



AIR NAVIGATION SERVICE CHARGES IN AFRICA

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Introduction

Air transport plays a major role in the global economy. It supports 65.5 million direct and indirect jobs worldwide and contributes \$ 2.7 trillion to the world's gross domestic product (GDP). As the volume of air traffic doubles approximately every 15 years, the states have to provide all necessary services to support safe operations flights in their airspace.

Any user of air navigation services performing a flight in one or more national airspace is required to pay air navigation fees to cover the costs of the provided services. Thus, air navigation service charges affect airlines' operational costs. Air navigation service charges are levied on to cater the costs related to services En-route, Approach and in Terminal Area.

The objective of this study is to benchmark Africa's navigation charges against those of other non-African regions.

The data calculated in this document referred to Air Navigation Service Providers' schemes as published by ICAO.

I – AIR NAVIGATION CHARGES IN AFRICA

In Africa, there is no common policy in terms of Air navigation service charges. Service Providers apply different rates from a country to another, except for ASECNA whose formulas are common for 17 member states in western and central Africa, and in Indian Ocean.

1- ASECNA controlled airspace

ASECNA 17 member states are:

Benin, Burkina Faso, Cameroon, Central African Republic, Comoros, Congo, Côte d'Ivoire, Gabon, Guinea-Bissau, Equatorial Guinea, Madagascar, Mali, Mauritania, Niger, Senegal, Chad, Togo.

The formula applied is:

$$C = R * U$$

Where R and U are as follows:

- R :

Domestic:	USD 76
Among ASECNA states:	USD 93
International:	USD 116

- U is read on the table below :

AIRCRAFT WEIGHT	DISTANCE			
	0 – 750 KM	751 – 2 000 KM	2 001 – 3 500 KM	OVER 3 500
15 – 20 tons	1.00	5.00	12.00	20.00
21 – 50 tons	1.20	6.00	14.40	24.00
51 – 90 tons	1.40	7.00	16.80	28.00
91 – 140 tons	1.60	8.00	19.20	32.00
141 – 200 tons	1.80	9.00	21.60	36.00
201 – 270 tons	2.00	10.00	24.00	40.00
271 – 350 tons	2.15	10.75	25.80	43.00
351 – 440 tons	2.30	11.50	27.60	46.00
441 – 540 tons	2.45	12.25	29.40	49.00
541 – 650 tons	2.60	13.00	31.20	52.00

Example:

A flight operated in a B737 with an MTOW of 70 tons, operating a distance of 1000 nm (1852 km), En-route charges will be:

Within ASECNA states 'airspace
 $C = R * U = \text{USD } 651$

With R = 93
 U = 7

From ASECNA to other regions
 $C = R * U = \text{USD } 812$

With R = 116
 U = 7

The harmonized policy in ASECNA countries allows transparency and relative stability in the rates.

2- Northern Africa

The countries of the Northern African region are Algeria, Egypt, Libya, Morocco, Tunisia, and Sudan.

- Algeria, Egypt and Morocco

The three countries adopted the following formula to calculate En-route charges:

$$C = R \times ((D-20)/100) \times (MTOW/50)^{1/2}$$

Where R vary per country:

- Algeria = 36.15
- Egypt = 18.64
- Morocco = 43.14

And D is the distance

Examples:

A flight operated in a B737 with an MTOW of 70 tons, operating a distance of 100 nm (185 km), En-route charges will be:

- **Algeria:**

$$C = R \times (D/100) \times (MTOW/50)^{1/2} = \text{USD } 70.58$$

With R = 36.15
 D = 185
 MTOW = 70

- **Egypt:**

$$C = R \times (D/100) \times (MTOW/50)^{1/2} = \text{USD } 36.39$$

With R = 18.64
 D = 185
 MTOW = 70

- **Morocco:**

$$C = R \times (D/100) \times (MTOW/50)^{1/2} = \text{USD } 84.22$$

With R = 43.14
 D = 185
 MTOW = 70

- **Libya, Sudan and Tunisia**

Those countries have chosen a tariff scale related to the weight only.

- **For Libya**, the scale is as follows:

AIRCRAFT WEIGHT (TONES)	CHARGES PER FLIGHT (USD)
5 OR LESS	38.47
5 TO 25	96.17
25 TO 100	269.27
100 TO 200	384.67
200 TO 300	480.84
ABOVE 300	641.12

Example:

A flight operated in a B737 with an MTOW of 70 tons, En-route charges will be **USD 269.27**

- **For Sudan**, the scale is as follows:

ATS Route Aleba-Tokar

AIRCRAFT WEIGHT (TONES)	CHARGES PER FLIGHT (USD)
LESS THAN 30	770
30 OR MORE	1233

Other ATS Routes

AIRCRAFT WEIGHT (TONES)	CHARGES PER FLIGHT (USD)
LESS THAN 50	1840
50 UP TO 199	2453
200 OR MORE	2760

Example:

A flight operated in a B737 with an MTOW of 70 tons, En-route charges will be **USD 1233**

- **In Tunisia**, the En route charges follow the scale below:

AIRCRAFT WEIGHT (TONES)	CHARGES PER FLIGHT (USD)
1 TO 5	48.6
6 TO 24	124.2
25 TO 40	194.4
41 AND OVER	340.2

Example:

A flight operated in a B737 with an MTOW of 70 tons, En-route charges will be **USD 340.2**

For the same distance, En-route charges vary a lot from a country to another in the sub-region. Sudan have the highest rate with more than USD 1000. The country may consider a review of its charging policy

3- Eastern Africa

The countries of the East African region are Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Seychelles, Somalia, Tanzania and Uganda.

- Kenya

The country has opted for the following formula:

$$C = R \times D \times (MTOW/50)^{1/2}$$

With $R = 0.4831$

$D = 185$, a minimum of 300km and maximum of 500 km for international traffic

Example:

A flight operated in a B737 with an MTOW of 70 tons, operating a distance of 100 nm (185 km), En-route charges will be:

$$C = R \times D \times (MTOW/50)^{1/2} = \text{USD } 219.71$$

With $R = 0.4831$

$$D = \text{Min} (500, \text{Max} (D, 300)) = 300$$

MTOW = 70

- Seychelles

Seychelles opted for the following formula:

$$C = R \times D \times (MTOW/50)^{1/2}$$

With $R = 0.345$

$D = 185$

Example:

A flight operated in a B737 with an MTOW of 70 tons, operating a distance of 100 nm (185 km), En-route charges will be:

$$C = R \times D \times (MTOW/50)^{1/2} = \text{USD } 40.82$$

With $R = 0.345$

$D = 500$

MTOW = 7

- Tanzania

Tanzania opted for a different formula, which is as follows:

$$\text{For } R = (D/100) \times (MTOW/50)^{1/2}$$

Where D is the distance

Then charge is read on the following table, depending on R:

R	CHARGES PER FLIGHT (USD)
UP TO 1	60
1 - 2	90
2 - 4	140
4 - 8	200
8 - 12	235
12 - 15	280
15 - 20	320
20 - 25	365
ABOVE 25	400

Example:

A flight operated in a B737 with an MTOW of 70 tons, operating a distance of 100 nm (185 km), En-route charges will be:

$$R = (D/100) \times (MTOW/50)^{1/2} = 2.19$$

With D = 185

MTOW = 70

Then according to the table above, En-route charges are **USD 140**

- **Burundi**

In Burundi, the charge depends on the MTOW, following the scale below:

AIRCRAFT WEIGHT (TONES)	CHARGES PER FLIGHT (USD)
UP TO 6	3
7 TO 50	$18 + MTOW \times 0.40$
51 TO 100	$18 + MTOW \times 0.50$
OVER 100	$18 + MTOW \times 0.60$

Example:

A flight operated in a B737 with an MTOW of 70 tons, En-route charges will be:

$$C = 18 + MTOW \times 0.50 = \text{USD } 53$$

With MTOW = 70

- **Djibouti**

For Djibouti, the charge also depends on the MTOW.

AIRCRAFT WEIGHT (TONES)	CHARGES PER FLIGHT (USD)
UP TO 5	29.00
6 TO 50	$29.00 + 0.28 \times MTOW$
50 TO 200	$41.26 + 0.14 \times MTOW$
ABOVE 200	$62.00 + 0.084 \times MTOW$

Example:

A flight operated in a B737 with an MTOW of 70 tons, En-route charges will be:

$$C = 41.26 + 0.14 \times MTOW = \text{USD } 51.40$$

With MTOW = 70

- **Ethiopia**

In Ethiopia the charge depends on the MTOW and the distance following this scale:

WEIGHT IN LBS	DISTANCE IN NM			
	below 200	201 - 400	401 - 1000	above 1 000
BELOW 10 000	7.51	7.51	7.51	7.51
10 000 - 50 000	16.24	32.48	56.84	81.20
50 001 - 120 000	32.48	64.96	113.68	162.40
120 001 - 300 000	40.60	81.20	142.10	203.00
ABOVE 300 000	48.72	97.44	170.52	243.60

Example:

A flight operated in a B737 with an MTOW of 70 tons (155000 lbs.), operating a distance of 100 nm; En-route charges will be **USD 40.60**

- **Eritrea**

For Eritrea, the scale is as follows:

AIRCRAFT WEIGHT (LBS.)	CHARGES PER FLIGHT (USD)
UP TO 10 000	75
10 001 - 50 000	100
50 001 - 120 000	150
120 001 - 300 000	175
ABOVE 300 000	200

Example:

A flight operated in a B737 with an MTOW of 70 tons (155000 lbs.), En-route charges will be **USD 175**

- **Rwanda**

The scale in Rwanda is as follows:

AIRCRAFT WEIGHT (KG)	CHARGE PER FLIGHT (USD)
UP TO 3 500	20
3 501 TO 10 000	30
10 001 TO 20 000	35
20 001 TO 95 000	100
95 001 TO 150 000	180
150 001 TO 273 000	250
ABOVE 273 000	310

Example:

A flight operated in a B737 with an MTOW of 70 tons, En-route charges will be **USD 100**

- **Somalia**

For Somalia, the scale is as follows:

AIRCRAFT WEIGHT (TONES)	CHARGES PER FLIGHT (USD)
BELOW 20	40.00
ABOVE 20	275.00

Example:

A flight operated in a B737 with an MTOW of 70 tons, En-route charges will be **USD 275**

- **Uganda**

Uganda apply the following scale:

AIRCRAFT WEIGHT (KG)	CHARGES PER FLIGHT (USD)
UP TO 2 000	10
2001 – 4 000	20
4001 - 10 000	25
10 001 - 20 000	40
20 001 – 95 000	125
95 001 - 150 000	200
150 001- 273 000	280
OVER 273 000	330

Example:

A flight operated in a B737 with an MTOW of 70 tons, En-route charges will be **USD 125**

4- Southern Africa

The countries of the Southern African region are Angola, Botswana, Eswatini, Malawi, Mauritius, Mozambique, Namibia, South Africa, Zambia, and Zimbabwe.

- Angola

For Angola, the charge depends on the MTOW and the distance following this scale:

AIRCRAFT WEIGHT	DISTANCE			
	0 – 750 KM	751 – 2 000 KM	2 001 – 3 500 KM	OVER 3 500
UP TO 4	79.44	79.44	79.44	79.44
5 - 14	158.88	158.88	158.88	158.88
15 - 20	166.824	397.2	953.28	1588.8
21 - 50	169.2072	476.64	1143.936	1906.56
51 - 90	170.796	556.08	1334.592	2224.32
91 - 140	174.768	635.52	1525.248	2542.08
141 - 200	178.74	714.96	1715.904	2859.84
201 - 350	182.712	853.98	2049.552	3415.92
351 - 440	190.656	913.56	2192.544	3654.24

Example:

A flight operated in a B737 with an MTOW of 70 tons, operating a distance of 100 nm (185 km), En-route charges will be **USD 170.796**

- Malawi

The country has opted for the following scale:

AIRCRAFT WEIGHT (KG)	CHARGE PER FLIGHT (USD)
UP TO 5 000	40
5 001 - 20 000	55
20 001 - 70 000	60
70 001 - 180 000	75
OVER 180 000	80

Example:

A flight operated in a B737 with an MTOW of 70 tons, En-route charges will be **USD 75**

- Mozambique

Mozambique has opted for the following scale:

AIRCRAFT WEIGHT (KG)	CHARGE PER FLIGHT (USD)
UP TO 5 700	23
5 701 TO 30 000	56
30 001 TO 43 000	162
43 001 TO 100 000	280
100 001 TO 190 000	342
190 001 TO 300 000	435
ABOVE 300 001	540

Example:

A flight operated in a B737 with an MTOW of 70 tons, En-route charges will be **USD 280**

- **Botswana**

Botswana has opted for the following formula:

AIRCRAFT WEIGHT (KG)	CHARGE PER FLIGHT (USD)
0 – 2500	14.07
2501 – 5700	18.77
5701 AND ABOVE	$18.77 \times D \times (MTOW/20)^{1/2}$

Example:

A flight operated in a B737 with an MTOW of 70 tons, operating a distance of 100 nm (185 km), En-route charges will be:

$$C = 18.77 \times D \times (MTOW/20000)^{1/2} = \mathbf{35.14 \text{ USD}}$$

With D = 100
MTOW = 70

- **Mauritius**

En-route charges are calculated using the following formula:

$$C = 0.2 \times D \times (W/50)^{1/2} \text{ for distances above 150 nm}$$

Where D is the distance

Example:

A flight operated in a B737 with an MTOW of 70 tons, operating a distance of 100 nm (185 km), En-route charges will be:

$$C = 0.2 \times D \times (MTOW/50)^{1/2} = \mathbf{0.00 \text{ USD}}$$

With D = 100
MTOW = 70

- **Namibia**

En-route charges are calculated with the following formula:

$$\text{Charge} = D \times W^{1/2} \times R$$

Where D is the distance and R is as follows:

MTOW	R
LESS THAN 5 700 KG	0.001
5 700 KG OR MORE	0.0029

Example:

A flight operated in a B737 with an MTOW of 70 tons, operating a distance of 100 nm (185 km), En-route charges will be:

$$C = D \times MTOW^{1/2} \times 0.0029 = \mathbf{76.73 \text{ USD}}$$

With D = 100
MTOW = 70000

- **South Africa**

In South-Africa, En-route charges are calculated with the following formulas:

Below 5000 kg

$$C = 1.86 + (0.012418 \times \text{MTOW}) + 121.03$$

Between 5000 and 15000 kg

$$\text{Charge} = 1.86 + (0.012418 \times \text{MTOW}) + (0.0001737 \times \text{MTOW} \times D)$$

Over 15,000 kg

$$\text{Charge} = 1.86 + (1.5206 \times \text{MTOW}^{1/2}) + (0.021284 \times \text{MTOW}^{1/2} \times D)$$

Where D is the distance

Example:

A flight operated in a B737 with an MTOW of 70 tons, operating a distance of 100 nm (185 km), En-route charges will be:

$$C = 1.86 + (1.5206 \times \text{MTOW}^{1/2}) + (0.021284 \times \text{MTOW}^{1/2} \times D) = \text{USD } 89.36$$

With D = 100

MTOW = 70

- **Zambia**

En-route charges are calculated using the formula below:

$$\text{Charge} = 20 \times (D/100) \times (\text{MTOW}/50)^{1/2}$$

Where D is the distance

Example:

A flight operated in a B737 with an MTOW of 70 tons, operating a distance of 100 nm (185 km), En-route charges will be:

$$C = 20 \times (D/100) \times (\text{MTOW}/50)^{1/2} = \text{USD } 43.779$$

With D = 500

MTOW = 70

- **Zimbabwe**

En-route charges are calculated with the following formula:

$$\text{Charge} = 20 \times (D/100) \times W$$

Where D is the distance and W is as follows:

MTOW (KG)	W
3 001- 15 000	0.5
15 001- 35 000	1.0
35 001 - 65 000	1.5
65 001 - 100 000	2.0
100 001 - 200 000	2.5
OVER 200 000	4.0

Example:

A flight operated in a B737 with an MTOW of 70 tons, operating a distance of 100 nm (185 km), En-route charges will be:

$$C = 20 \times (D/100) \times W = \text{USD } 40$$

With $D = 100$

$MTOW = 70$

Recap of charges in Africa

The charges are calculated for a flight operated in a B737 with an MTOW of 70 tons operating a distance of 500 nm.

Routing	En-route charges	Terminal	VSAT	Total
Guinea	750.0	544.1	-	1294.1
Sudan	1265.2	-	10.0	1275.2
Nigeria	822.2	235.6	-	1057.8
Morocco	472.7	341.6	-	814.3
Angola	556.1	100.6	9.6	666.3
ASECNA	651.1	-	-	651.0
DRC	526.2	110.2	9.6	646.0
Namibia	421.5	130.7	9.6	561.8
Eritrea	175.0	350.	10.0	535.0
Reunion	431.7	-	-	431.7
Kenya	366.2	50.	10.0	426.2
Egypt	204.2	176.4	-	380.6
Tunisia	340.0	-	28.4	368.4
South Africa	298.4	31.8	9.6	339.7
Algeria	298.6	-	-	298.5
Mozambique	280.0	-	9.0	289.0
Somalia	275.0	-	10.0	285.0
Libya	269.0	-	-	269.0
Cape Verde	140.8	127.5	-	268.3
Tanzania	235.0	-	9.6	244.6
Zambia	219.3	-	9.6	228.9
Botswana	193.3	19.7	9.6	222.5
Zimbabwe	200.0	-	9.6	209.6
Ghana	200.0	-	-	200.0
Sao Tome and Principe	200.0	-	-	200.0
Malawi	75.0	75.0	9.6	159.6
Ethiopia	142.2	-	10.0	152.2
Uganda	125.0	-	10.0	135.0
Burundi	53.0	53.0	9.6	115.6
Rwanda	100.0	-	8.0	108.0
Mauritius	85.7	-	21.1	106.9
Djibouti	51.4	-	10.0	61.4
Seychelles	40.8	-	10.0	50.8
AVERAGE	317.1	167.6	11.0	395.5

The average amount of air navigation charges in Africa is USD 395.5. This include an average USD 317.1 for En-route charges, USD 167.6 for terminal charges and USD 11 for communication.

Guinea, Sudan and Nigeria have the highest Air Navigation rate, charging more than USD 1000. On the other hand, two countries charge less than USD 100.

Examples of intra African flights

Three flights operated in a B737 with an MTOW of 70 tons in three different routings within Africa.

Routing 1: Cairo – Dar es Salam

The total Air Navigation charges is **USD 2733.80** with the detail as follows

Country	Charge Type	Distance(km)	Cost(USD)
Egypt	Terminal	899.71	193.31
	En-Route		170.89
Sudan	En-Route	750.21	1236.71
	NAFISAT		10.00
Eritrea	En-Route	206.17	175.00
	NAFISAT		10.00
Ethiopia	En-Route	1228.25	142.10
	NAFISAT		10.00
Kenya	En-Route	915.20	366.19
	NAFISAT		10.00
Tanzania	En-Route	242.29	400.00
	VSAT		9.60
Total		4241.83	2733.80

Routing 2: Casablanca – Douala

The total Air Navigation charges is USD 2302.20 with the detail as follows

Country	Charge Type	Distance(km)	Cost(USD)
Morocco	Overflight	445.51	220.58
	Terminal		334.39
Algeria	Overflight	1 515.41	475.58
Mali – Niger (ASECNA)	Overflight	671.82	160.40
Nigeria	Overflight	890.23	790.45
Cameroon	Overflight	268.36	160.40
Total		3 791.33	2 302.20

Routing 3: Dakar – Monrovia

The total Air Navigation charges is USD 930.20 with the detail as follows

Country	Charge Type	Distance(km)	Cost(USD)
Senegal	Overflight	299.68	160.40
Gambia	Overflight	33.54	-
Guinea Bissau	Overflight	148.20	160.40
Guinea	Overflight	255.51	206.96
Sierra Leone	Overflight	311.76	252.53
Liberia	Overflight	154.22	124.92
	Terminal		25.00
Total		1202.91	930.20

II - AIR NAVIGATION CHARGES IN EUROPE

Most of the European countries are included in the Euro control, which is the regional organization for the safety of Air Navigation.

The formula used to calculate En-Route charges in this area is as follows:

$$C = R \times (D/100) \times (MTOW/50)^{1/2}$$

Where D is the distance and R vary by country

Example:

A flight operated in a B737 with an MTOW of 70 tons, operating a distance of 1978 km within the Euro control territory from London to Zagreb, total En-route charges will be **USD 927.17**

Country	Charge Type	Distance(km)	Cost(USD)
UK	Overflight	159,94	113,38
	Terminal		20,99
France	Overflight	65,31	16,87
Belgium	Overflight	250,68	269,17
Luxembourg	Overflight	15,99	80,10
Germany	Overflight	544,00	427,62
Austria	Overflight	210,17	145,46
Slovenia	Overflight	93,00	48,00
Croatia	Overflight	36,66	8,79
	Terminal		322,24
Total		1375,75	1452,62

En-route charges in the Euro control region and in Africa are similar.

As an example, En-route charges for a flight of approximately 1300km will be USD 1452.62 in Europe and 1462.62 in Africa.

An exemption is the intra- ASECNA flights that have lower rates. A 1300 km flight between ASECNA states will cost USD 663.

Examples of intra-European flights

Three flights operated in a B737 with an MTOW of 70 tons in three different routings within Europe.

Routing 1: Lisbon – Moscow

The total Air Navigation charges is **USD 2808.18** with the detail as follows

Country	Charge Type	Distance(km)	Cost(USD)
Portugal	Terminal	237.26	185.96
	Overflight		112.01
Spain	Overflight	548.49	350.98
	Meteorological		13.41
France	Overflight	883.82	660.61
Germany	Overflight	414.69	327.09
Czech republic	Overflight	223.52	113.49
Poland	Overflight	639.30	345.28
Belarus	Overflight	487.47	262.08
Russia	Overflight	438.15	437.27
Total		3 872.70	2 808.18

Routing 2: Lisbon – Kiev

The total Air Navigation charges is **USD 2786.71** with the detail as follows

Country	Charge Type	Distance(km)	Cost(USD)
Portugal	Terminal	268.12	203.24
	Overflight		107.71
Spain	Overflight	605.96	389.16
	Meteorological		13.41
France	Overflight	677.66	495.31
Italy	Overflight	166.32	125.85
Switzerland	Overflight	171.59	185.42
Austria	Overflight	476.42	353.56
Slovakia	Overflight	391.40	221.40
Poland	Overflight	53.00	18.40
Ukraine	Overflight	594.67	381.14
	Terminal		292.11
Total		3 405.14	2 786.71

Routing 3: London – Zagreb

The total Air Navigation charges is **USD 1452.62** with the detail as follows

Country	Charge Type	Distance(km)	Cost(USD)
UK	Overflight	159.94	113.38
	Terminal		20.99
France	Overflight	65.31	16.87
Belgium	Overflight	250.68	269.17
Luxembourg	Overflight	15.99	80.10
Germany	Overflight	544.00	427.62
Austria	Overflight	210.17	145.46
Slovenia	Overflight	93.00	48.00
Croatia	Overflight	36.66	8.79
	Terminal		322.24
Total		1375.75	1452.62

III – MIDDLE-EAST

Unlike the European region, there is no common policy in the Middle-East region in terms of Air navigation service charges. Each country has its own taxation policy.

Most of the countries opted for MTOW related scales.

- United Arab Emirates

The country has opted for the following scale:

AIRCRAFT WEIGHT (KG)	CHARGE PER FLIGHT (USD)
UP TO 120 000	130
120 001 TO 190 000	165
190 001 TO 290 000	200
OVER 290 000	235

Example:

For a flight operated in a B737 with an MTOW of 70 tons, En-route charges will be **USD 130**

- Bahrain

En-route charges are calculated with the following formula:

AIRCRAFT WEIGHT (KG)	CHARGE PER FLIGHT (USD)
UP TO 40 000	64
40 001 - 80 000	93
80 001 - 120 000	125
120 001 - 200 000	156
200 000 - 300 000	188
300 001 OR MORE	209

Example:

For a flight operated in a B737 with an MTOW of 70 tons, En-route charges will be **USD 93**

- Israel

The scale used to calculate En-route charges is as follows:

AIRCRAFT WEIGHT (KG)	CHARGE PER FLIGHT (USD)
UP TO 50 000	101.45
50 001 TO 100 000	120.47
100 001 TO 150 000	158.51
150 001 TO 200 000	183.87
200 001 TO 300 000	215.57
OVER 300 000	259.96

Example:

For a flight operated in a B737 with an MTOW of 70 tons, En-route charges will be **USD 120.47**

- Kuwait

En-route charges are fixed. For any aircraft type or any distance, the charge is:

Charge = 130 USD

- Iraq

The scale in Iraq is as follows:

AIRCRAFT WEIGHT (KG)	CHARGE PER FLIGHT (USD)
UP TO 80 000	60
80 001 TO 150 000	75
150 001 TO 290 000	90
OVER 290 000	105

Example:

For a flight operated in a B737 with an MTOW of 70 tons, En-route charges will be **USD 60**

- Lebanon

The scale is as follows:

AIRCRAFT WEIGHT (KG)	CHARGE PER FLIGHT (USD)
UP TO 70 000	50
OVER 70 000	100

Example:

For a flight operated in a B737 with an MTOW of 70 tons, En-route charges will be **USD 100**

- Oman

The country has opted for the following scale:

AIRCRAFT WEIGHT (KG)	CHARGE PER FLIGHT (USD)
UP TO 49 999	152
50 000 TO 99 999	202
100 000 TO 199 999	250
OVER 200 000	327

Example:

For a flight operated in a B737 with an MTOW of 70 tons, En-route charges will be **USD 202**

- Iran

En-route charges are calculated with the following formula:

$$C = 0.00406 \times D \times W$$

Where D is the distance

W is the aircraft weight in tons

With a minimum charge of USD 100

Example:

A flight operated in a B737 with an MTOW of 70 tons, operating a distance of 100 km, En-route charges are:

$$C = 0.00406 \times 100 \times 70 = 28.42 \text{ USD}$$

In this case the charge will be **USD 100**, which is the minimum

A flight operated in a B737 with an MTOW of 70 tons, operating a distance of 500 km, En-route charges are:

$$C = 0.00406 \times 500 \times 70 = 142.10 \text{ USD}$$

- Jordan

In Jordan the following formula is applied:

$$\text{Charge} = 1.41 \times W$$

Where W is the aircraft weight in tons

With a minimum charge of USD 56

Example:

A flight operated in a B737 with an MTOW of 70 tons, operating a distance of 100 km, En-route charges are:

$$C = 1.41 \times 70 = \mathbf{98.7 \text{ USD}}$$

- Saudi Arabia

Air navigation charges are calculated using the following formula:

$$\text{Charge} = 32 \times (D/100) \times (MTOW/50)^{1/2}$$

Where D is the distance

W is the aircraft weight in tons

Example:

A flight operated in a B737 with an MTOW of 70 tons, operating a distance of 100 km, En-route charges are:

$$C = 32 \times 1 \times (70/50)^{1/2} = 37.86 \text{ USD}$$

- Syrian Arab Republic

En-route charges are calculated with the following formula:

$$\text{Charge} = U \times W$$

Where W is the MTOW and U is as follows:

MTOW (TONS)	U
76 – 200	1.00
OVER 200	1.25

For aircraft with an MTOW up to 75 tons, a flat rate of USD 75 is applied

Example:

For flight operated in a B737 with an MTOW of 70 tons, En-route charges will be USD 75

For a flight operated in a B737 with an MTOW of 80 tons, En-route charges will be:

$$C = 1 \times 80 = 80 \text{ USD}$$

- Yemen

En-route charges are calculated with the following formula:

$$\text{Charge} = U \times W$$

Where W is the MTOW and U is as follows:

MTOW (TONS)	U
UP TO 25	3.50
26 - 100	4.00
OVER 100	5.00

With a minimum charge of USD 108 and a maximum charge of USD 999

Example:

For a flight operated in a B737 with an MTOW of 70 tons, En-route charges will be:

$$C = 4 \times 70 = \mathbf{280 \text{ USD}}$$

Examples of intra Middle-East flights

Routing 1: Beirut – Teheran

The total Air Navigation charges is **USD 724.50** with the detail as follows

Country	Charge Type	Distance(km)	Cost(USD)
Lebanon	Overflight	106.24	99.50
Syrian arab republic	Overflight	439.77	75.00
Iraq	Overflight	438.18	450.00
Iran	Overflight	460.00	130.88
	Terminal		100.00
Total		1444.19	724.50

Routing 2: Tel Aviv – Oman

The total Air Navigation charges is **USD 1322.07** with the detail as follows

Country	Charge Type	Distance(km)	Cost(USD)
Israel	Overflight	10,62	129,13
	Terminal		87,43
Jordan	Overflight	242,61	98.84
Saudi Arabia	Overflight	538,36	200,58
Iraq	Overflight	382,89	450
Kuwait	Overflight	217,86	130,2
Bahrain	Overflight	160,59	93,09
Iran	Overflight	388,45	110,52
UAE	Overflight	265,48	130.00
Oman	Overflight	248,15	121,12
Total		2455,01	1322,07

Air Navigation charges seems to be less expensive in Middle-East than in Europe and Africa.

As an example, En-route charges for a flight of approximately 1500km is USD 724.5 that is 50% less than in Europe and Africa (except intra-ASECNA) which is around USD 1450.

Comparison table between regions

Routing	Regions	Distance	Terminal charge	En-route charge	Total
INTRA AFRICA					
Abidjan - Abuja	Western - Central	1 317.14	235.59	1 226.69	1 462.28
Casablanca - Douala	Nothern - Central	3 791.33	334.39	1 967.81	2 302.20
Lagos - Addis	Western- Eastern	3 949.20	235.59	3 357.85	3 593.44
Cotonou - Gaborone	Western - Southern	4 335.09	0.00	2 443.60	2 443.60
Cairo - Dar es Salam	Nothern - Eastern	4 241.83	193.31	2 540.49	2 733.80
INTRA EUROPE					
London - Zagreb	Intra EUROPE	1375.75	343.23	1109.39	1452.62
Lisbon - Kiev	Intra EUROPE	3 405.14	495.35	2 291.36	2786.71
Lisbon - Moscow	Intra EUROPE	3 820.70	185.96	2 622.22	2 808.18
INTRA MIDDLE EAST					
Beirut - Teheran	Intra - Middle East	1 444.19	100.00	624.50	724.50
Tel Aviv - Muscat	Intra - Middle East	2 455.01	87.43	1 030.83	1 118.26

From the table above, we can see that the rates are similar in Africa and Europe. The region where air navigation charges are less expensive is Middle East.

Conclusion

Air navigation charges, which include En-route charges as well as terminal and sometimes meteorological charges affects airlines, as it represents a non-negligible fraction of their variable direct operating costs. It affects the choice of the route to be actually flown in the airspace; it also influences the final ticket price proposed to the passenger.

In Africa, the ASECNA have harmonized the Air navigation charges policy with uniform rates, within the airspaces of the 17 member countries.

It is also the case in Europe with Euro control, where the formula is the same for all states, but the only difference is that the unit rates are not yet harmonized.

In other regions across Africa, there are huge variations from a country to another. A continental harmonization of the rates and formulas will bring more transparency and may lead to a cost reduction relating to the provision of air navigation services.

For comparable distances, ANSPs charges are similar in Africa and in Europe.

In Middle East, the Air Navigation charges are 50% less expensive for the same type of distances, although the traffic is more significant than in Africa (224.21 million passengers).

At most, ANSPs in Africa should charge at the same level as in Middle East, as the density of traffic is even lower.

Any productivity gain to reduce Air Navigation charges will contribute to improve the competitiveness of Air transport in Africa.



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