THE UTILIATION OF FLIGHT PLAN IN PROMOTING AIR TRANSPORTATION SAFETY IN NIGERIA (PROBLEMS AND PROSPECTS)

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DEDICATION

This research project is dedicated to my parents for their love and care over my life and to the glory of Almighty God.

CERTIFICATION

This is to certify that this project was carried out by Jegede Adebola Matthew under my supervision in transport Management Ladoke Akintola University of Technology, Ogbomoso Nigeria

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ABSTRACT

The basic purpose of Flight Planning System is to ensure that aeroplanes take any necessary precautions and adequately equipped both with fuel and enroute information before commencing on any flight or journey.

Aeroplanes must also carry some research fuel to allow for unforeseen circumstances, such as inaccurate weather forecasts, or Air traffic control requiring an aircraft to fly at a lower height than optimum due to congestion or some last – minute passengers whose weight was not allowed for when the flight plan was prepared.

In view of this, the study attempts to examine the necessary precautions and information that must be available to pilots for safety purpose any flight. The effect of these information and lack of them on safety of flight was critically examined. The details content of flight plan and their usefulness were discussed.

Furthermore, the study revealed that without the flight plan, the safety or air craft in the sky cannot be guaranteed. The congestion in the air with an average growth rate of 4.5% shows that flight plan will continue to play prominent roles in aviation industry in general. The use of computer generated information to develop and disseminate flight plan will enhance safety and be a necessary safety requirement in the next decade. Thus, the prospects of flight plan in Nigeria aviation development cannot not be overemphasized.

CHAPTER ONE

INTRODUCTION

1.0

1.1 Background of the study

Flight planning is the process of producing a flight plan that will ensure that aircraft can safely reach the destination; and comply with air traffic control requirements, to minimize the risk of mid-air collision. Safety regulations require aircraft to carry fuel beyond the minimum needed to fly from origin to destination, allowing for unforeseen circumstances or for diversion to another airport if the planned destination becomes unavailable. Furthermore, under the supervision of air traffic control, aircraft flying in controlled airspace must follow predetermined routes known as airways, even if such route are not as economical as more direct flight.

All the above requirements are necessary to ensure safety of flights in our airspace. The fact that air transport generally carries influential and important people across the world makes it mandatory to take all necessary measures that will ensure security and safety of lives and properties. In developing countries such as Nigeria, it is only the rich and high class people that can afford the cost of air transport, and as such any air disaster will attract more attention and calls for higher safety standards.

Traditionally, air traffic services across the globe have been provided by governments, on a national and sovereign basis so as to oversee and continuously monitor the development Some air navigations services can trace their, origins back to the earliest days of civil flying; others have evolved from strictly military roots. However, due to increasing demand for funding, air navigation service providers are

increasing being asked to adopt business practices as means of funding crucial investment in aviation infrastructure, since they are being assigned to authorities with administrative and often with administrative and often with financial autonomy . Such is the change that air traffic service providers now even have an official body representing their interests at international forums, where for many years they have simply being considered as part of the government process and represented by their individual government, if at all.

Several factors have stimulated the swing to commercialization. For example, as the population of economically mature states ages, government finances are becoming increasingly stretched. Growing demands on treasury resources to finance service and program for which states have traditionally been responsible – such as health. Welfare and social security – mean that services such as air traffic control, find themselves in an unequal competition for scarce public funds.

But if sole responsibility for funding air navigation systems rests in the hands of national governments, political expediency or public sector borrowing limits can affect the funding available to the creation of a safe, efficiency and evolving infrastructure. In essence, the provision of flight plan for navigation safety must continue to be done without limitation for reliability and efficiency either by the government or private agency.

1.2 Statement of the Problem

The air transport industry has growth enormously high recent decades and is projected to continue growing strongly into the next century, particularly internationally. Over the past thirty years, the number of passengers worldwide grew

from 117 million in 1965 to an estimated 1.26 billion in 1995. United State airline passengers for the same period grew from 103 million in 1965 to an estimated 548 million in 1995. Also common carrier offer scheduled and charter flight to international, regional and local destinations. Depending on the length of the trip and the amount of cargo or number of people to be carried, the airplane with varying sizes would be engaged. In addition, general aviation has become part of the air transport industry in the mid 1920's. This includes all flying in corporate-owned or leased aircraft and in air taxis, which provide on-demand services from fixed locations. While much of general aviation is commercial, the companies that offer these services are not legally defines as common carriers. Their services are provided to select clients at negotiated rates rather than to the public at large, and they do not have the same carrier certification requirements as the airlines.

However, with the availability of common carriers and general aviation everywhere in the world, it is pertinent to state that many people especially in the developing countries do not have access to aviation services. The locational effect of the airports negatively. Though airline prices have declines, when adjusted for inflation globally, and the new competitive climate has fastened numerous innovations of benefit to travelers/including frequent-flyer program, many people could not still afford it in developing countries such as Nigeria.

It is in an attempt to examine this phenomenon and offer possible explanations that this important topic on utilization of flight plans in air transport was chosen.

1.3 Aim and Objectives

The study aims at examining the utilization of flight plan in promoting air safety in Nigeria. The aim will be accomplished through the following objectives:

i. To examine the need and purpose of flight planning in Nigeria.

ii. To evaluate the importance of flight plan to air navigation safety.

iii. To identify the key requirements for efficient and reliable flight plan in Nigeria aviation industry.

iv. To examine the effect of changing technology on the preparation and utilization of flight plan.

1.4 Hypothesis to be Tested

That accurate and reliable flight plan determines the transportation safety in Nigeria.

1.5 Justification of the Study

The problems of Nigeria aviation industry are many and varied. These problems have given rise to the emergence of air crashes that will witness today. The situation has also exposed the air transport industry to stagnation and underdevelopment. Furthermore, the socio-political situation in the country which makes the Nigeria aviation to be under the control of Federal Government, with exception of airline, does not help matter.

The appointments at the top management level are made by the government. These appointments/positions are seeing by many as national cake and means of getting one's share. Invariably, no matter the allocation of fund to this sector by the government, the impact will not be felt.

However, the provision of reliable air navigation services, such as the preparation of flight plan, requires adequate funding, trained personnel, among others. Flight panning requires accurate weather forecasts so that fuel consumption calculation can account for the final consumption effect of head or tail wind and air temperature. Thus, there is need to have accurate and up to date weather information and other enroute facilities to prepare reliable and effective flight plan. Producing an accurate optimized flight plan, requires a large number of calculations and precautions, so commercial flight planning systems make extensive use of computers. These computers must be available to the concerned personnel to enhance their operations. This is because any short-coming in its preparation will jeopardize safety.

The airspace has continued to be congested with several thousands of aero planes flying and the information must be made available to them to prevent air collision and other form of accidents and incidents. The study will critically examined the effect of flight plan or air safety and the need for provision of modern facilities at Nigeria airport to enhance this operation.

1.6 Scope of the Study

The aviation industry comprises three independent entities, which include the aircraft manufactures, the airline operators; and the airport authority/management performing various different function. An arm of the last, which is now an in independent agency, is responsible for the provision of air navigation services, such as air traffic control and fight planning.

This project will focus on the activities and operations of flight planning unit and the effect of their operations on safety of flights in Nigeria.

Given that there is no parking space in the air, adequate precautions must be taken on ground before taking up; as it is usually said, safety in the air starts from the ground. The need to improve the efficiency and effectiveness of flight planning system will be critically considered. The factors affecting its utilization will also be examined.

1.7 Limitation of Study

This project work as any other faced with some limitations which include; limited access to airlines while gathering information, inadequate return of questionnaire, limited funds and inadequate times.

1.8 Definition of Terms

Flight: This is a journey made by air especially in an air craft or plane.

Planning: This is a make detailed arrangements for something you want do e.g. travelling in the future.

Air craft: This can be refer to as any machine that can drive support in the atmosphere from the reactions of the air against the earth's surface.

Routes: It is way for travelling from one place to another.

Transport: This is the movement of passengers and goods from one location to another.

Boarding: The act of passenger and crew entering in air craft.

Air space: It is the area located above ground level, which in air craft traveled through.

Airport: An airfield with control tower and hanger as well as accommodation for passenger and cargo.

CHAPTER TWO

2.0 LITERATURE REVIEW

Airlines as provided in Article 96 of the International Civil Aviation Organization, is any air transport enterprises of operating a-schedule international air service.

Everyday, the world's air services fly more than ten million aircraft miles and earn some US$400million of revenue from three million passenger journeys and the carriage of 30,000 tones of cargo and mail. Air transport throughout the world provides direct work for more than two million men and women (Charles, D.D and Okereke, N.O. 1997). All this has been founded on seventy-years of progress. Since commercial transport began to those years, it has known many vicissitudes through wars and rumour of wars; from times of recession to times of plenty, through crises in fuel supplies and in exchange currencies from the restrictions of over-regulation to the upheavals of deregulation, from embarrassments of excess capacity to the frustrations of critical shortages.

Now, the industry struggles with some of the even greater problems of success, problems of congestion in controlled (or not so controlled), air space, problems of inadequate airport capacities, of low profit margins, of enforced retirement and replacement of older, noisy, aircrafts, and of rapid technological changes. They range all the way from new sophisticated marketing methods (notably computer reservation systems of maximize market shares) to significant advances in thermodynamics applied to turbine engines, and in composite materials for aircraft structures.

Charles and Okereke (1997) further explained that what was experiences was based upon many years of a steady reduction, in real terms, of both costs and fares. They now stand some 30 percent less than they were 20 years ago. That has been combined with increase in productivity in available tons miles per employee which has averaged more than three percent per annum during recent years. None of this would have been possible without an avid increase in demand.

International Civil Aviation Organization Statistics revealed that in 1988, some 1.1 billion passenger journeys were performed, adding up to a total of more than 200 billion tone kilometers of passengers, cargo and mail. Passenger traffic predominates at some 76% of the total, some 30% of all traffic travels on international scheduled passenger services. In addition, character passenger traffic; which is growing faster than the scheduled element accounts so far for only 7% of the total tone kilometers. Diepriye (1990) asserted that in the past 15 years, many new airlines have been formed with some disappearing just as quickly. The remaining ones have been forced to down-size, merge or Torn alliances. Airlines face the challenge of reducing costs because they have little control of the competitive market which determines revenue. Further, some of the biggest costs airlines incur and ticketing, sales and promotion, cabin crew, passenger services, insurance, depreciation, rentals and fuel. Rapidly increasing costs arise from monopoly suppliers such as airports and providers enroot navigation facilities.

According to Allan Hay (1973), a carrier has to know more than the hourly productivity of his aircraft in order to set output against costs. An estimate of utilization measured in terms of the number of revenue flying hours performed over

some period of time must be produced. Also multiplication of annual utilization (in hours) by the aircraft productivity in capacity in tone kilometer hour gives the annual productivity of the aircraft against which direct operating costs can be set. Utilization like productivity is a critical factor in aircraft economics.

Fromm G. (1985) said that the choice of aircraft in a fleet is a function of the projections of the management of an airline. He observed that this could be due to the aims and objectives of setting up the airline. The airline might decide to engage in, long haul routes where the utilization of aircraft that possess greater productivity, reduce unit costs and offer much faster transit times.

Moreover, in order to acquire aircraft, a survey of existing aircraft in the fleet of other, airlines should be taken as it would be cheaper to locally standardize with respect to aircraft maintenance and inventory savings. The ability to maintain the fleet at a minimal cost is very important too. Glushkor et al (1988) explained that safety and regularity of flights is the most important principle of airport master planning. It is achieved through a proper choice of dimensions of the basic airfield components (runaways, taxiways, aprons or aircrafts parking areas, etc). Ideally runaway approaches should be over non-residential areas or sparsely populated areas where the public will be least inconvenienced by aircraft operations. The airport master planning is also expected to comply with environmental requirements. These requirements include both on the ground and in the space. The use of airspace must be risk and hazards free for safety of life and property.

Environmental protection has to do with a system of measure concerned with the preservation and/or control and modification to suit man productivity in capacity

with tone kilometer hour gives the annual productivity is a critical factors in aircraft economics.

Spanyol (1965) with much concern about the operational characteristics of an aircraft observed that “the airplane is supported by momentum, a wholly different manner from nearly all vehicles. The drag or resistance of an airplane relative to its weight is higher, and so greater effort is required before movement can take place. As a consequence, the aircraft consumes more fuel in relation to its weight. “He further posted that the aircraft designers or manufacturers are to pay due respect to weight since not only does greater running or manufacturers are to pay due respect to weight since not only does greater running area positively affect perfect lift, aircraft moving at high speed require more complex systems of control and guidance than surface vehicles. The alien environment of high altitudes means additional expenditure on pressurized equipment and thus extra weight for carriage.

Moreover, Andy Geary (1994) in his paper, The perception of the international Carrier” observed that passenger who travel regularly/expect (pr in most cases demand) consistency of service safety of flights, computerized reservations system, corporate identification, computerized check-in, through check-in to final destination, frequent flyer tracking, branded or business lounges and recognition play important role. They have spent a lot of money on their tickets and expect to be accorded recognition for their loyalty in booking on a particular airline or using a particular airport. Unless an airline can influence the way in which its customers are handled, it will be unable to establish the required level of contact.

Lester Robert explained that quick, free and safe flights have become the goal and ambition of millions people. The result is the existence of a number of ICAO annexes and guidelines on aviation safety which have directly or indirectly contributed to the current approach to aviation safety in the world. However, in order to sustain and maintain the level of safety standards we witness today, environmental factors that can result to accidents or incidents must be extensively studied. The aircraft operating environment must be well guided to eliminate hazards through an effective means. Though the objective of any airline both or either as a national or private carriers was to operate scheduled and chartered air transportation service for the carriage of passengers, cargo, mails and other related business in the most reliable, efficient, affordable and profitable manner on domestic and international routes. This function must be carried out in a safe environment for profitability and efficiency.

2.1 Conceptual and Theoretical Framework

Concepts and theories are concerted efforts to project events or phenomena in their true perspective. They aim to produce an understanding of underlying ideas or general notion and explanation of general principles. They equally help to Streamline procedural approaches to be adopted in research enquiries. An important research topic "The utilization of flight plan in promoting air navigation safety, in Nigeria" requires theoretical consideration so as to assist in better organization and assertion of various relevant activities. In the aviation system, basically all concepts address services, best and the best is good enough to be applied in such a very competitive environment.

Invariably the following concepts and theories will be considered;

1. Sustainability Concept
2. System Theory
3. Concept of Safe Arrival.

2.2 Concept of Sustainability

This concept recognizes 01 predicts a situation where resources are continuously on the decline and the corresponding required measure to raise the needs cannot be guaranted. Then the issues of using existing resources to cope become very necessary. Invariably, the means to sustain safety among the space users must be developed, and necessary recommendations made. Thus, the concept of sustainable can be described as strategy aimed at realizing or redirecting existing operating approach in such a way that operation of air cargo transportation system posses so many economic and environmental risks which required adequate attention and precautions. To cope with the dynamism of human factors in air transport system there is need to imbibe the concept of sustainability.

In its totality, the concept of sustainability can be described as a precautionary measure employed to assist in retaining and improving the potential benefits attributable to a particular situation thereby minimizing the pains due to such losses.

2.2.1 System Theory

A comparison of air transportation with other modes of transportation shows that the aviation industry is fraught with many complexities. Perhaps this account for its very regulated nature. The process of planning, coordination, prediction and other related issues are paramount if success must be achieved. The symbiosis and synchronism amongst above process definitely requires much thinking, times and

timely execution, multiracial solutions, as well as giving consideration for the application of viable alternatives. In order to meet the challenges of safety and economic effectiveness, a system of pro-activity must be put in place, which "would have considered all safety elements and implications".

All activities related to the objectives or target commence from the preamble through to the planning process, to execution and results from feedback, which is indeed a tool for performance measurement. The system approach aims at striking a good balance between service and risk of environment and vice versa.

2.2.2 Concept of Safe Arrival

The transport activity is designed to meet the needs of customer. These needs are not met until a passenger's journey or goods transit is completed by a safe arrival, Steward – Davis (1980). He further stated that the concept of safe arrival is not confirmed merely to the avoidance of injury or damage, although such safety is of prime importance. But that they are not exhausted by sickness, anxiety, discomfort or frustration. The transport operator should not expect his passenger to travel hopefully but to arrive with peace of mind. Also goods transit or cargo should be achieved without damage, theft delay or diversion. A consignment should be delivered at the promised time and accompanied by the relevant documents. Safe arrival of passengers or goods means peace of mind to the customer. This peace of mind is a quality which the customer is prepared, to pay good money or reasonable sum and make him satisfied with the service, the operating agency provide.

The air transport industry, aside from its inherent advantage of speed over other modes of transportation strives to achieve a safe, efficient and economic operation. In

short, the safety of life and property is the priority of air transportation there is no packing space in the air.

2.3 Measurement and Components of Flight Plan

Flight plans use an unusual mixture of metric and non-metric units of measurement. The particular units used may vary by aircraft by airline and by location (e.g. different height units may be used at different point during a single flight). Distances are always measured in nautical miles, as calculated at a height of 32,000 feet, with due allowance for the fact that the earth is an oblate spheroid rather than a perfect sphere. Aviation charts always show distances as rounded to the nearest nautical mile, and these are the distances which are shown on a flight plan. Flight planning systems may need to use the unrounded values in their internal calculations for improved accuracy. However, there are a variety of ways in which fuel can be measured, depending mainly on the gauges fitted to a particular aircraft. The most common unit of fuel measurement is kilograms; other possible measures include pounds, UK gallons and liters. When fuel is measured by weight the specific gravity may vary depending on the location and the supplier. There has been at least one occasion on which an aircraft ran out of fuel due to an error in coverting between kilograms and pounds. In this particular case the flight crew manage to glide to a nearby airport and land safety. Many airlines request that fuel quantities be rounded to a multiple of 10 or 100 units. This can cause some interesting rounding problems, especially when subtotal are involved. Safety issues are also considered when deciding whether to round up or down. Further, aircraft with propellers normally use knots as the primary speed units, while aircraft powered by jet engines normally use

match number as the primary speed unit, though flight plans often include the equivalent speed in knot as well (the conversion includes allowance for temperature and height). In a flight plari a mach number of 820 means that the aircraft is travelling at 0.820 of the speed of sound. The widespread use of global positioning systems (GPS), allows navigation systems to provide air speed and ground speed more or less directly.

Additionally, the weight of an aircraft is most commonly measured in kilograms, but may sometimes be measured in pounds, especially in the fuel gauges are calibrated in pound or gallons. Many airlines request that weights be rounded to 9 multiple of 10 or 100 units. Great care is needed when rounding to ensure that physical constraints are not exceeded. When chatting informally about a flight plan, approximate may be referred to in tons. This “ton” generally either a metric tone or a UK long ton, which is about 10% less.

ON the other hand, it is necessary to examine the components of flight plan. The major component as it were, is the route or path/airways, through which the aircraft navigate. For example, when twin-engine aircraft are flying across oceans, deserts etc, the route must be carefully planned so that the aircraft can always reach an airport, even if one engine fails. The applicable rules are known as ETOPS (Extended-range).

Twin-Engine Operational Performance Standards. The general reliability of the particular type of aircraft and its engines and the maintenance quality of the airline are taken into account when specifying for how long such an aircraft may fly with only one engine operating (typical from one to three hours).

Worldwide; there are a large number of names of facial airways, along which aircraft fly under the direction of Air Traffic Control. An airway has no physical existence, but can be thought of as a ‘motorway’ in the sky. On an ordinary motorway, cars use different lanes to avoid collisions, while on an airway; aircraft can change from one airway to another collision. Charts showing airways are “published by various supplies and are usually updated once a month coinciding with the AIRAC (Aeronautical Information Regulation and Control) cycle. This every fought Thursday when every country publishes their change which are usually to airways.

Each airway starts and finishes at a waypoint, and way contain some intermediate waypoint as well. Airways may cross or join at a waypoint, so an aircraft can change from one airway to another at such points. A complete route between airports often uses several airways. Where there is no suitable airway between two waypoints and using airways would result in a somewhat roundabout route, air traffic control may allow a direct waypoint to waypoint routing which does not use an airway (often abbreviated in light plans as DCT).

Most waypoints are classified as compulsory reporting point, e.g the pilot (or the onboard flight management system) reports the aircraft position to air traffic control as the aircraft position to air traffic control as the aircraft passes a ways points.

Special Routes known as ocean tracks are used across some oceans, mainly in the northern hemisphere to increase traffic capacity o busy routes. Unlike ordinary airways which change infrequently, oceans tracks change twice days, so as to take advantages of any favorable winds.

Flight going with the jet stream may be an hour shorter than those going against it. Ocean tracks start and finish perhaps a hundred miss offshore at named waypoint to which a number of airways connected tracks across northern oceans are suitable for east- west or west-east which constitution the bulk of the traffic in these areas.

2.4 Traffic Forecasts for flight planning purpose

Assessments of future trends in aircraft movement and of passenger and freight traffic flows underpin the planning of aviation facilities and the development of aviation policies. Concerns over airport and airspace congestion in some regions make the task increasingly important. The scale of, air transport operation has changed out of all recognition since the signature of the Chicago, convention at the end of 1994.

Schedule domes tries and international air service carried 9 million passengers in 1945 in 1999 the number of passengers passed 1.5 billion for the first time. In facts, growth in passenger, traffic has averaged about 10% annually through the rate has slowed as the air transport market has become more matures, form the 20% plus recorded in the first ten postwar years to less than 50% in recent decades. The output of air transport has increased by a factor of (30) thirty since 1960.

Although world gross domestic product (GDP), which in the same period, there is a strong correlation between the two measures. Statistical analyses have shown that growth in GDP, reflect in increasing commercial and business activity and increasing personal income and propensity to travel, accounts for about two-thirds of air travel growth. Demand for airfreight service is also primarily economic growth and international trade. Other economics' and structural which influence the rate of growth

Include improved service, reduction in airline fares business globalization and changes in population and income distribution.

In terms of scheduled passenger-kilometers performed, the recent ICAO-10 years forecast shows domestic traffic growing at an average annual rate of 3.5 % and international traffic at 5.2% in 1997-2020, freight traffic growth rate and assumption about aircraft utilization, averages stage length, aircraft and load factor and averages seat size, global aircraft movement are projected to increase at an average annual rate of about3.5% over the 1997-2020 period.

All these forecast assume there will be sufficient system infrastructure and capacity to handle what amounts to almost a 2.7-fold increases in traffic and a doubling of aircraft movement. Invariably, and efficient flight planning technique must be put in place to ensure the safety of our airspaces. It is very obvious that the airspaces will continued not be congested on a daily basis and therefore accurate and adequate, information as contained in flight plan will be only ways out of reducing the risk of mid-air collision and bad weather effect, and as such ensures high safety standard.

CHAPTER THREE

3. 1 METHODOLOGY OF THE STUDY

The methodology is a body of activities that must be carefully organized, so that the study would be reliable and its conclusion is true and have generally applicability. The method of investigation of this study is essentially based on both descriptive and analytical method and therefore relied heavily on desk research complemented by field survey. The approaches to the study are participant observation, field survey, interview and analysis of returned questionnaires.

3.2 Technique Of Data Collection

The study sources its data form both primary and secondary source. The primary source involves the use of questionnaires, personal interview and observation of behavior. On the other hands, the secondary source includes: review of relevant journals, reports and book of the organization under study, newspaper and other previous relevant works.

A questionnaire is designed particularly for users to express their opinion on the services rendered by NAMA especially on flight plan. The multiple structured questionnaires comprises of open and closed ended question on information of the airline Chief Executive, Head of operation department and pilots.

The interview seeks information about administrative strategies, coordination and supervision of operation, staff welfare, discipline of staff and the provision of good working environment for staff.

The secondary source is of prime important to the study. According to Okosun and Solanke (2000), researchers are generally warned not to hurry into the field

"without first consulting the necessary books and journals, literature, past and present, investigations of relevant official reports and statistics", they further acknowledge that the data obtained through these sources are to supplement data obtained through other methods mention above. Professional journals, Annual report on NAMA activities statistics of operation, National dailies and other relevant works in the field are consulted.

3.3 Sampling Technique and Sample Size

Three factors have been identified as determinants of the size of adequate sample. These are nature of population, types of sampling design and degree of precision desired (Osuala 1987). However, a situation of large population the sample technique and size becomes crucial for the sample to enhance "the external validity (the generalization) of our research conclusions" (Kidder 1981).

What constitute an adequate sample size varies from researcher and from study to study, Balogun (1995) made use of only 30 students in his bid to relate the new vehicle plate numbering system in Nigeria to human memory capacity, especially short term memory. Also Oyesiku (1995) made use of 1,800 households out of a total of 177,757 households in six of the eleven cities in Ogun State. Kin (1969) is of the opinion that there is no consensus on the sample size and concluded, "Only rules of thumb concerning the percentage of population sample…. Have been following by geographers". However, this study made use of one hundred (100) questionnaires, which were distributed randomly to NAMA staff, Airline operators, passenger's pilots and aviation consultants to obtain first hand information.

3.4 Problem of Data Collection

Since the study focus on an organized establishment. Quantitative data are to be collected from the sources, though the researcher adopts participant observation methods of collecting information, yet the study is not without its limitation, the limitation of the study as discussed here are only in relation to the numerous problems encountered during the field survey. The most important of such are confidential information, and thus the airlines are reluctant at giving full information on the issues rather the information we gathered from scattered sources. In addition, security alertness at the airport to a great extent affect the collection of data. Hence, airlines personnel are reluctant to give information, especially on issues of quality of services from NAMA. However, the participant observation method adopted and the personnel administration on the questionnaire by the researcher gives credibility to the study.

3.5 Method of Data Analysis

The data collected for this study will be analyzed by the use of tables, percentages and other statistical methods. These include the use of chi-square analysis to test the hypothesis.

The questions in the questionnaire have five options and the responses were complied appropriately by the use of like scale to comply with the use of inferential statistical methods to answer the stated research question. Other information were presented by the use of tables and simple percentages.

CHAPTER FOUR

4.0 DATA PRESENTATION AND ANALYSIS

The Geographers, demographers, ecologist, and social physicists prefer to deal with statistics of mass behaviour and the properties of collectivities, Ayeni (1979). The elements of a model based on this tradition probabilities. Except for the simple descriptive case, a model usually purports to represent the outcome of a process with temporal dimensions. Beginning with the state of the (relevant) word at time "t" thus it carries us forward to the state of that world at "t" + "n", thus a land use model may start with a 1960 land use inventory in order to predict the 1970 inventory.

However for the purpose of this study, the data from the field survey will be presented in form of table, percentage and simple descriptive statistics of chi-square. As said earlier, one hundred questionnaire were produced and administered on the respondent to obtain their opinion on the effectiveness of flight plan in promoting air navigation safety. The breakdown of the distribution of the questionnaire is as follows.

Table 4:1: Showing Result from Field Survey

S/N	Respondents	No Distributed	No Obtained	Percentage
1.	Airline Operators	20	18	20%
2.	Nigerian Management Agency (NAMA)	20	20	23%
3.	Flight planning Unit of NAMA	20	20	23%
4.	Pilots	20	14	16%
5.	Others (NCAA, FAAN)	20	16	18%
	Total	100	88	100%

Source: Findings of the researcher

The research questionnaire had five responses against each questions as follow:

1. Strongly Agreed
2. Agreed
3. Indifference
4. Disagreed

(SA) (A) (I) (D)

5. Strongly Disagree (SD)

4.1.1. Statement of Hypothesis

The following hypothesis has been postulated to be tested in the study. **Null Hypothesis**

That accurate and reliable flight plan does not determine air-transportation safety in Nigeria.

Alternate Hypothesis

That accurate and reliable flight plan determines air transportation safety in Nigeria.

The hypothesis will be tested by using chi-square statistical analysis. The hypothesis has been formulated under the null and alternate form so that the null hypothesis is accepted when alternate is rejected and vice versa. The chi-square formular is

$$X = \frac{\sum (0-E)^2}{E}$$

Where X – chi-square

0- Observed

E=Expected

4.2 Result of Findings

The data obtained from the questionnaire were collated and analyzed with computer. The result of the findings and analysis is presented in the table below.

Table 4.2: Result of Analysis and Findings

	SA	**A**	**I**	**D**	**SD**
OBSERVED (O)	950	960	219	220	67
MEAN (X)	7.14	7.21	1.64	1.65	0.50
STANDARD DEVIATION (SD)	2.72	1.95	2.24	1.83	0.88
EXPECTED (E)	3325	2660	1995	1330	665
0-E	-2375	1700	-1776	-1110	-598
(0-EY	5640625	2890000	3154176	123" 00	357604
E (O-E)	1696.42	1089.46	1581.04	926.9	537.75

Source: Author's Field 2009

Hence: Z Score = 18.493

The decision rule of chi-square is to accept the null hypothesis if the Z score is less than 7.82 or vice versa. Since the calculated chi-square in the analysis is higher than 7.82, then the Null Hypothesis is rejected while the alternate is accepted.

Therefore, accurate and reliable flight plan determines the success of any flight in Nigeria. Thus, no aero plane can successfully navigate from point of origin to destination if no flight plan was filed. It is the flight plan that will enable the Air Traffic Controllers to direct and advise the pilot of the aero plane. In addition, weather information and be made available, thereby enhance the safety of the flight.

4.3 Effect of Utilization of Flight Plan on Air Transport Safety

After a century of improvement in flight safety the industry is still struggling to find ways and means to advance further. With world average accident rates already very low, at about one accident per 1.2 million flights, progress has become inherently more difficult; so smarter and better means of improving safety have to be sought. This respite could be found accurate and reliable flight planning system.

Globalization, privatization of government services, liberalization of economic regulation increasing environmental controls and the emergence of new technologies all have significant implication for safety of flights. Fundamentally, government cannot divest themselves of the responsibility of ensuring the optimum level of safety, security and efficiency of civil aviation at the international level. In order to conduct aircraft operations effectively and safely, the operators of an aircraft must file appropriate flight plan before the commencement of the flight. Data on weather and fuel required should adequately be provided in the flight plan. This is because there could be need to change routes or levels while already in the sky. This can only be successfully done through flight planning system.

Infact, without the flight plan, air force traffic control services would be practically impossible while the risk of mid air collision will be very high. The safety of aircraft in national air space depends on many factors which could be facilitated by flight planning system. Shortage of fuel in the air, without any parking space could have unimaginable effect on safety of the aircraft. This phenomenon requires adequate planning before embarking on any journey.

4.4 Prospects for Utilization of Flight Plan in Nigeria

Prospects for the aviation industry in Nigeria are bountiful. Given the potential viability of the Nigerian aviation market, projected to grow at 6-8 percent annually in the next ten years, definitely, the air transport industry will continue to attract more investors. However, the industry must adopt the global 21st century aviation technology especially in the area of flight planning so as to compete favourably and safely. The traffic will continue to increase with increasing population and democratic government in place thereby making the airspace to be more congested with high requirement for safety standards. Accurate and reliable flight planning should be employed to improve the level of safety and measure that the public still has confidence in air travel.

Furthermore, it is necessary to state that in 2001 in Nigeria, the total international air passengers that pass through Lagos with exception of others whose destination were not revealed was 830,981 passengers, representing 84.2% of the total traffic experienced by the four other international airports. Out of this total, 18.7% departed to United Kingdom, 8.990% to Netherlands, 3.9% to Belgium, 14% to Germany; 10% to Switzerland and 28% to USA.

Therefore, to handle the traffic from Lagos to their various destinations by the air traffic controllers require accurate and reliable weather information and fuel calculations. With over 11,000 airliners all over the world, the management of aviation at all level, weather local, domestic or international, calls for accurate and reliable flight planning, and also a high degree of co-ordination between aircraft operators, pilots, air traffic controllers, meteorologist and airport managers.

That the present method of flight planning still work as it does is thanks in no small part to the work of international civil aviation organization (ICAO), with its technical working group dedicated to ensuring international cooperation on the technical rules of the air. Still the challenges remain a big one as technological advances continue space.

Airliners and light aircraft should continue to be provided with up to the minute, graphical weather displays in their cockpits, with the first systems called Aviation Weather Information (AWI) installed by 2003, where the displayed date will originate from satellites that have helped to revolutionize other areas of aviation, notably navigation and communications. The last twenty years have seen significant research advances in forecasting and monitoring Weather hazards, including icing, turbulence, lightning and wind shear by many international organizations. Since weather is a factor in about 30% of aviation accidents and is also responsible for about two third of air carrier delay, then reliable weather forecast required in the flight plan would continue to promote safety in air transport industry.

In addition, producing an accurate optimized flight plan requires a large number of calculations (millions), so commercial flight planning system make extensive use of computers (an approximate and optimized flight plan can be done by hand in an hour or so, but more allowance must be made for unforeseen circumstances). In Nigeria, computerized system will enable the country to complete favourably in the world and improve the level of safety. It will also continue to be a major factors in promoting air transport safety and reliable not only in Nigeria but in the Global affairs.

CHAPER FIVE

5.1 SUMMARY, CONCLUSION AND RECOMMENDATION

As said earlier in the previous chapter, the basic purpose of a flight planning system is to calculate how much trip fuel is needed by an aircraft when flying from an origin to a destination airport. Aircraft must also carry some reserve fuel to allow for unfroseen circumstances, such as inaccurate weather forecast, or air traffic control requiring an aircraft to flying at a lower height than optimum due to congestion, or some last minute passengers whose weight was not allowed for when the flight plan was prepared. For example in USA all domestic flights must carry enough fuel to carry for forty five minutes at the destination.

In addition, dynamic innovation with rapid technology requires computerized flight planning system which Nigeria has stated to embrace.

In essence, all necessary information concerning a particular flight must be included in the flight plan. This include weather forecast, enroute facilities, fuelling and airports of origin and destinations.

Except for some USA domestic flights, a flight plan normally has an alternate airport as well as a destination airport. The alternate airport is for use in case the destination airport becomes unusable while the flight is in progress (due to weather conditions, a strike, a crash, terrorist activity, etc).

This means that when the aircraft gets near the destination airport, it will still have enough alternative fuel and alternative reserve available to fly on from there to the alternate airport.

Thus, the importance of flight plan in promoting safety air transport cannot be over emphasized. The success of air navigation will continue to depend on aircraft and reliable flight plan.

5.2 Recommendation

The end of the last decade saw the world airlines scrambling either to sign up for star, or to create competing alliances of their own. As this millennium 40 unfolds, those alliances seem to be establishes for the long term. The question that remains, however, is whether alliances are really the solution for this new century. Though a relatively low level of accidents and incidents has been achieve, the fact still remains that a single accident attracts more attention than hundreds of same in order mode of transport. Therefore, the following recommendations are necessary to enhance safety in air transportation industry.

1. Computerized flight planning system, that is still at infant stage in Nigeria should be fully embraced to promote air transport safety.
2. In addition, on congested routes flight plan must produce summarise showing how much fuel would be needed if the aircraft is little lighter or heavier or if it is flying higher or lower than planned. These summarize allow flight "dispatchers and pilots to check if there is enough reserve fuel to cope with a different scenario.
3. Also, while enroot, an aircraft may be diverted to some airport other than the planned alternate, A flight planning system can be produce a new light plan for the new route from the diversion point and transmit it to the aircraft, including a check that there will be enough fuel for the revised flight. This would be enhanced by computerized system.

4. Due to the rapid increase in numbers of aircrafts and the trend towards all weather operations, the utilization of flight plan will continue to play a dominant role. Therefore, modern and adequate training is required for the personnel of flight planning unit. Technology continues to change with new innovations and therefore the personnel must be abreast of the system.

Finally, it is expected that the findings of this study will be a basis for further study by other researchers so as to continue to develop strategies that will enhance safety in the transport industry, study confirmed that the utilization of flight planning will continue to promote air transportation safety in Nigeria. The result of chi-square analyses gave a very high calculated score of 18.25 which is at above the acceptable figure of 7 & 2. Thus, the alternate hypothesis was accepted to affirm that a reliable and accurate flight plan will enable aero plane to navigate successfully from airports of origin to destinations.

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