



## Application of Space Science and Technology in Administration and Finance

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### ABSTRACT

Space Science and Technology has many application areas such as in agriculture, education, transportation, health, business, administration, oil explorations, water, environment, and many more, but this work looks at its applications in administration and finance. The work adopts theoretical approach to discuss some uses of Space Science and Technology in administration and finance. It was explained that Space Science and Technology can be used in monitoring of staff movement at work, monitoring of staff on the field, tracking of company vehicles, suitability analysis for the establishment of a new business, monitoring of punctuality and/or lateness to work, spatial distribution analysis. It was concluded that efficiency will be increased and productivity will be improved if Space Science and Technology is applied in the area of administration and finance.

**Keywords:** *Space science, Administration, Business, E-government, Finance, Tele-education.*

### 1.0 INTRODUCTION

Space Science and Technology is the study of phenomena that take place in space (upper atmosphere and beyond) as well as the systematic application of engineering and scientific disciplines to the exploration and utilization of outer space. The major backbone in Space Science and Technology is the satellite. Depending on the function(s) in which the satellite is intended to carryout, each satellite launched into space has its own payload or onboard equipment which allows it to perform its functions.

For instance, earth observation satellites such as the Nigeria NigSat-2 and NigSat-X satellites carry cameras to allow them capture the image of the target area. Also, the Nigeria communication satellite, NigComSat-1R has transponders as one of its onboard equipment. This allows it to receive and transmit signals from and to the earth's surface. While the earth observation satellites are used in environmental or earth surface monitoring, communication satellite is used for communication, television and radio broadcasting, and internet services. Both of these satellites have applications in administration, finance as well as business organizations. This work will look into some applications of these satellites under Space Science and Technology as a whole in administration and finance. According to Encarta dictionary, administration is the management of the affairs of a business, organization, institution, public affairs or the affairs of the government, while finance in the business or art of managing the monetary resources of an organization, country or person. Other application areas of space Science and Technology are agriculture, education, transportation, health, water, environment, power, minerals, oil explorations etc.

### 1.1 Aim

The aim of this work is to study some applications of Space Science and Technology in administration and finance with a view to improving efficiency and productivity.

## 1.2 Objectives

1. To discuss some uses of Space Science and Technology in government offices;
2. To discuss the uses of Space Science and Technology in business organization; and
3. To discuss the uses of Space Science and Technology in new business establishment.

## 1.3 Scope

The work is limited to the theoretical studies of how Space Science and Technology can be used in administration, finance and business organizations.

## 2.0 METHOD

This work makes use of theoretical explanations of some applications of Space Science and Technology in administration and finance, some which are listed below.

Applications of Space Science and Technology in administration and finance

1. Space Science and Technology can be used in the monitoring of staff movement during work or office hours
2. It can be used in accessing the punctuality/lateness on staff
3. Space Science and Technology is used for conducting online staff promotion examination
4. Space Science and Technology is used for tele-education in financial or business activities
5. It is used for internet banking and online financial transaction
6. Space Science and Technology is used in suitability analysis for business/financial institutions
7. Space science and technology is used in e-government
8. It is used for spatial distribution analysis for business enterprises
9. It is used for tracking of company staff and vehicles
10. Space Science and Technology is used for tracking and monitoring of field workers

11. Space Science and Technology is used in e-commerce

## 2.1 Brief explanations

**2.1.1. Space Science and Technology can be used in the monitoring of staff movement during work or office hours :** Sometimes, staff are seen moving about from one office to the other even when they are supposed to be on their seat. These staff would only stay in their office when they notice the presence of their superior whom they know will not take it lightly with them when not staying in their office. But one serious question here is that how many offices will the superior be at a time in an organization having up to twenty or more offices? This calls for the use of a mechanism that performs such task in a simple and effective way. The use of satellite tag, GPS tracking device and Radio frequency Identification Device (RFID) is the solution. A satellite tag or GPS tracking unit makes use of satellite or terrestrial network to determine the position of the user at any point in time. The sensors or devices are made in a small size so that it can be attached to the staff identity (ID) card. Also, the RFID can be constructed in a form of chip which can be attached also to the staff ID card. The configuration of these devices is such that they identify an object or location, collect data (latitude, longitude, time, name of location) about it, and transmit the data directly into a computer systems in a real-time. The information sent to the computer will be observed by the concerned person in the control room along with a map in the background which will indicate the location of the staff at that time. The computer will be manned by one or two persons in the office to monitor staff movement, hence reducing staff unnecessary movement in the office, and will in the process increase efficiency and productivity of the staff. This can be used in various offices and organization in the country. The device can be used to detect when some staff members gather themselves somewhere or having an unofficial meeting in the office. RFID makes use of radio wave while satellite tag or GPS tracking unit make use of satellite network.



Fig. 2.1: RFID chip (source: m.123rf.com)

### 2.1.2. Space Science and Technology can be used in assessing punctuality/lateness of staff:

The use of digital ID card such as the ones explained in (2.1.1) can be used to determine when the staff come to work and when they leave. As seen in banks today, such a door can be used to capture staff data based on the digital ID card he or she is carrying whenever he or she passes through the door, and automatically transfer it into a system where it can be assessed and analysed by the respective personnel in the office. The assessment of the data stored in the system can be daily, weekly or monthly as the case may be to determine the staff that come to work late as well as those that leave the work early or move in and out of the compound with or without permission. This mechanism also makes use of satellite network and can be used in government offices, private organizations and in academic institutions such as our tertiary institutions.

### 2.1.3. Space Science and Technology is used for conducting online staff promotion examination:

Today, unified tertiary matriculation examination (UTME) is conducted in Nigeria by JAMB through internet or networked computers. The examination answers are transmitted to the JAMB database as soon as any student submits his or her own exam answers. In the same way, promotion examination or job interview can be conducted online without the person(s) conducting the examination going to the venue where those writing the examination are. This will reduce time wasting, increase efficiency and as well reduce any delay in the releasing of the results of the examinations.

### 2.1.4. Space Science and Technology is used for tele-education on financial or business activities:

Tele-education is the process of teaching and learning in which the teacher and the students (learners) are in different locations while the teaching and learning is carried out. Example is a situation in which a teacher in Abuja teaches the students in Jos, Plateau state without both having physical contact. Training can be organized outside the country and some staff of a company or organization such as those in business unit or those in financial institutions like banks but will be expensive to go to the venue. In this case, arrangement can be made for the training to be done through videoconferencing. In this way, the learners will see the trainer and the trainer will see the learners, and the learners will have the opportunity of asking the trainer to clarify something that was not understood in the course of the teaching. This method will in no small way reduce cost especially in the area of transportation of these staff to the venue. It will also reduce time wasting since the learners will no longer have to travel to the venue.

### 2.1.5. It is used for internet banking and online financial transaction:

In some years past, online or internet banking was not available in Nigeria. Today, payment or transaction can be done within and outside the country within a short period of time. Even with an ordinary valid ID card, one can receive money sent from anywhere in the world through western union, whether or not the receiver has bank account or not. Today, with a mobile phone that has internet connection, one can make payment to any part of the world from the comfort of one's room. All these wouldn't have been possible without Space Science and Technology.

### 2.1.6. Space Science and Technology is used in suitability analysis for business/financial institutions:

Suitability analysis deals with the process in which a particular location or area is assessed to see the part or parts of that given area that will be suitable or convenient to site a particular establishment or enterprise such as school, market, banks, and even an office of an organization. In the process, the suitability map will be made in which the areas with free spaces can be shown, and among these free places, other factors will be considered such as nearness to recreational centres, accessibility, as well as the integration with the land use/land cover map. This will help to display if the free areas are convenient for such an establishment as some free areas may be water bodies, hills, forests, etc, hence making for instance the establishment of bank or

school to be done near forest or water not suitable. This analysis can be done using geographical information system (GIS), which is an aspect of Space Science and Technology. The basic premise of GIS suitability analysis is that each aspect of the landscape has intrinsic characteristics that are to some degree either suitable or unsuitable for the activities being planned [Philip and Moses, 2015].

**2.1.7. Space Science and Technology is used in e-government:** E-governance is defined “as the integration of Information and Communication Technology (ICT) in all the processes, with the aim of enhancing government ability to address the needs of the general public”. E-governance has some benefits, some of which are increase in transparency, reduction in corruption, cost reduction and increase or expand the reach of governance. E-governance can be between the government and the employees, government and citizens, government and business, and government and government.

E-governance between government and the employees involves the employees interacting with the government or heads through ICT such as through internet medium. This helps the employees to obtain fast response from their boss or any person in such a higher position.

E-governance between government and citizens involves the interaction between the citizens and the government. Observations can be made by citizens using a particular platform set up by the government.

E-governance between government and business involves a process in which business class people interact with the government. This allows transparent business or transaction to be carried out between the government and the business organization such as banks or business people such as contractors.

E-governance between government and government involves the process in which the interaction as such as sharing of ideas is done between government entities at the same or different levels. This can be between the state and federal governments or state and local governments. It can also be between two or more states sharing ideas on how to solve a particular problem. It could be in a form of scanned letter, emails, faxing, calls, video, text messages, etc. These are achieved through networking, and which makes use of satellite communication, an aspect of Space Science and Technology.

**2.1.8. It is used for spatial distribution analysis for business enterprises:** Spatial distribution analysis is a process of studying how some structures, natural or artificial, such as buildings, trees, hills, ground waters, schools, banks, hospitals, etc are located or positioned in an area. In some areas, many schools are found to be clustered in one particular place while in some other places, the schools are so scattered and in some places in that same area, there are no schools. This situation is also applicable to business establishments. Some areas in our communities today have different types of business set up while in some areas, a few or none will be found. In some cases, one may like to establish a business or private enterprise such as school, clinic, computer business centre, supermarket, etc in a place but the best location to site it becomes an issue. With the aid of spatial distribution analysis in which the location of the existing ones are known in addition to the manner of their distribution, the person can easily find a convenient place to site his or her own.

**2.1.9. It is used for tracking of company staff and vehicles:** Some modern vehicles today have global positioning system (GPS) receiver unit. This unit allows the driver to know his location at any point in time. In addition to the driver knowing his position, the GPS receiver unit in the vehicle is wirelessly connected to the computer system in the control room of the company. This will allow the person on the computer to track the vehicle and the driver at any time using the location coordinate and background map. With this, a driver who takes a wrong route or stopped when he is not supposed to will be informed of the route already taken or be asked why he has stopped which is not the location he is to stop.

**2.1.10. Space Science and Technology is used for tracking and monitoring of field workers:** Field workers sometimes will not be serious especially when there was no one monitoring them. In a work in which the person is not supposed to stand in one particular position too long and a person or some persons are found to be at the same location for too long a time or when the coordinate points of many of them are almost equal, then it is likely that they are resting or are just discussing instead of working. A message can be sent to them or putting calls across to find out the reason(s) why they are not working as supposed. This will put each staff on his or her toes, thus improving efficiency and staff productivity.

**2.1.11. Space Science and Technology is used in e-commerce:** E-commerce is defined as all business activities that are done online, through electronic processing as well as transmission of data in the form of text, audio, video. It is also defined as “the business conducted through the use of computers, telephones, fax machines, barcode readers, credit cards, automated teller machines (ATM) or other electronic appliances (whether or not using internet) without the exchange of paper-based documents” [*Bussiness dictionary*]. In other words, it involves the use of computer network to carry out buying and selling of goods and services. This involves ordering for items, delivery of goods, making payment, etc using Information and Communication Technology.

### 3.0 CONCLUSION

The various ways in which Space Science and Technology can be used in administration, business and/or finance have been listed and discussed, some of which are monitoring of staff movement at work, monitoring of staff on the field, tracking of company vehicles, conducting of staff promotion examination, e-governance, suitability analysis for the establishment of a new business, spatial distribution analysis. From this discussion, it can be concluded that efficiency will be increased and productivity will be improved if Space Science and Technology is applied in our administration and finance.

#### Constraints:

- Energy/ power issue
- Equipment maintenance
- Funding
- Political will/policy to develop this
- Sanction

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