

**ELECTRONIC AIRLINES DAILY ROUTE RECORD**  
**(E-ADR16)**

**Bayode Blessing Akinbola.**

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## 1. Introduction

As population increases, traveling rate escalates across the World and the more we keep having Traveling Agencies (both private and Governmental). With respect to this, Statistical analysis to think of.

It is mandatory in Nigerian Airspace Management Agency (NAMA) in each Stations across Nigeria to compile all Air Trasport Operators to render statistical analysis of their operations for the month in a format prescribed by the Authority. Subsequence to this, more hands are needed for collation and analysis of data especially in a very big and busy Stations located in places such as Lagos, Abuja, Kano etc.

In this our generation, Computer Systems had been designed and developed to make works easier and faster with a trusted level of accuracy.

Therefore, Technology quadrantes a higher level of positive impacts in this very operation.

## 2. Statements of Problem

- 2.1. The Statistical Unit in NAMA is aimed to collate and analyze all Air Traffic data for each Airlines /Operators ranging from daily basis to monthly basis as-well-as publishing of Annual Traffic Movements on Passengers and Aircraft based on the Airlines Daily Route Records (ADR16).
- 2.2. However, the System in-use (Manpower) is inefficient due to human-imperfection and time wasting especially in the aspect where large number of traffic is recorded.
- 2.3. Consider an Airline with total traffic of **232 Aircraft movements an 7938 Passenger movement** roughly calculated as **231 Aircraft movements and 7887** resulting to the billing loss of one traffic with **51** Passengers.
- 2.4. Using an **Electronic Airlines Daily Route Record (E-ADR16)**, accurate statistical record can be met as-well-as easy Air Traffic Movements Publication.
- 2.5. NAMA stands to benefit more from the adoption of E-ADR16 and will also make NAMA more competitive among other traveling Agencies.

- 2.6. The enhancement of the current System or adoption of E-ADR16 is essential to ensure the advancement of NAMA.

### **3. Aim and Objectives**

The aim is to develop a Software for managing Air Traffic Operational Data using NAMA, Ilorin Station as Focus group.

#### **Objectives**

- 3.1. To propose an effective System of Managing Air Traffic Operation Data.
- 3.2. To design and implement a Software for Statistics Unit in NAMA.
- 3.3. To evaluate the Software developed.
- 3.4. To fully deploy the Software with the approval of NAMA.

### **4. Methodology**

The methodology subsequence to the development of the Software are as follows:

- 4.1. Collection and understanding data.
- 4.2. Identifying the relationships between data sets.
- 4.3. Design of the System's Graphical User Interface (GUI) with Java programming language using JSWING and AWT.

### **5. Implementation**

#### **5.1. Functional Requirements**

- 5.1.1. Efficient data storage.
- 5.1.2. Easy correction of data.
- 5.1.3. Automatic statistical calculation of daily Air Traffic Movements.
- 5.1.4. Automatic statistical calculation of monthly Air Traffic Movements.
- 5.1.5. Removal of Airlines without any traffic within the Monthly Reports.
- 5.1.6. Easier printing function.
- 5.1.7. Automatic detection of Aircraft's data with arrival but without departure.
- 5.1.8. Automatic detection of Aircraft's data with departure but without arrival.
- 5.1.9. Easy management of Airline/Operator's details.

5.1.10.Privilege access control.

5.1.11.Quick sorting of Operator names during operation.

## 5.2. Usability

5.2.1. Interactive Graphical User Interface (GUI).

5.2.2. Less cognitive for Computer illiterates and first timers.

5.2.3. Provision of Tools-tips for all components in the Software.

5.2.4. Provision of User's Guide within the Software.

## 5.3. Designs

### 5.3.1. Graphical User Interface (GUI)



E-ADR16 DNIL ADR16



NIGERIAN AIRSPACE MANAGEMENT AGENCY

ILORIN INTERNATIONAL AIRPORT

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AIRCRAFT DETAILS:

Date:

29-8-2022

Operator:

AEROTAK

Aircraft Type:

Reg. Number:

ARRIVAL

DEPARTURE

Call Sign:

Number of Crews:

Number of Passengers (P.A.X.):

0

Departure Station (From):

Actual Time of Arrival (A.T.A.):

Submit

Arrival

Departure

S/N	DATE	OPERATOR	AIRCRAFT TY...	REG. NUMBER	CALL SIGN	CREW	P.A.X.	FROM	A.T.A
1	01-09-2021	AIR PEACE	E145	5NBXG	APK7110	05	37.0	DNMM	0631
2	01-09-2021	OVERLAND	ATR42	5NBND	OLA1187	04	36.0	DNMM	0729
3	01-09-2021	AIR PEACE	E145	5NBXG	APK7112	04	38.0	DNAA	0902
4	01-09-2021	OVERLAND	BE190	5NBGO	OLA1164	03	16.0	DNMM	1029
5	01-09-2021	GREEN AFRICA	ATR76	5NGAE	GWG304	04	18.0	DNMM	1113
6	01-09-2021	ARIK AIR	B737	5NMJF	ARA402	06	105.0	DNAA	1304
7	02-09-2021	AIR PEACE	E145	5NBXG	APK7110	07	39.0	DNMM	0655
8	02-09-2021	OVERLAND	ATR42	5NBND	OLA1184	04	27.0	DNAA	0726
9	02-09-2021	OVERLAND	ATR42	5NBGR	OLA1187	04	46.0	DNMM	0807
10	02-09-2021	ARIK AIR	B737	5NMJF	ARA402	07	78.0	DNAA	0940
11	02-09-2021	AIR PEACE	E145	5NBXG	APK7112	04	38.0	DNAA	0945
12	02-09-2021	OVERLAND	B190	5NBGO	OLA1177	04	0.0	DNKA	1006
13	02-09-2021	GREEN AFRICA	ATR76	5NGAE	GWG304	04	25.0	DNMM	1058
14	02-09-2021	OVERLAND	ATR42	5NBND	OLA1186	04	47.0	DNAA	1638
15	02-09-2021	OVERLAND	ATR42	5NBGR	OLA1184	06	0.0	DNMM	1916
16	03-09-2021	AIR PEACE	E145	5NBVD	APK7110	06	26.0	DNMM	0636
17	03-09-2021	OVERLAND	AT42	5NBND	OLA1187	03	44.0	DNMM	0739
18	03-09-2021	AIR PEACE	E145	5NBVD	APK7112	04	40.0	DNAA	0919
19	03-09-2021	GREEN AFRICA	ATR76	5NGAE	GWG304	04	21.0	DNMM	1226
20	03-09-2021	ARIK AIR	B737	5NMJF	ARA402	06	129.0	DNAA	1240
21	03-09-2021	OVERLAND	BE190	5NBGO	OLA1164	03	13.0	DNMM	1244
22	03-09-2021	NPF	E232	NPF222	NPF222	03	00	DNAA	1222
23	03-09-2021	OVERLAND	ATR42	5NBND	OLA1186	04	43.0	DNAA	1606
24	04-09-2021	OVERLAND	ATR72	5NBPF	OLA1187	04	44.0	DNMM	0736
25	04-09-2021	AIR PEACE	E145	5NBVD	APK7112	04	42.0	DNAA	0916
26	04-09-2021	GREEN AFRICA	ATR76	5NGAD	GWG304	04	25.0	DNMM	1022
27	04-09-2021	NAF	C130	NAF917	NGR917	11	180.0	DNJO	1049
28	04-09-2021	OVERLAND	ATR72	5NBPF	OLA1186	04	38.0	DNAA	1552
29	05-09-2021	AIR PEACE	E145	5NBUD	APK7110	04	36.0	DNMM	0621
30	05-09-2021	OVERLAND	ATR42	5NBNO	OLA1187	04	42.0	DNMM	0723
31	05-09-2021	AIR PEACE	E145	5NBUD	APK7112	05	40.0	DNAA	0902

New Row

Delete

Update

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E-ADR16 DNIL ADR16



NIGERIAN AIRSPACE MANAGEMENT AGENCY

ILORIN INTERNATIONAL AIRPORT

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LOCAL TRAINING

S/N	DATE	OPERATOR	AIRCRAFT TYPE	A/C REG. NO.	POB/ENDURANCE	DEPARTURE TIME	ARRIVAL TIME	FLIGHT HOURS
1	01-Sep-2021	IAC	DA40	5NBK	02/0530	758.0	0906	0108
2	01-Sep-2021	IAC	DA40	5NBK	02/0500	805.0	0908	0103
3	01-Sep-2021	IAC	DA40	5NBK	02/0500	946.0	1054	0108
4	01-Sep-2021	IAC	DA40	5NBK	02/0500	1148.0	1254	0106
5	01-Sep-2021	IAC	DA40	5NBK	02/0300	1207.0	1256	0049
6	01-Sep-2021	IAC	DA40	5NBK	02/0400	1405.0	1456	0051
7	01-Sep-2021	IAC	DA40	5NBK	03/0500	1430.0	1514	0044
8	01-09-21	IAC	DA40	5NBK	02/0400	1549.0	1629	0040
9	02-Sep-2021	IAC	DA40	5NBK	02/0500	1010.0	1148	0138
10	02-Sep-2021	IAC	DA40	5NBK	02/0500	1020.0	1150	0130
11	02-Sep-2021	IAC	DA40	5NBK	02/0500	1313	1352	0039
12	02-Sep-2021	IAC	DA40	5NBK	02/0300	1239	1342	0103
13	02-Sep-2021	IAC	DA40	5NBK	02/0500	1307	1346	0039
14	02-Sep-2021	IAC	DA40	5NBK	02/0400	1435	1528	0053
15	02-Sep-2021	IAC	DA40	5NBK	03/0400	1446	1552	0106
16	03-Sep-2021	IAC	DA40	5NBK	02/0530	0905	0949	0054
17	03-Sep-2021	IAC	DA40	5NBK	03/0200	0927	1015	0048
18	03-Sep-2021	IAC	DA40	5NBK	02/0400	1305	1347	0042
19	06-Sep-2021	IAC	DA40	5NBK	03/0500	0955	1036	0041
20	06-Sep-2021	IAC	DA40	5NBK	02/0400	1154	1255	0101
21	06-Sep-2021	IAC	DA40	5NBK	02/0400	1219	1344	0125
22	06-Sep-2021	IAC	DA40	5NBK	02/0500	1348	1435	0047
23	06-Sep-2021	IAC	DA40	5NBK	02/0500	1505	1552	0047
24	06-Sep-2021	IAC	DA40	5NBK	03/0500	1524	1613	0049
25	07-Sep-2021	IAC	DA40	5NBK	02/0500	1054	1145	0051
26	07-Sep-2021	IAC	DA40	5NBK	02/0500	1226	1319	0053
27	07-Sep-2021	IAC	DA42	5NBK	03/0530	1326	1434	0108
28	07-Sep-2021	IAC	DA40	5NBK	02/0500	1406	1446	0040
29	08-Sep-2021	IAC	DA40	5NBK	03/0500	0901	1026	0125
30	08-Sep-2021	IAC	DA40	5NBK	03/0500	1110	1200	0050
31	08-Sep-2021	IAC	DA40	5NBK	02/0500	1205	1304	0059

New Row

Delete

Update

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E-ADR16 DNIL ADR16									
 <b>NIGERIAN AIRSPACE MANAGEMENT AGENCY</b> <b>ILORIN INTERNATIONAL AIRPORT</b>									
<div>Acquisition Military&amp;Training Local Training Aircraft Mov.&amp;PAX Mov. Summary</div> <div>A+ A+</div>									
	S/N	DATE	OPERATOR	NO. OF AIRCRAFT A...	NO. OF AIRCRAFT D...	TOTAL	NO. OF PAX ARRIVED	NO. OF PAX DEPAR...	TOTAL PAX
All Reports	1	01-09-2021	AIR PEACE	2	2	4	75	85	160
	2	01-09-2021	ARIK AIR	1	1	2	105	96	201
	3	01-09-2021	GREEN AFRICA	1	1	2	18	13	31
	4	01-09-2021	OVERLAND	2	2	4	52	51	103
	5	02-09-2021	AIR PEACE	2	2	4	77	99	176
	6	02-09-2021	ARIK AIR	1	1	2	78	92	170
	7	02-09-2021	GREEN AFRICA	1	1	2	25	17	42
	8	02-09-2021	OVERLAND	5	5	10	120	89	209
	9	03-09-2021	AIR PEACE	2	2	4	66	98	164
	10	03-09-2021	ARIK AIR	1	1	2	129	106	235
Graph Reports	11	03-09-2021	GREEN AFRICA	1	1	2	21	23	44
	12	03-09-2021	NPF	1	0	1	0	0	0
	13	03-09-2021	OVERLAND	3	3	6	100	95	195
	14	04-09-2021	AIR PEACE	1	1	2	42	47	89
	15	04-09-2021	GREEN AFRICA	1	1	2	25	17	42
	16	04-09-2021	NAF	1	1	2	180	135	315
	17	04-09-2021	OVERLAND	2	2	4	82	85	167
	18	05-09-2021	AIR PEACE	2	2	4	76	97	173
	19	05-09-2021	ARIK AIR	1	1	2	67	115	182
	20	05-09-2021	GREEN AFRICA	1	1	2	32	30	62
<< Back	21	05-09-2021	OVERLAND	2	2	4	65	93	158
	22	06-09-2021	AIR PEACE	2	2	4	74	93	167
	23	06-09-2021	ARIK AIR	1	1	2	83	120	203
	24	06-09-2021	GREEN AFRICA	1	1	2	18	18	36
	25	06-09-2021	OVERLAND	3	3	6	66	86	152
	26	07-09-2021	AIR PEACE	2	2	4	76	99	175
	27	07-09-2021	GREEN AFRICA	1	1	2	25	11	36
	28	07-09-2021	IAC	1	1	2	0	0	0
	29	07-09-2021	OVERLAND	3	3	6	78	90	168
Print									

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E-ADR16 DNIL ADR16									
 <b>NIGERIAN AIRSPACE MANAGEMENT AGENCY</b> <b>ILORIN INTERNATIONAL AIRPORT</b>									
<div>Acquisition Military&amp;Training Local Training Aircraft Mov.&amp;PAX Mov. Summary</div> <div>A+ A+</div>									
	S/N	DATE	OPERATOR	NO. OF AIRCRAFT A...	NO. OF AIRCRAFT D...	TOTAL	NO. OF PAX ARRIVED	NO. OF PAX DEPAR...	TOTAL PAX
All Reports	1	01-09-2021	AIR PEACE	2	2	4	75	85	160
	2	01-09-2021	ARIK AIR	1	1	2	105	96	201
	3	01-09-2021	GREEN AFRICA	1	1	2	18	13	31
	4	01-09-2021	OVERLAND	2	2	4	52	51	103
	5	02-09-2021	AIR PEACE	2	2	4	77	99	176
	6	02-09-2021	ARIK AIR	1	1	2	78	92	170
	7	02-09-2021	GREEN AFRICA	1	1	2	25	17	42
	8	02-09-2021	OVERLAND	5	5	10	120	89	209
	9	03-09-2021	AIR PEACE	2	2	4	66	98	164
	10	03-09-2021	ARIK AIR	1	1	2	129	106	235
Graph Reports	11	03-09-2021	GREEN AFRICA	1	1	2	21	23	44
	12	03-09-2021	NPF	1	0	1	0	0	0
	13	03-09-2021	OVERLAND	3	3	6	100	95	195
	14	04-09-2021	AIR PEACE	1	1	2	42	47	89
	15	04-09-2021	GREEN AFRICA	1	1	2	25	17	42
	16	04-09-2021	NAF	1	1	2	180	135	315
	17	04-09-2021	OVERLAND	2	2	4	82	85	167
	18	05-09-2021	AIR PEACE	2	2	4	76	97	173
	19	05-09-2021	ARIK AIR	1	1	2	67	115	182
	20	05-09-2021	GREEN AFRICA	1	1	2	32	30	62
<< Back	21	05-09-2021	OVERLAND	2	2	4	65	93	158
	22	06-09-2021	AIR PEACE	2	2	4	74	93	167
	23	06-09-2021	ARIK AIR	1	1	2	83	120	203
	24	06-09-2021	GREEN AFRICA	1	1	2	18	18	36
	25	06-09-2021	OVERLAND	3	3	6	66	86	152
	26	07-09-2021	AIR PEACE	2	2	4	76	99	175
	27	07-09-2021	GREEN AFRICA	1	1	2	25	11	36
	28	07-09-2021	IAC	1	1	2	0	0	0
	29	07-09-2021	OVERLAND	3	3	6	78	90	168
Print									

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E-ADR16 DNIL ADR16									
 <b>NIGERIAN AIRSPACE MANAGEMENT AGENCY</b> <b>ILORIN INTERNATIONAL AIRPORT</b>									
<div>Acquisition Military&amp;Training Local Training Aircraft Mov.&amp;PAX Mov. Summary</div> <div>A+ A+</div>									
	S/N	OPERATOR	NO. OF AIRCRAFT ARR...	NO. OF AIRCRAFT DEP...	TOTAL	NO. OF PAX ARRIVED	NO. OF PAX DEPARTED	TOTAL PAX	
All Reports	1	AIR PEACE	60	60	120	2542	2910	5452	
	2	ALLIED AIR	1	1	2	0	0	0	
	3	ARIK AIR	19	19	38	1938	1798	3736	
	4	GREEN AFRICA	30	30	60	909	702	1611	
	5	IAC	3	3	6	0	0	0	
	6	JAVI AVIATION	1	1	2	6	6	12	
	7	JET SUPPORT	3	3	6	23	13	36	
	8	JUBILEE AVIATION	2	2	4	8	9	17	
	9	NAF	6	7	13	415	390	805	
	10	NPF	3	1	4	12	7	19	
Graph Reports	11	OVERLAND	84	84	168	2759	2750	5509	
	12	PAF	2	2	4	0	11	11	
TOTAL			214	213	427	8612	8596	17208	
<< Back									
Print									

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## NIGERIAN AIRSPACE MANAGEMENT AGENCY

### ILORIN INTERNATIONAL AIRPORT

		Acquisition	Military&Training	Local Training	Aircraft Mov.&PAX Mov.	Summary			
	SIN	OPERATOR	NO. OF AIRCRAFT ARR.	NO. OF AIRCRAFT DEP.	TOTAL	NO. OF PAX ARRIVED	NO. OF PAX DEPARTED	TOTAL PAX	
All Reports	1	OVERLAND	66	66	132	2198	2210	4408	
	2	AIR PEACE	49	49	98	2335	2335	4270	
	3	GREEN AFRICA	24	24	48	1935	553	1273	
	4	JET SUPPORT	3				13	36	
	5	ARIK AIR					1511	3148	
Graph Reports	6	NAF					205	460	
	7	PAF					11	11	
	8	IAC					0	0	
	9	NPF					12	24	
	10	JUBILEE AVIATION					9	17	
	11	BRINKLE AGRO					3	3	
	12	DOMINION					3	3	
	13	ALLIED AIR					0	0	
	14	WEST LINK					6	6	
	15	JAVI AVIATION					6	12	
	TOTAL					6877	13671		

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General
Page Setup
Appearance

**Print Service**

Name: Microsoft Print to PDF Properties...

Status: Accepting jobs

Type:

Info: ☐ Print To File

**Print Range**

☒ All

☐ Pages 1 To 1

**Copies**

Number of copies: 1

☐ Collate

Print
Cancel

Print

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## 6. User's Guide

This Software had been designed and developed with inbuilt **tool-tips** for each and every available components present there-in to guide every Users (both Computer illiterates, literates and first-timers) during operation.

To see the tool-tips for any component; place your Mouse pointer on the said component for about **5seconds**, thereafter the tool-tip appears to guide you.

For documentation, let's discuss how to go about with different operations in the software.

### 6.1. How to open a new monthly record

- i. **Launch** the software. *(The first page appears).*
- ii. Click on the button "**New**". *(You have a different sub-page).*
- iii. Click on the drop box containing the months and **select the appropriate month.**
- iv. Below that, is a text box to **input the year.** *(You are expected to type-in the year).*
- v. Click on "**Done**" to save the new record. *(The page changes automatically).*
- vi. Click on "**Back**" to cancel the new record.

### 6.2. How to input data into the monthly record

- i. **Launch** the software. *(The first page appears).*
- ii. Click on the drop box to **Select the appropriate month.**
- iii. Click "**Done**". *(The page changes).*
- iv. Click on the **Acquisition button** to input the daily Air Traffic data.
- v. For the Local Training Aircraft (IAC or any), **click on Local Training button.** *(The page changes).*

### 6.3. How to register a new Airline or Operator

- i. **Launch** the software. *(The first page appears).*

- ii. Click on the drop box to **Select the appropriate month.**
- iii. Click “**Done**”. *(The page changes).*
- iv. Click on the button “**New Operator**”.
- v. **Type** the name of the new Airline/Operator to the text box available.
- vi. Below it, is a Check box. This is to be checked (marked) only when the new Airline/Operator is a Military or a Training Airline. *(Please be cautious).*
- vii. Click on “**Done**” to save the new record. *(The page changes automatically).*
- viii. Click on “**Back**” to cancel the new record.

#### 6.4. How to view and print the statistical reports

- i. **Launch** the software. *(The first page appears).*
- ii. Click on the drop box to **Select the appropriate month.**
- iii. Click “**Done**”. *(The page changes).*
- iv. Click on the button “**Reports**” and “**All Reports**” thereafter.  
*(In this very page there are five different tabs with different contents according to their names; Acquisition, Military/Training, Local Training, Aircraft Moves & Passengers Moves, and Summary; each with different Print buttons (changes in print buttons might not be noticeable)).*
- v. Click on each “**Print**” buttons in each tab to print the reports. *(Ensure the printer is properly plugged and connected).*

#### 6.5. How to input data in the Acquisition page

- i. **Launch** the software. *(The first page appears).*
- ii. Click on the drop box to **Select the appropriate month.**
- iii. Click “**Done**”. *(The page changes).*

- iv. Click on the button **“Acquisition”**.  
*(Type-in the necessary data (details) related to each air traffics as requested from this page).*
- v. Click on **“Submit All”** button to submit all typed data to the appropriate tables (Arrival and Departure table).
- vi. *(In case of only arrival)* Click on the **“Submit”** button under the arrival section to submit all the arrival data (details).
- vii. *(In case of only departure)* Click on the **“Submit”** button under the departure section to submit all the departure data (details).

#### 6.6. How to correct wrong input(s)

- i. **Launch** the software. *(The first page appears).*
- ii. Click on the drop box to **Select the appropriate month.**
- iii. Click **“Done”**. *(The page changes).*
- iv. Click on the button **“Acquisition”**.
- v. **Double click** on the said cell in the table where wrong input is noticed.
- vi. **Type-in the correct** data.
- vii. **Press the “Tab” button on the Computer keyboard.** *(This is very important).*
- viii. Click on the **“Update”** button at the bottom right-hand corner of the screen.

#### 6.7. How to delete row(s)

- i. **Launch** the software. *(The first page appears).*
- ii. Click on the drop box to **Select the appropriate month.**
- iii. Click **“Done”**. *(The page changes).*
- iv. Click on the button **“Acquisition”**.
- v. **Click** on the said row in the table.

- vi. Click on the “**Delete**” button at the bottom right-hand corner of the screen.