

LEGAL REGIME OF REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEM IN NIGERIA

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ABSTRACT

In the early times, the main rationale for the sensing of the Earth from space and other associated activities was the demonstration of technological superiority of the sensing state. Today, that trend has changed as nation states have come to recognize the economic values of such activities. Nigeria is no exception to this. Hence, the National Space Research and Development Agency (NASRDA), was established in 1999 to take the lead in the area of space-based activities. Two of its operational centres - National Centre for Remote Sensing, Jos and Regional Space Application Laboratory (South/West), Ile-Ife - are charged with the responsibility of harmonizing research and development in space science and technology application for sustainable socio-economic development in Nigeria, through engagement in space-based remote sensing and geoinformation system activities. Nigeria, in her adoption of national remote sensing regime, takes authority to control what she does by the use of the technology, and bestowed with the duty to authorize and supervise space activities over which she has jurisdiction. This paper, therefore, focuses on and reviews the laws and policies guiding the conduct of space-based remote sensing and geographic information system (GIS) activities in Nigeria. It traces briefly the history of remote sensing and GIS activities in Nigeria. It then, critically examines the laws and policies (past and present) in the area, especially the 2003 National Geoinformation Policy and the Copyright Act. It talks further on the increased participation by Nigeria in alliance with other space-faring nations in the development of national space laws, and in being a party to Conventions and Treaties dealing on remote sensing and associated areas. It concludes by giving recommendations and suggestions on how the country would have a comprehensive national legal regime of remote sensing and associated areas.

INTRODUCTION*

The early activities of Louis M. Daguerre, Joseph Nicéphore Niepce Tournachon Nadar of Paris, Alfred S. A. King, J. W. Black and some other individuals, in the invention of photography and aerial photography, gave birth to what we today refer to as remote sensing. The activities regarding sensing of the Earth from space increased during World War I with the development of

practical aerial cameras, new films, and the techniques to interpret these photos and produce accurate maps for both military and civil use. Further technologies for aerial photography and remote sensing were developed during the World War II; there was the development of other imaging systems such as near-infrared photography, thermal sensing and radar. And from the 1950s up to the 1960s, remote sensing came to serve the major purposes of military reconnaissance, meteorology and national security. During this time, there was really no national or international legal regime on remote sensing. Article I of the Outer Space Treaty, 1967 only applied by implication, placing remote sensing under a complete regime of freedom. In the 1970s up to the 1980s, State practice had included mainly data collection relating to the protection of the environment, though, the highly sensitive question of national security was still present.

The adoption by the United Nations General Assembly in 1986 of the Principles Relating to Remote

* See S. Madry and J. Pelton, "Satellites in Service to Humanity", in J. N. Pelton and A. P. Burkley, 2010, *The Farthest Shore: 21st Century Guide to Space*, Canada: Apogee Books, pp 181 – 220; S. A. Morain, "A Brief History of Remote Sensing Application with Emphasis on Landsat". Available at www.nap.edu/openbook.php?record_id=59638&page28 Visited 7th September, 2011; S. Aggarwal, *Principle of Remote Sensing*; M. Williams, "Remote Sensing Earth Observation Satellites", delivered at the International Law Association, Berlin; J. I. Gabrynowics, "The Land Remote Sensing Laws and Policies of National Governments: a Global Survey"; G. Oduntan, 2012, *Sovereignty and Jurisdiction in the Airspace and Outer Space – Legal Criteria for Spatial Delimitation*, New York: Routledge Publishers, p. 269.

Sensing of the Earth from Outer Space, following its earlier resolutions from 1974 to 1985 in which it recommended that the Legal Sub-Committee of the Committee on the Peaceful Uses of Outer Space should consider the question of the legal implications of remote sensing of the Earth from space, with the aim of formulating draft principles relating to remote sensing, was innovative. The principles formulated did not, however, meet expectations because they were agreed at a time when the commercialization of remote sensing activities, were still not envisaged.

A period came, when remote sensing activities became one of the core areas of the utilization of Outer Space, and the usefulness of the application to commercial and exploitative activities on Earth became known. From this period onwards, States began to have national laws regulating remote sensing activities and data; their policies, however, tended towards commercialization of remote sensing system. This is because remote sensing and geographic information system facilities which are set up to acquire process and manage data/databases are quite expensive and time consuming. Today, Nigeria has joined leading nations like the United States of America, France, India, etc in the adoption of national remote sensing law regime.

MEANING OF REMOTE SENSING AND GIS

Different authors have offered different definitions to remote sensing and geographic information system (GIS). This is because in these subjects, definitions have been somewhat hard to nail down.[†] An author, therefore, chooses his definition based on what he or she seeks. Since our aim here is not to dwell on the meaning of these subjects, any of the definitions will suffice.

Remote Sensing

The United Nations Principles Relating to Remote Sensing of the Earth from Outer Space in its Principle I defined remote sensing as “the sensing of the Earth’s surface from space by making use of the properties of electromagnetic waves emitted, reflected or diffracted by the sensed objects, for the purpose of improving natural resources management, land use and the protection of the environment.” Simply put, it is “the use of satellites to search for and collect information about the earth.”[‡]

Geographic Information System

The 2003 National Geoinformation Policy of Nigeria defined GIS as an integrated computer information system designed for collecting, managing,

displaying and analyzing large volumes of spatially referenced and associated attributed data. It is also seen as a powerful set of tools for storing and retrieving at will, transforming and displaying spatial data from the real world for a particular set of purposes.[§]

BRIEF HISTORY OF REMOTE SENSING AND GIS ACTIVITIES IN NIGERIA

As far back as the 1960s, Nigeria had started using satellite-based infrastructure for various purposes.^{**} In 1976, at the inter-governmental meeting held in Addis Ababa, Ethiopia, the delegation of the Federal Government of Nigeria made known to the Economic Community of Africa/Organization of African Unity member countries, the intention of the country to venture into space science and technology.^{††} Before then, however, there were recommendations in the several studies undertaken on behalf of the Federal Government to establish a National Centre for Remote Sensing, which should be centrally located. The National Centre for Remote Sensing (NCRS), Jos, was established in 1996 under the National Agency for Science and Engineering Infrastructure (NASeni)^{‡‡}, shortly after the Federal Government of Nigeria included it in the 1975 – 1980 developmental rolling plans.^{§§} The centre was established to build capacity in satellite data applications; implement space application programmes of national importance; acquire satellite data from various satellites; and operate multi-choice satellite archiving station.^{***} The establishment of the National Space Research and Development Agency (NASRDA) on 5 May 1999, with the Mandate of ‘gearing its organizations and activities towards the implementation of National Space Research and Development Programmes which shall be directed towards the goal of self reliant use in space technology

[§] P. A. Burrough, 1986, *Principles of Geographic Information Systems for Land Resources Assessment*, Oxford: Clarendon Press.

^{**} Tare Brisibe, “Outer Space Activities and Intellectual Property Protection in Nigeria”, in *Journal of Space Law*, Volume 32, Number 2, Winter 2006, pp 229 - 251

^{††} See G. I. Agbaje, “Nigerian Space Policy, Satellite Technology and NGDI Programmes”, in A. T. Salami (ed), 2006, *Imperatives of Space Technology for Sustainable Forest Management in Nigeria*, Ile-Ife: Space Applications and Environmental Science Laboratory, pp. 118 – 145;

R. A. Boroffice and Akinyede, 2005, *Space Technology and Development in Africa and the Nigeria’s Experience*, Abuja: National Space Research and Development Agency, p.45;

Tare Brisibe, *ibid*;

See also www.ncrsjos.org/history.html.

^{‡‡} Tare Brisibe, n.2

^{§§} G. I. Agbaje, n.3

^{***} See R. A. Boroffice, “Ways and Means of Coordinating National Space-Related Activities: the Nigerian Experience”, an address delivered at the United Nations/Government of Nigeria Workshop on Space Law, 21 – 24 November, 2005, Abuja.

Available at www.unoosa.org/sap/2005/nigeria/presentations/03-02.pdf

Visited on 11 September, 2011.

[†] See K. C. Clarke, 1999, *Getting Started with Geographic Information Systems*, 2nd Edn, Upper Saddle, NJ: Prentice Hall, p.2

[‡] See S. Wehmeier (ed), 2000, *Oxford Advanced Learner’s Dictionary of Current English*, New York: Oxford University Press, p. 992

for national development^{†††}, automatically placed the National Centre for Remote Sensing under it.

The NCRS is charged with the responsibility of harmonizing research and development in space science and technology application for sustainable socio-economic development in Nigeria. It acquires and applies remote sensing, geographic information system and other related space technologies for the inventory, development and management of the nation's natural resources and environmental protection for the benefit of humanity.^{†††} To achieve this vision, NigeriaSat-1, an Earth Observation micro-satellite, was launched into Low Earth Orbit on 27 September 2003. And as part of the short term proposed projects to build laboratories and procure laboratory equipment and computers for signal/image processing, stated in the National Space Policy and Programmes, NASRDA has established Space Application Laboratory, South-West (Cooperative Information Network) in Obafemi Awolowo University, Ile-ife, to undertake remote sensing and geographic information system activities in the South-West Geopolitical Zone of Nigeria.

Following the establishment of this Space Application Laboratory, NASRDA has further launched into the orbit, NigeriSat-2 (a high resolution Earth Observation satellite), and NigeriaSat-X (a small satellite built by Nigerian engineers to provide data continuity and interface with NigeriaSat-1, and to enhance national human resources to use space applications and to develop Nigeria capability in space). These two satellites were launched 17 August 2011.

SPACED-BASED REMOTE SENSING AND GIS LAWS IN NIGERIA

Nigeria is a country that has gained a foothold in remote sensing data collection and distribution,^{§§§} with her launch of three Earth Observation Satellites earlier mentioned. The country, unlike United States of America, Canada, France, etc has no formal Remote Sensing and Geographic Information System legal regime. However, apart from the National Geoinformation Policy 2003 and the Copyright Act 1990, which according to Tare Brisibe,^{****} have

^{†††} See NASRDA's Mandate.

^{†††} See the Vision of the Centre

Available at <http://www.ncrsjos.org/history.html>
Visited 13 September, 2011.

^{§§§} This position is not in consonance with the position of Ananya Ghosh that Nigeria is gaining a foothold in remote sensing, data collection and distribution. See Ananya Ghosh, 2010, "Remote Sensing Policies".

Available at www.geospatialworldnet/index.php?option=com_content&view=article&id=20307&Itemid=1304.

Visited 11 September, 2011.

^{****} Tare Brisibe, "International Obligations and National Regulation of Outer Space Activities in Nigeria", delivered at the United Nations/Ukraine Workshop on Space Law: Status, Application

provisions 'intended to protect intellectual property arising from the enhancement and dissemination of remotely sensed data', it is noteworthy that the recently passed National Space Research and Development Agency Act 2010, has provisions dealing with remote sensing activities like the development of satellite technology for remote sensing application, building and launching of remote sensing satellites, repository of remote sensing satellite data, granting of licences to persons or body corporate for activities relating to satellite data, national security, satellite data acquisition and archiving. It is noteworthy that the provision of Section 9 (4) of the Act is in tune with the provision of Article VI of the Outer Space Treaty. This is a laudable move in the area of national space law.

The different domestic laws of the country govern remote sensing and its associated activities. For instance, the Nigerian Insurance laws govern satellite insurance. The provisions of the Nigerian Insurance Act 2003 are to the effect that part of the re-insurance pertaining to assets such as satellites, underwritten by foreign insurance companies must be placed with Nigerian underwriters.^{††††} As mentioned earlier, the Intellectual Property law is equally not left out. The Copyright Act^{††††} and the National Geoinformation Policy 2003 both contain provision and policy statements respectively intended to protect intellectual property arising from remotely sensed data.^{§§§§} The 2003 National Geoinformation Policy provides that –

1. A data owner shall own the copyright of the data produced by him/her.
2. For value-added data, the producer shall own the copyright of only the value-added component of the data.
3. For integrated, non-decomposable composite datasets, the producer of the data shall own the copyright provided that permission has been obtained from the copyright holder(s) of the individual base data.

Satellite imagery in court proceedings as evidence^{*****} before national courts has a place in

and Progressive Development of International and National Space Law. See also, Joanne Irene Gabrynowicz, "The Land Remote Sensing Laws and Policies of National Governments: a Global Survey", prepared for the United States Department of Commerce/National Oceanic and Atmospheric Administration's Satellite and Information Service Commercial Remote Sensing Licensing Program.

^{††††} See W. Momoh, "An Overview of Nigerian Space Activities and Space Law"

^{††††} Cap 68, Laws of the Federation of Nigeria, 1990

^{§§§§} W. Momoh, n.11

^{*****} See the work of Maureen Williams and the comment Joanne Irene Gabrynowicz on the proceedings of United Nations/Brazil Workshop on Space Law – 'Disseminating and Developing International and National Space Law: the Latin America and the Caribbean Perspective', 2005.

Nigerian Law of Evidence. The Evidence Act^{†††††}, governs such areas and places them under “Statements made in Special Circumstances”. For instance, Section 40 of the Act provides –

Statement of fact in issue or relevant facts made in published maps or charts generally offered for public sale, or in maps or plans made under the authority of Government, as to matters usually represented or stated in such maps, charts or plans, are themselves relevant facts.

Some areas of remote sensing relating to survey, for instance, aerial photography for survey purposes, topographical survey, linear measurements by means of radio transmission, radar, any electronic or electromagnetic means, etc are governed by the Survey Coordination Act.^{†††††}

Just as the law of contract pervades virtually all sphere of human activity^{§§§§§}, it affects almost all aspects of remote sensing and GIS regime from the building of remote sensing satellites to the distribution of data; there is a contract relation between the purchaser/user/distribute and the technology product/distributor/service provider upon which claims can be asserted. It can be a contract for the sale of goods (which will also be governed by the Sale of Goods Act^{*****} of Nigeria) or a contract for the performance of services. It normally contains Warranties (express or implied), Liabilities, Damages, Indemnification, Representation, Assignment, and other terms.^{†††††} GIS products or services can be custom-developed or software. Datasets can be sold pre-packaged to the general customer market. The relationship between GIS producer and purchaser or user in either case will probably be affected foremost by contract law principles.^{†††††} A contract has been defined as ‘an agreement which the law will enforce or recognize as affecting the legal rights and duties of the parties’^{§§§§§}. It can also be defined as ‘a promise or a set of promises that the law will enforce.’^{*****} The definition of Niki Tobì, J.C.A in *Orient Bank (Nig) Plc v. Bilante*

International Ltd^{†††††††} is interesting. He defined contract as ‘an agreement between two or more parties which creates reciprocal legal obligations to do or not to do particular things.’ Other areas where contract law principles can be provoked are misrepresentation, mistake, and warranty.

The Nigerian law of Tort will be invoked in areas of civil wrong involving a breach of duty fixed by Nigerian law. GIS professionals may be held legally accountable for the accuracy and reliability of information stored in their databases, sold, or issued to the public.^{†††††††} If harm is caused or economic loss is sustained by a mistake made in a GIS dataset, or by a mistake not corrected once discovered, then those in charge of the GIS may be sued. Data providers may be held accountable if the information they distribute leads to damage or loss even if that information was used for the purposes for which it was never intended.^{§§§§§§§} Since tort theories come to the forefront when the goal of the law is to prevent harms to the public generally, concepts such as negligence and strict liability may often be invoked by third part users outside of, and independent of contractual considerations.^{*****} However, it is worthy to mention that the 2003 National Geoinformation Policy of Nigeria has a provision which states that “a custodian shall be deemed to possess indemnity against any liability arising from unauthorised use of its dataset”. This provision is against the goal of the tort law.

Another Nigerian domestic Statute that governs some areas of remote sensing activities and GIS is the Freedom of Information Act, 2011, which makes public records and information more freely available; provide for public access to public records and information; protect public records and information to the extent consistent with the public interest and the protection of personal privacy; protect serving public officers from adverse consequences for disclosing certain kinds of official information without authorization and establish procedures for the achievement of those purposes. It should be noteworthy that the signing of this Act into law by President Goodluck Jonathan enjoyed high public support. Public agencies are to make open information held in their files open to the general public.

Pre-packaged or custom-developed GIS software can be stolen. This has its place in the Nigerian Criminal Law. Problem may arise when it is not in a ‘movable’ form, as the Criminal Code Act^{††††††††} of

^{†††††} Cap E14, Laws of the Federation of Nigeria, 2004.
^{†††††} Cap S17, Laws of Federation of Nigeria 2004.
^{§§§§§} See I. E. Sagay, 2000, Nigerian Law of Contract, 2nd edn, Ibadan: Spectrum Books Limited.
^{*****} Cap. , Laws of the Federation of Nigeria 2004
^{†††††} See for instance “ESRGC GIS Data Product Distribution Agreement.” Available at www.esrgc.org
 Visited 26 January, 2011.
^{†††††} See H. J. Onsrud, “Libility in the Use of GIS and Geographic datasets” in: P. Longley, M. Goodchild, D. Maguire and D. Rhind (eds), 1999, Geographic Information Systems, Volume 2, Management Issues and Applications, John Wiley and Sons, Inc., pp 643-652.
^{§§§§§§§} See Treitel, 1979, The Law of Contract, 5th Edn, cited in I. E Sagay, n.17
^{*****} Ibid

^{†††††††} (1997) 8 NWLR (Pt 515) 37 at 76
^{†††††††} See M. Lynch and K. E. Foote, 2000, “Legal Issues Relating to GIS”.
^{§§§§§§§} Ibid
^{*****} H. J. Onsrud, n. 20. See the ‘Confidentiality, Privacy and Liability’ section of the 2003 National Geoinformation Policy of Nigeria.
^{††††††††} Cap 77, Laws of the Federation of Nigeria, 1990

Nigeria places only movable things under ‘Things Capable of Being Stolen’.

NIGERIA’S INCREASED PARTICIPATION IN REMOTE SENSING LAW DEVELOPMENT

Nigeria has increased her participation in alliance with space-faring nations to develop national space laws that includes remote sensing.^{*****} In its move to have her national space law regime, the country has signed into law the National Space Research and Development Agency Act, 2010. This Act has provisions dealing with remote sensing and GIS. More so, the Nigerian Space agency has submitted a proposal to the country’s National Assembly to have a complete legal regime of remote sensing. The Agency keeps its fingers crossed as it awaits the response of the National Assembly.

Nigeria is a party to several international instrument either dealing in remote sensing, geographic information systems and data or aspects of these. The country is a signatory to the Liability and Registration Conventions, and it keeps her obligations under the Conventions.

CONCLUSION AND RECOMMENDATIONS

Although Nigeria has no formal legal regime on remote sensing and all-encompassing space law, her recent moves towards having national space laws, as seen in the passing into law the NASRDA Act 2010 and its submission of a proposal to the country’s National Assembly to have remote sensing legal regime is laudable. It is therefore recommended that the country should take speedy action to have complete remote sensing law regime; all the applicable laws should be put in a single document.

Apart from compiling all the remote sensing and GIS laws into a single document, some of these laws need immediate review. The Criminal Code Act provision in respect of stealing needs immediate review. The National Geoinformation Policy also needs immediate review.

With the present foothold of Nigeria in remote sensing and associated areas, Nigeria needs a single document that will contain all the remote sensing laws. Having remote sensing laws in one document will go a long way in removing the conflicts in the laws presently governing remote sensing and GIS.

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