate for RS to become a public good, and have enacted laws that are sensitive to privacy of individuals. For instance

<sup>24</sup> Article 19 Universal Declaration of Human Rights (UDHR) is a declaration adopted by the United Nations General Assembly (10 December 1948).

<sup>25</sup> There are of course limitations such threat to security etc. In 2008 NASA and the US Geological Survey - agreed to provide free access to Landsat's database see Spatial Data Infrastructure – Africa Newsletter July 2011. Vol 10 No 7.

<sup>26</sup> The challenge is usually however the question of cost. Whether or not there should be a charge for the processing or to what extent should the tax payer contribute in RS and data acquisition.

<sup>27</sup> Eric Krangel, 'Google Wins Street View vs Privacy Case', Business Insider 8 February 2009 <http://www.businessinsider.com/court-tries-google-street-view-vs-privacy-rights-case-google-wins-2009-2> accessed 14.09.2011.

<sup>21</sup> 'primary data' means the raw data that are acquired by remote sensors borne by a space object and that are transmitted or delivered to the ground from space by telemetry in the form of electromagnetic signals, by photographic film, magnetic tape or any other means.

<sup>22</sup> The term 'processed data' means the products resulting from the processing of the primary data, needed to make such data usable. The term 'analysed information' means the information resulting from the interpretation of processed data, inputs of data and knowledge from other sources.

<sup>23</sup> UNPRS.

the EU policies on GMES<sup>28</sup> include protection of personal data under the Data Protection Directive.<sup>29</sup> Moreover, the INSPIRE Directive<sup>30</sup> addresses the potential conflict between open data access and privacy.

#### **IV. The RS data sharing trend**

The remote sensing community is currently witnessing a move towards open data policies and away from restrictive licensing. The availability of the data has largely been influenced by several regulations by the UNPRS stipulating that data sharing should be on a non-discriminatory and reasonable-cost basis. The International Disaster Charter on Cooperation which aims to achieve the coordinated use of space facilities in the event of disasters and emergencies.<sup>31</sup>

EU Directives encouraging open data access including the Directive on the re-use of public sector information (PSI Directive)<sup>32</sup> and INSPIRE Directive. The INSPIRE Directive provides general rules to establish an infrastructure for spatial information for environmental policies and has highly influenced the GMES and Sentinel Data Policy provisions. Other International organizations advocating for open access include the WMO, UNESCO, EU, the US National Science Foundation and the OECD.<sup>33</sup>

#### **V. A glance at the (EO/RS) legal and policy frameworks for African space faring nations**

The African countries featured in this paper include Nigeria, Algeria, Morocco Egypt, Kenya and South Africa. They have been selected as other African countries are yet to make substantial progress in

enacting legal frameworks and policies governing their space activities.

#### **V. I The Federal State of Nigeria**

In Nigeria, the National Space Research and Development Agency (NASRDA) established in 1999 is responsible for the space activities. NASRDA implements the national policy, for space including RS science and technology, meteorology, communication and information technology and national defense and security. Nigeria has ratified major UN space treaties and other related treaties.<sup>34</sup> Nigeria does not have a specific legislation governing EO/RS activities. It however undertakes a bulk of its RS activities through the National Geo-information Policy of 2003. It has also passed the National Space Research and Development Agency Act 2010 which deals with the remote sensing and GIS operations. Among the objectives of the Nigeria's legal framework and policy is ensuring access of RS data for various applications. To achieve this goal the National Centre for Remote Sensing and Center for Geodesy and Geodynamics were established. The Nigerian space policy encourages the development of private space activities within the country. Under this policy framework, various small scale companies such as the Survicom Services Nigeria Ltd have been registered. Survicom is a remote sensing and GIS/GPS company which provides engineering, surveying and mapping, large information technology consulting and services. The companies rely on both the data provided by Nigeria's satellite<sup>35</sup> and international providers.<sup>36</sup> Nigeria also hosts the United Nations African Regional Center for Space Science and Technology Education in English (ARCSSTEE) which awards postgraduate training in RS/GIS, basic space sciences and satellite meteorology.

#### **V. II The Republic of South Africa**

South Africa's space activity dates back to 1820 when the Royal Observatory at the Cape of Good Hope was established. South Africa has a vibrant space sector with a number of strategic initiatives. The country has tremendously developed its space activity in recent years. It has anchored its space involvement in a robust legal framework and policy. Space activity in

<sup>28</sup> Regulation (EU) No. 911/2010 of the European Parliament and of the Council of 22 September 2010 on the European Earth monitoring programme (GMES) and its initial operations (2011 to 2013) L 276/1.

<sup>29</sup> Directive 95/46/EC on the protection of individuals with regard to the processing of personal data and on the free movement of such data.

<sup>30</sup> Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE) 14.03.2007, OJ L 108/1 (2007).

<sup>31</sup> Natural or Technological Disasters Which prompted the adoption of the GEOS Ten-Year Implementation Plan mentioned endorsed via the Resolution adopted on 16 February 2006.

<sup>32</sup> EU Directive 2007/2/EC.

<sup>33</sup> See Spatial Data Infrastructure – Africa Newsletter July 2011. Vol 10 No 7.

<sup>34</sup> Nigeria has ratified the 1967 Outer Space Treaty, 1968 Rescue Agreement and Liability Convention.

<sup>35</sup> F.D. Chizea and J.I. Ejimanya NigeriaSat-2: Technical Parameters, Operational Perspectives and Target Applications.

<sup>36</sup> Nigerian Communications Satellite <http://www.nigcomsat.net/> accessed 14.09.2011

South Africa is governed by the Space Affairs Act.<sup>37</sup> Although the Act does not directly regulate EO and RS, the Spatial Data Infrastructure Act<sup>38</sup> provides a platform for undertaking EO/RS activities. The three key priority areas for South Africa's space activity are environment and resource management, innovation and economic growth. To oversee South African space activity, the Space Act provides the legal framework that set up the South African National Space Agency in 2008 under the Space Agency Act.<sup>39</sup> Several other institutions such as the South African Council for Space Affairs (SACSA) have been established under the legal framework. The legal and policy framework has provided favourable atmosphere and incentives for operation of space activities for both public and private enthusiasts. The National Space Policy and Strategy calls for formalization of the private space sector and there are plans afoot to enhance the value chain. In addition to the national legal framework, the country has acceded to and ratified several of the international space treaties among other space related legal instruments.<sup>40</sup>

### V. III The People's Democratic Republic of Algeria

Space activities were first undertaken in Algeria when France's first launched a satellite from Hammaguira in 1965. Algeria as an independent nation launched a microsatellite, ALSAT-1 in 2002 which is a part of the Disaster Monitoring Constellation (DMC). The Agence Spatiale Algérienne (ASAL) is the government agency established in 2003 which is responsible for space activities in Algeria.<sup>41</sup> Its space activity is executed by the Centre des Techniques Spatiales which has five departments including, space geodesy, remote sensing, and Geomatics.<sup>42</sup> Algeria launched more satellites in 2006. It has since launched other remote sensing satellites which provide very high quality images for use in a wide variety of applications such as cartography, management of agriculture, forestry, water, mineral

and oil resources, crop protection, management of natural disasters and land planning.<sup>43</sup> Although Algeria does not have a specific national space law, it relies on other national regulation to found its space activity. Algeria has ratified most of the UN space treaties which it uses to fulfill its legal obligation in space.

### V. IV The Kingdom of Morocco

The Royal Centre for Remote Sensing (CRTS) - Centre Royal de Télédétection Spatiale CRTS is the government organization responsible for civil space activities in Morocco. CRTS was created by the government of Morocco to "promote, use and development of Remote Sensing applications in Morocco."<sup>44</sup> Moreover, the agency provides training and education opportunities in space technologies. The activities of CRTS includes deploying space assets for agriculture, forest areas, land planning and urbanization, oceanography, water resources, the management of geographical information, natural hazards, geographic information systems, and desertification. In 2001, Morocco launched her first remote satellite Maroc-TUBSAT. The country also hosts the United Nations African Centre for Space Science and Technology - in French Language (CRASTE-LF): Some of its universities offer degrees in satellite communications technology.

### V.V The Arab Republic of Egypt

Egypt was the first country on the African continent to launch its own satellite Nilesat 101 on the 28<sup>th</sup> April 1998. Currently, Egypt has other scientific satellites - Nilesat 102, Nilesat 103 and Nilesat 201. The National Authority for Space Science and Remote Sensing (NARSS) established in 1971 was not an organization but a government entity responsible for satellite remote sensing in Egypt. In 1994, NARSS the authority was established as an organization aiming "to pursue, transfer and provide the most advanced technology in the fields of remote sensing and peaceful application of space sciences and build the self-capability to utilize these

<sup>37</sup>Space Affairs Act 84 of 1993.

<sup>38</sup> Spatial Data Infrastructure Act No 54 of 2003.

<sup>39</sup>Space Agency Act No 33 of 2008.

<sup>40</sup> The 1967 Outer Space Treaty, 1972 Liability Convention and the 1968 Rescue Agreement See UNOOSA

<http://www.oosa.unvienna.org/oosa/en/SpaceLaw/national/index.html> accessed 14.09.2011.

<sup>41</sup> Présentation of ASAL [online] available at <http://www.asal-dz.org/present.php> accessed 14.09.2011.

<sup>42</sup> Agence Spatiale Algérienne (ASAL) <http://www.asal-dz.org/> accessed 14.09.2011.

<sup>43</sup> EADS- Astrium., *Alsat-2 High Quality Imagery for Algeria* [online] available at <http://www.astrium.eads.net/en/families/satellite-navigation-sensing-gps-meteorology/remote-sensing/alsat-2> 14.09.2011.

<sup>44</sup> The Royal Centre for Remote Sensing (CRTS) - Centre Royal de Télédétection Spatiale CRTS <http://www.crt.s.gov.ma/static.php?file=english.html> accessed 14.09.2011.

technologies to support the development activities.”<sup>45</sup> The agency is divided into two major sectors: the remote sensing and space sciences. The remote sensing sector works on “the use of data provided by Earth observation satellites and various airborne sensors to produce maps and spatial data for the evaluation and monitoring of natural resources, natural hazards and environmental management. Apart from RS activity, Egypt also has communication satellite for television transmission. Within the country, many private companies are involved in space activities in with most of them carry out remote sensing activities. Egypt has ratified most of the space law treaties to provide opportunities for obtaining degrees in satellite communication.”<sup>46</sup>

## **VI. Challenges in policy formulation faced by African governments in ensuring the availability of RS data to its citizens**

Although many challenges are faced by the African government in availing data to its citizens this paper has selectively narrowed down only few that deemed relevant for RS data and information. One of the problems faced by African governments in obtaining RS data and information is the insufficient regulation at the international level is affecting implementation of access of RS data. It has often caused confusion to both service providers and receivers of EO data. The issue of cost of RS data has been compounded by the uncertainty left by the UNPRS. The blanket statements of like ‘reasonable costs’ are very difficult to quantify. For instance amount (cost) that could be cheap for an institution of learning would be dear for a common man who intends to commercialize the RS services with added value. There are several suggested approaches to have the UNPRS revised and converted into a legally binding treaty. The international community however seems to have found its solution through other agreements and moving towards free access motivated by open access trends set by GMES the EU and the Global Earth Observation System of Systems (GEOSS).

Moreover, not many African countries have a specialized institution or space agencies to oversee national space activities. The lack of a central unit can be an impediment for effective use of space products. This is however not a typical problem of African

States as has in previous times been encountered by developed nations such as Australia. For the case of RS however most African nations already have institutions or departments under ministries designated to handle EO/RS activities. Additionally, some African countries are faced with other legal dilemmas passed on by their colonial masters that have affected the legal mandates for developing space programs. One such country is Kenya in which despite of its capacity and potential to carry out space activity, faces mandate problems. The Kenyan government has been supportive of space activity and is in the process establishing a legal framework, space program, secretariat preceding establishment of a national space agency. It has also set aside funding for the same and continues to discussed it in parliament. However the process has stalled as there exists a legal lacuna due to lack of a clear mandate. The Department of Defense is of the opinion that the space agency belongs to military affairs while there is also a contention that the space agency should be an autonomous institution.<sup>47</sup> Such legal hiccups have slowed down Kenya’s space activity until the legal obstacle sorted out.

In the African continent, many of the policy makers are only concentrated in their sectors and forget to keep abreast with the on goings in space industry mainly due to limited recourses or cultural setbacks. There is also a laxity on the part of the policy makers to seek the relevant information. Thus they end up losing opportunities that do not need huge investments. An example is where policies for upgrading RS software are neglected. Since space issues are dynamic, in nature, in a matter of time the knowledge of the officer become obsolete. It then becomes an uphill task to retraining the officers as they find themselves lagging behind. Likewise, most of the citizens and especially those at the grassroots are simply not aware of the significance of space research in their life. They unconsciously consume space products but cannot trace then as of space related products. Some have the typical cliché that space is either close to science fiction or a preserve of the affluent. With such ignorance the demand for space activities and policies will definitely be low. Furthermore, the implementation of RS projects within individual African countries has often been slowed by poor management structures, contractual agreements and intellectual property rights relating to

<sup>45</sup>The National Authority for Space Science and Remote Sensing (NARSS) <http://www.narss.sci.eg/> accessed 14.09.2011.

<sup>46</sup> Egypt is a signatory to 1972 Liability Convention, and 1968 Rescue Agreement. See UNOOSA <http://www.oosa.unvienna.org/oosa/en/SpaceLaw/national/index.html> accessed 14.09.2011.

<sup>47</sup> It seems however that due to dual use of space activities the practice in many space faring nation is that the military space activates from civilian ones are separate. The have been seen to complement each or co-exist in order to achieve the goals of each other.

acquisition and use of the RS goods and services. Due to the weak IPR legal frameworks and policy issues some of the RS providers shy away or restrict RS data and information to African countries. In similar manner, weak RS services, limited technical resources, insufficient human capital and financial hiccups are among the factors attributed to poor access to the available RS data and information.

### VII. Observations and future perspectives

It is of paramount importance that African nations ensure that their (EO/RS) policies are at par with the developments in the international community. For instance, as established above there is a tendency to move towards free RS information, thus policies need embrace such changes. The policies should also provide progressive effective models of data sharing such Public-Private Partnership (PPP) model which has been practiced with Europe within the space sector. The set up in most of African countries are still hierarchical and sector specific thus inhibiting information sharing and cross-sectorial linkages required by the overarching nature of space activities. It is true that space activity can be procured without defined legal framework or acceding to all UN Space treaties. Nevertheless, an African space faring nation is better placed if it accedes to the international space treaties and implementation of the obligations therein (as preceded by the discussed space faring nations). Accession to the space law treaties identifies automatic impulse to the formulation of sound space regulation and develops RS policies.

Developing countries need not worry about large budgetary allocation for extensive traditional space activities such as launching satellites to orbits. They are privileged and leap frog from large financial burdens and utilize space products without necessarily becoming the launching States. All is required of them is innovation and creativity. Precedents on creative ways of maximizing space can be borrowed from small jurisdictions such as Isle of Man, Gibraltar and Bermuda, all which have used their strategic position and as tax havens to attract space activity and investment in jurisdiction without necessary relying on huge space budgets.<sup>48</sup> With the proper use of legal and policy frameworks even developing countries can compete with dominant space faring nations as demonstrated also in

borderless trade such as online businesses and outsourcing.

RS data and information distribution varies from jurisdiction to jurisdiction. It is contended that the access of the data is the least of problem but the challenge is with the re-use of the data as it may attract legal issue for IPRs if not properly channeled. Strengthening the legal and policy frameworks in order to achieve proper and practical economic utilization of EO applications in developing countries amid the restrictions is important. Also, development of creative ways to circumvent negative restrictions of EO/RS data acquisition should be a priority of the African countries. Existence of policies that encourage investment in human capital and resource development in both public and private sectors, enable effective structural changes in the economy. Thus, mainstreaming policies propels innovation, leading to growth, shared infrastructure and services, interaction between financial and technological progress while in search for new learning paradigms in the globalized world.

### VIII. EO/RS legal and policy for integration of States and Nations of Africa

When is the best time to construct spatial policy and regulation in Africa? If this question was to be directed to me, my answer would be 'yesterday'! Simply because African countries have all it takes to enact the legal framework and policies. If they can pass policies that enhance ICT industry why not enact specific ones governing EO/ RS? RS projects have been slowed by State management structures, geopolitics of contractual agreements and IPRS among others. RS policies will enable incorporation of other sectors such as ICT into the infrastructure for spatial integration of States. The implementation is slowed down only by limitations of RS industry and low volumes of trade in remote sensing equipment and spatial inequalities in utilization of remote sensing for social and economic well-being of the population in Africa.

### IX. Conclusion

There is indeed a need for adoption of specific legal and policy frameworks to support the progress and high demand of EO/RS data and information within the African continent. The RS policies will facilitate the understanding of significant role of RS applications and the assurance that the African countries are integrated into the global RS community. While launching an expert committee programme on global geospatial information management under the UN Economic and Social Council on 27<sup>th</sup> July 2011, the UN Secretary General

<sup>48</sup> Timiebi U. Aganaba, 'Developing space markets in small jurisdictions: The case of the Isle of Man' in *Contracting for Space: Contract Practice in the European Space Sector*, Lesley Jane Smith and Ingo Baumann (eds) 2011, Ashgate.



Mr. Ban Ki Moon concluded the thoughts of the authors by stating that “many developing countries have a “serious lack of institutional capacity to harness the enormous potential of geospatial information technologies and to build a sustainable national infrastructure”.<sup>49</sup> The report of the Secretary-General also confirmed the authors thought by reiterating that “geospatial data is increasingly owned by multinational corporations, which sell software and platforms to developing countries that may not have the capacity to know what the best products are or how best to use them.”<sup>50</sup> The expert committee will be the cartilage between the corporations and the developing countries and its task is to advise the developing countries on how to effectively consume the available geospatial data. While this is happening at a high level cadres, it is up to the African governments to live up to the challenge by ensuring that the geospatial information, EO/RS data and information are available to its citizens after establishing effective legal and policy frameworks to support innovation of the satellite downstream services.

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<sup>49</sup> United Nations Economic and Social Council, ‘Global Geospatial Information Management Report of the Secretary-General’ 12 May 2011, E/2011/89.

<sup>50</sup> Ibid UN ECOSOC ‘Global Geospatial Information Management Report of the Secretary-General’, 12 May 2011, E/2011/89.