



*Agenda Item 4.1: Initiatives by States & Industry
and other air navigation issues, the need for
EGNOS implementation deferral
Meeting in AFI (APIRG/23) 23rd November to 2nd
December 2020 – Presented by AFRAA*

Better Skies for Africa

COVID-19 Devastating Impact on African Aviation

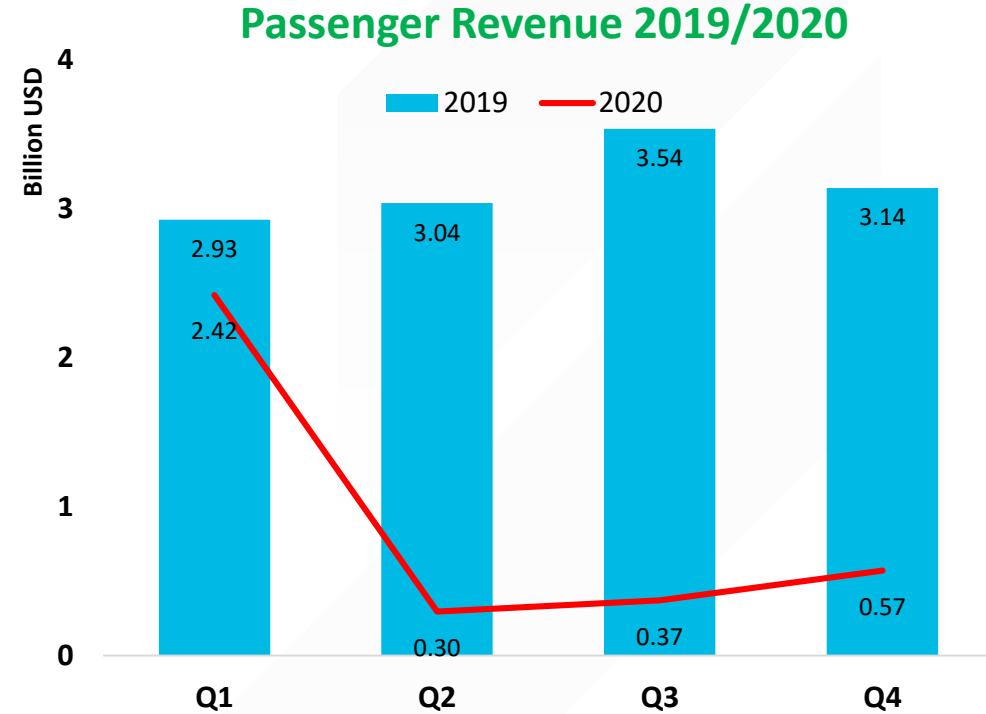


2019

- ✓ GLOBAL profit: **US\$ 5.8** average per passenger
- ✓ AFRICA : average **US\$ 2.67 loss** per passenger

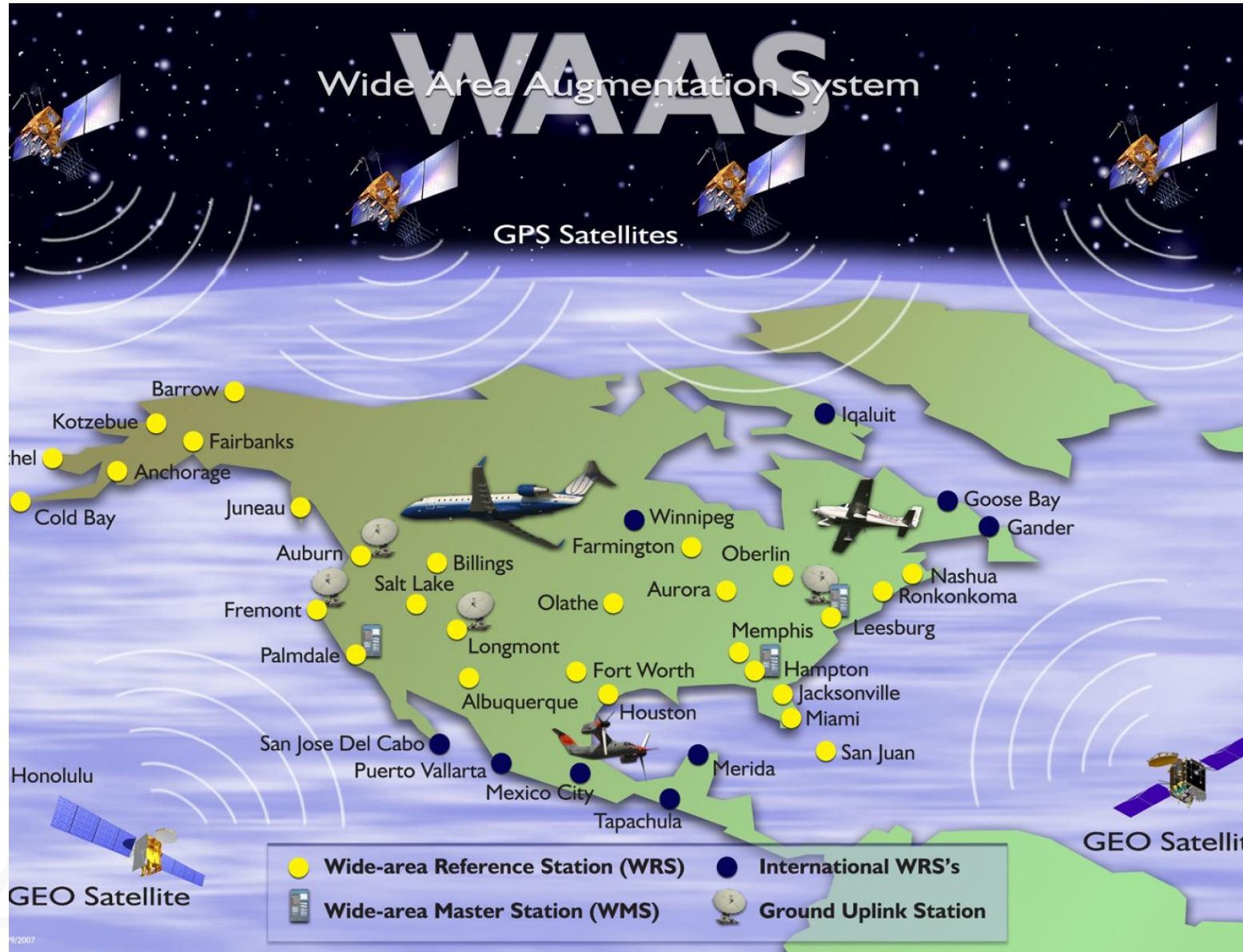
2020

Connectivity Index			
Airports	Nov. 2019	Nov-2020	Variation
JNB, ADD, CMN DSS DLA	4592	471	-90%



AFRAA Estimated Revenue loss for 2020 :
USD 9 billion (21 Oct. assessment)

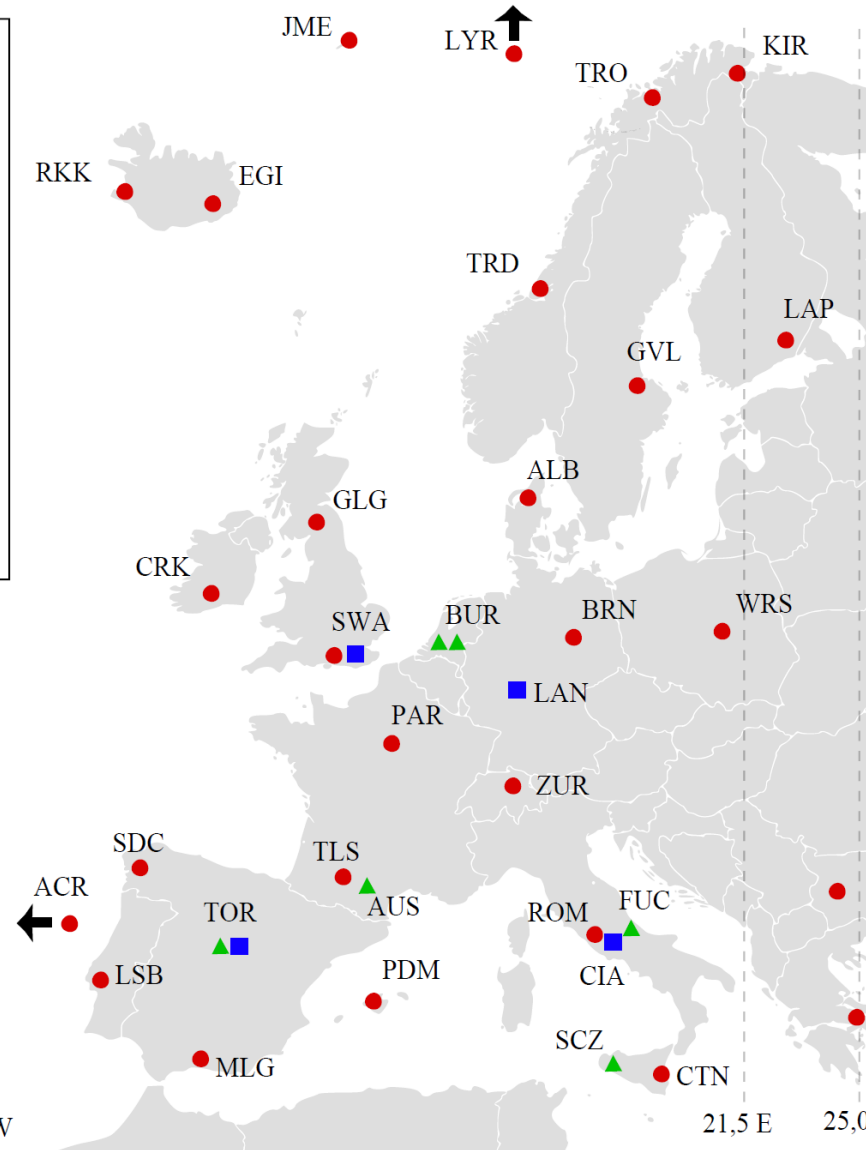
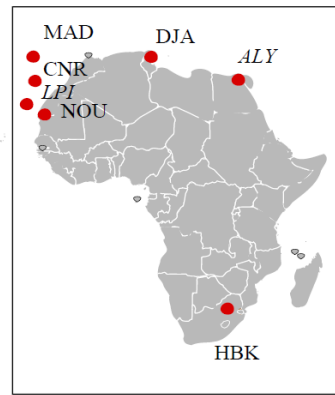
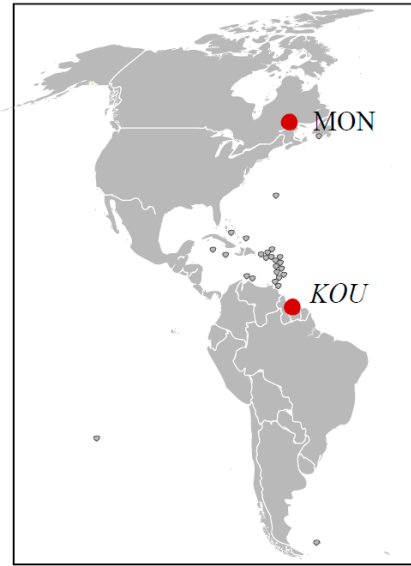
APIRG Conclusions 22/39 and 22/40



AFRAA

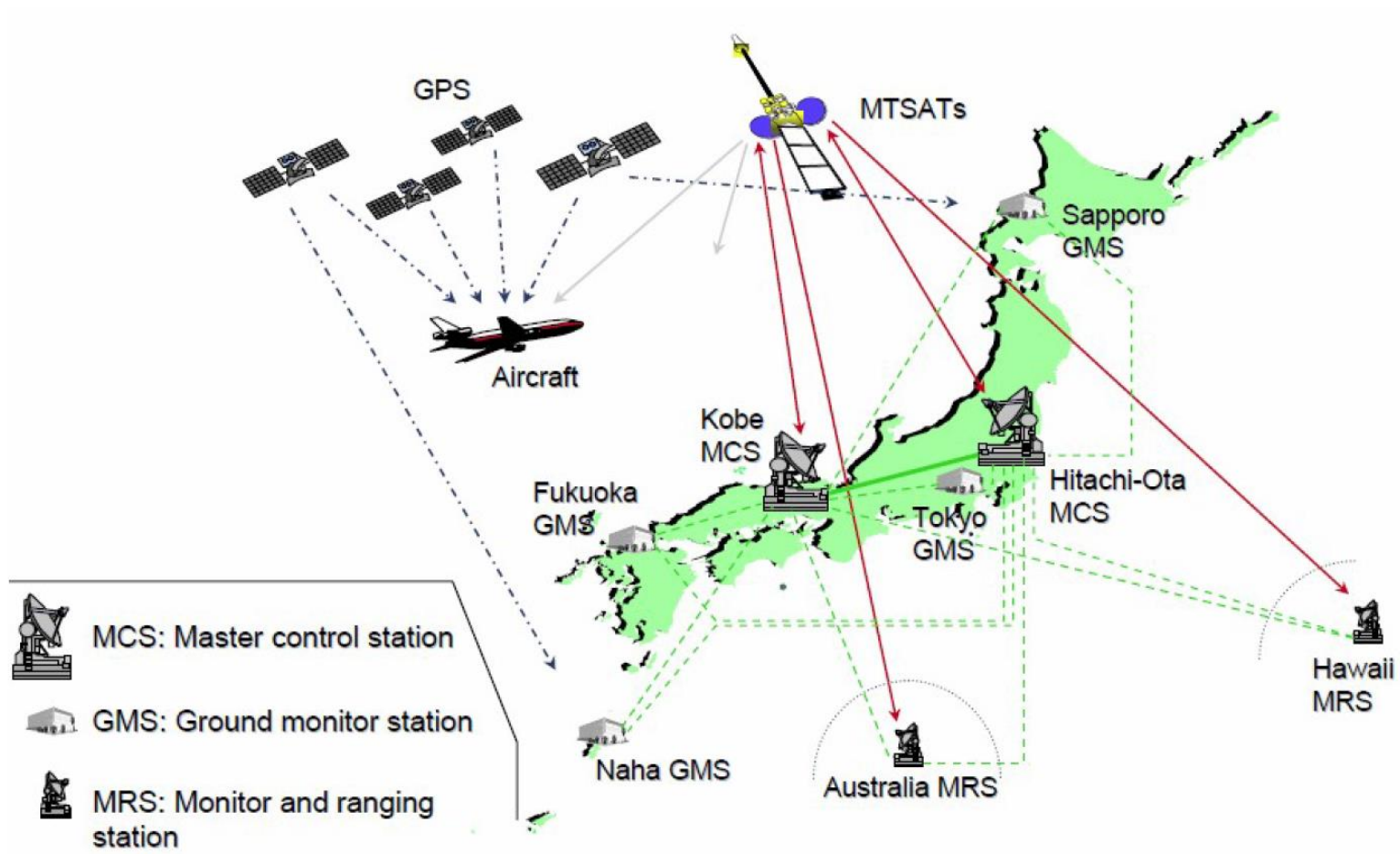
Geostationary Navigation Overlay Service

www.afraa.org



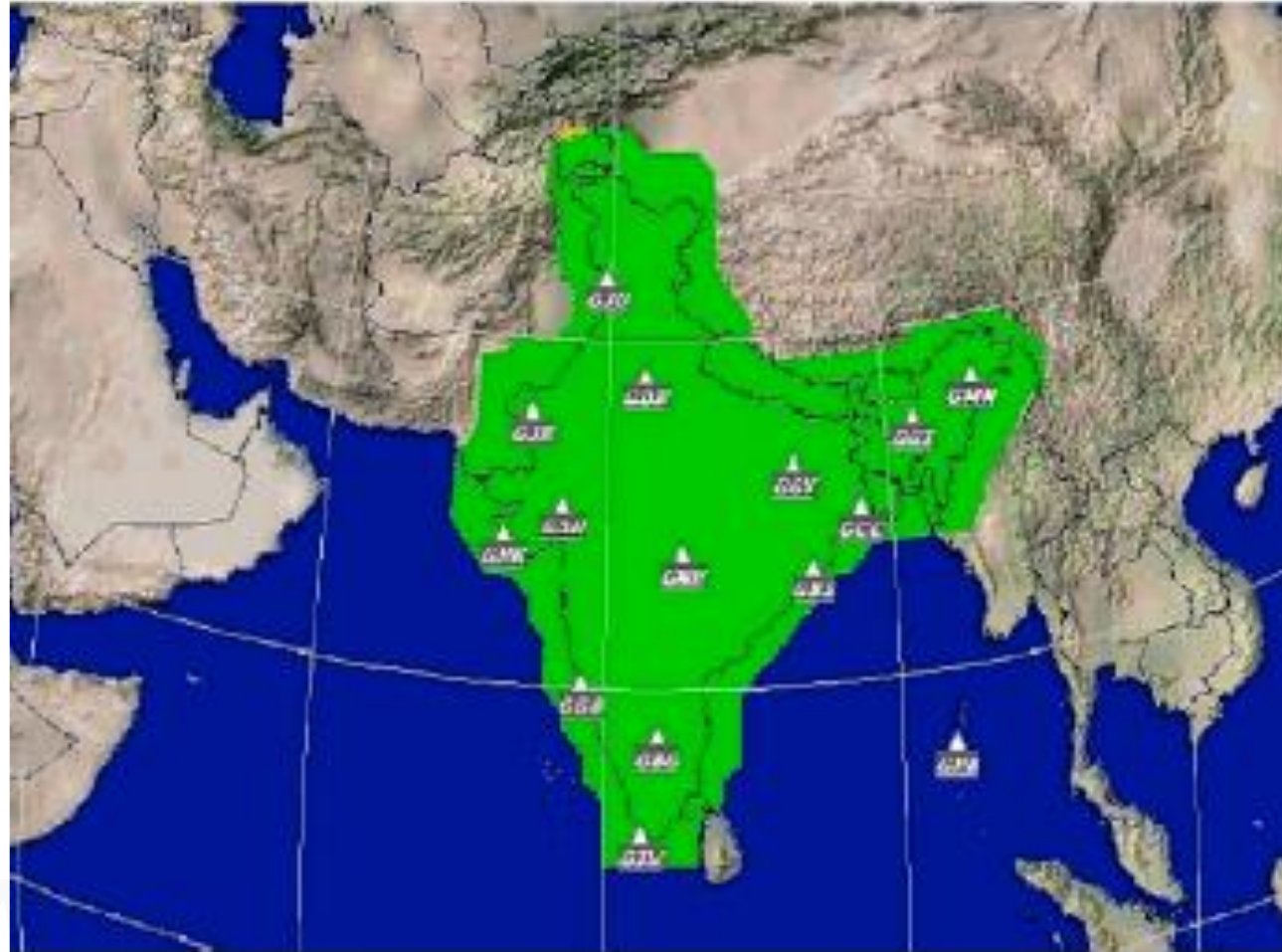
AFRA

Multi-functional Satellite Augmentation System MSAS





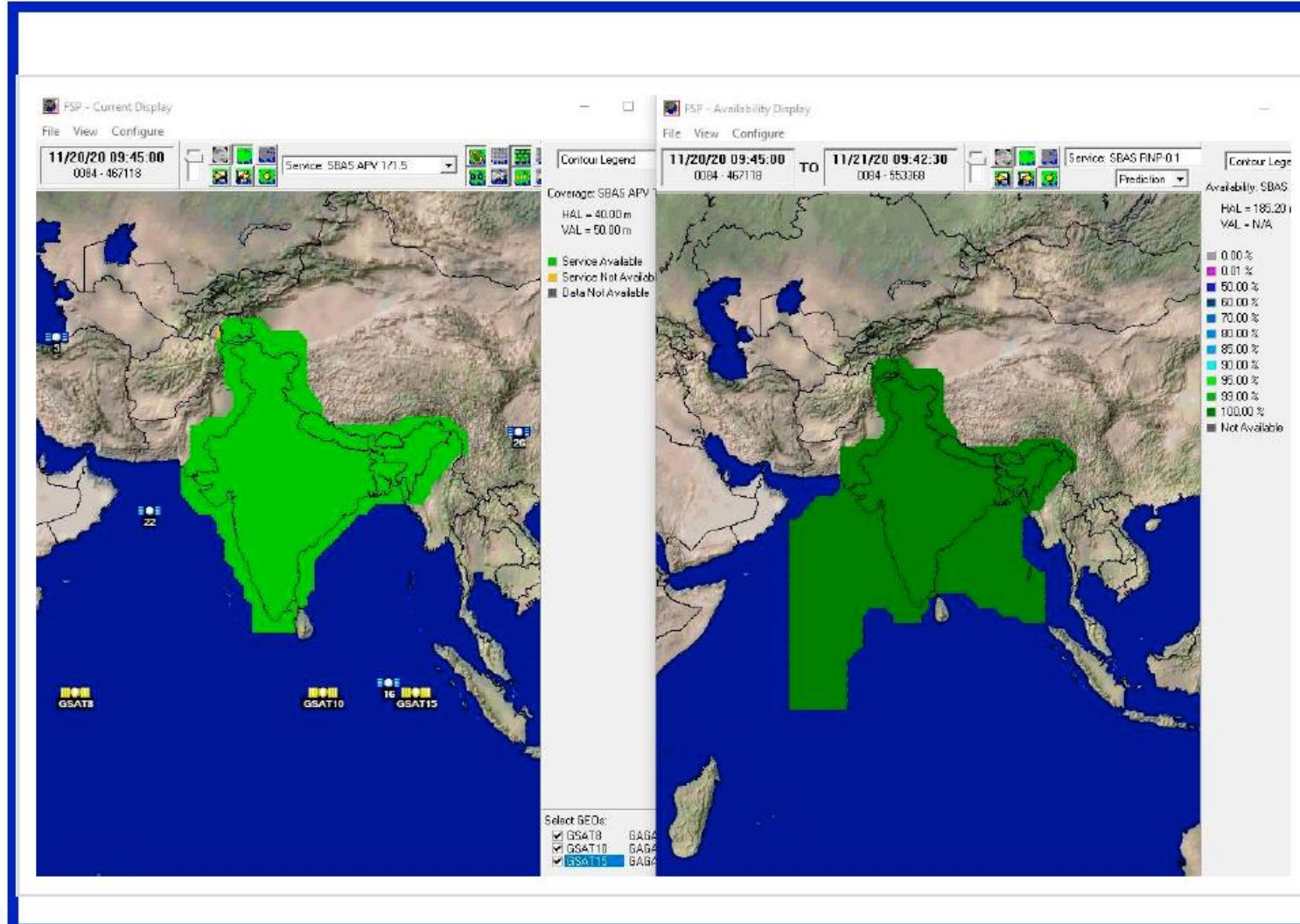
GPS-Aided Geo Augmented Navigation GAGAN



www.afraa.org

AFRAA

GPS-Aided Geo Augmented Navigation GAGAN



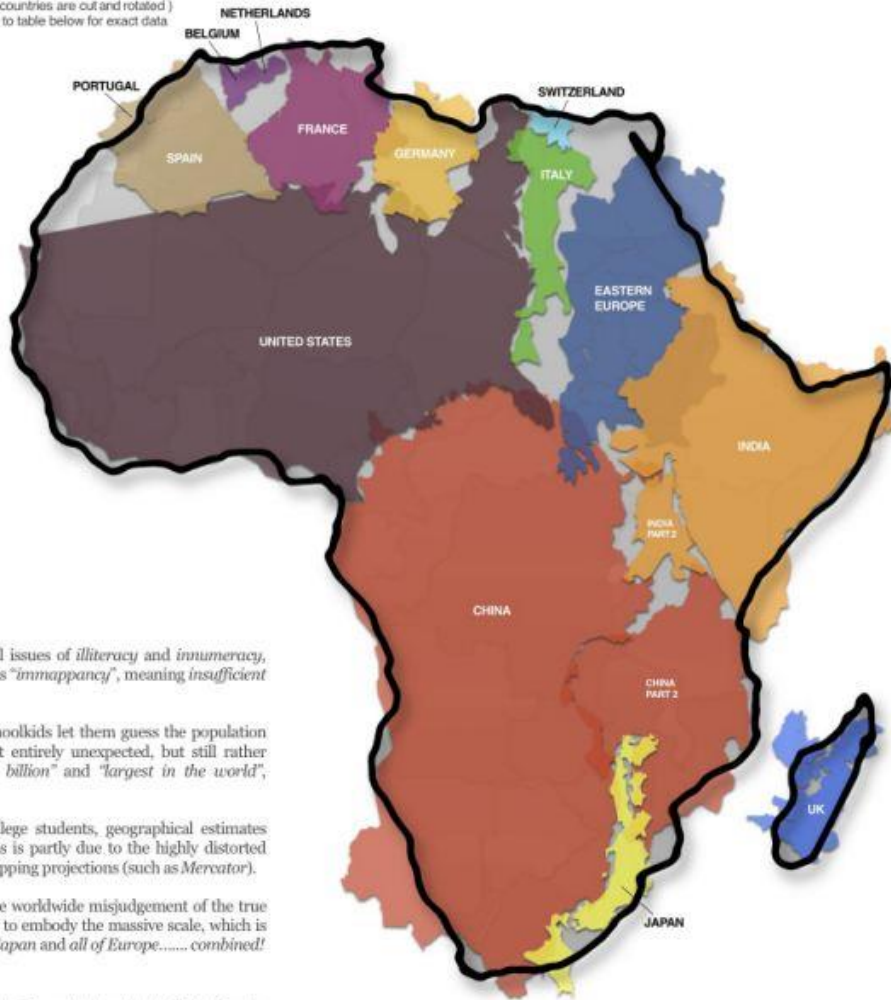
EGNOS in AFI – The Landmass

The True Size of Africa

A small contribution in the fight against rampant *immappancy*, by Kai Krause

Graphic layout for visualization only (some countries are cut and rotated)
But the conclusions are very accurate: refer to table below for exact data

COUNTRY	AREA x 1000 km ²
China	9.597
USA	9.529
India	3.287
Mexico	1.964
Peru	1.285
France	633
Spain	506
Papua New Guinea	462
Sweden	441
Japan	378
Germany	357
Norway	324
Italy	301
New Zealand	270
United Kingdom	243
Nepal	147
Bangladesh	144
Greece	132
TOTAL	30.102
AFRICA	30.221



Top 100 Countries

Area in square kilometers, Percentage of World Total
Sources: Britannica, Wikipedia, Almanac 2010

	AREA km ²	%	
1	Russia	17.098.243	11,53
2	Canada	9.984.670	6,70
3	China	9.596.961	6,40
4	United States	9.529.091	6,40
5	Brazil	8.514.877	5,70
6	Australia	7.682.004	5,20
7	India	3.287.283	2,30
8	Argentina	2.790.400	1,90
9	Kazakhstan	2.724.490	1,90
10	Sudan	2.505.813	1,70
11	Algeria	2.367.741	1,60
12	Congo	2.344.858	1,60
13	Greenland	2.188.088	1,50
14	Saudi Arabia	2.149.690	1,40
15	Russia	1.984.275	1,30
16	Indonesia	1.860.500	1,30
17	Lithya	1.759.540	1,20
18	Iran	1.628.750	1,10
19	Mongolia	1.564.100	1,10
20	Peru	1.285.216	0,90
21	Chad	1.284.000	0,90
22	Niger	1.267.000	0,85
23	Angola	1.248.700	0,85
24	Mali	1.240.192	0,85
25	South Africa	1.221.037	0,82
26	Colombia	1.141.748	0,70
27	Ethiopia	1.104.360	0,74
28	Bolivia	1.098.581	0,74
29	Mauritania	1.025.530	0,68
30	Egypt	1.002.000	0,67
31	Tanzania	945.087	0,62
32	Nigeria	923.769	0,62
33	Venezuela	912.050	0,61
34	Honduras	824.116	0,56
35	Haiti	801.580	0,54
36	Pakistan	796.090	0,53
37	Turkey	783.562	0,53
38	Chile	759.102	0,51
39	Zambia	752.612	0,51
40	Myanmar	676.679	0,46
41	Algeria	652.000	0,44
42	Somalia	637.657	0,43
43	France	632.834	0,43
44	C. African Rep	622.984	0,42
45	Ukraine	603.620	0,41
46	Madagascar	587.041	0,39
47	Bolivia	582.000	0,39
48	Kenya	580.367	0,39
49	Yemen	527.969	0,35
50	Thailand	513.120	0,34
51	Spain	505.992	0,34
52	Turkmenistan	488.100	0,33
53	Cameroon	475.642	0,32
54	Papua New Guinea	462.843	0,31
55	Uzbekistan	447.400	0,30
56	Morocco	446.550	0,30
57	Sweden	441.270	0,30
58	Iran	438.317	0,29
59	Paraguay	406.752	0,27
60	Zimbabwe	390.757	0,26
61	Japan	377.830	0,25
62	Germany	357.114	0,24
63	Rep. of Congo	342.000	0,23
64	Finland	338.419	0,23
65	Vietnam	331.212	0,22
66	Malaysia	330.803	0,22
67	Norway	325.862	0,22
68	Cote d'Ivoire	322.463	0,22
69	Poland	312.685	0,21
70	Oman	306.500	0,21
71	Italy	301.336	0,20
72	Philippines	300.000	0,20
73	Burkina Faso	274.200	0,18
74	New Zealand	270.467	0,18
75	Gabon	267.669	0,18
76	Western Sahara	266.000	0,18
77	Dominican	286.369	0,20
78	Ghana	245.857	0,17
79	United Kingdom	242.800	0,16
80	Uganda	241.038	0,16
81	Ghana	238.639	0,16
82	Romania	238.281	0,16
83	Laos	228.600	0,16
84	Ghana	214.900	0,14
85	Belarus	207.600	0,14
86	Egypt	198.641	0,13
87	Sri Lanka	198.722	0,13
88	Syria	185.183	0,12
89	Cameroon	181.000	0,12
90	Uruguay	178.210	0,12
91	Suriname	163.600	0,11
92	Tanzania	160.670	0,11
93	Nepal	147.181	0,10
94	Bangladesh	143.999	0,10
95	Tanzania	143.150	0,10
96	Ghana	131.857	0,09
97	Nicaragua	130.373	0,09
98	North Korea	120.539	0,08
99	Haiti	116.684	0,08
100	Ethiopia	117.800	0,08
TOP 100 TOTAL	133.632.528	68,34	



In addition to the well known social issues of *illiteracy* and *innumeracy*, there also should be such a concept as *"immappancy"*, meaning *insufficient geographical knowledge*.

A survey with random American schoolkids let them guess the population and land area of their country. Not entirely unexpected, but still rather unsettling, the majority chose *"1-2 billion"* and *"largest in the world"*, respectively.

Even with Asian and European college students, geographical estimates were often off by factors of 2-3. This is partly due to the highly distorted nature of the predominantly used mapping projections (such as *Mercator*).

A particularly extreme example is the worldwide misjudgement of the true size of *Africa*. This single image tries to embody the massive scale, which is larger than the *USA*, *China*, *India*, *Japan* and *all of Europe*..... combined!

Regional East – West Width

Regions	City - Pairs	Distances (KMs)
USA	Honolulu – Denver	5,415
	Los Angeles – New York	3,983
	Anchorage – Chicago	4,605
Europe	Lisbon – Warsaw	2,754
	Dublin – Warsaw	1,831
Japan	Nagasaki – Tokyo	1,013
	Osaka – Tokyo	432
India	Bhuj - Kolkata	1,925
	Mumbai – Kolkata	1,668
Africa	Sal – Djibouti	7,131
	Dakar – Addis Ababa	6,152
	Mauritius – Windhoek	4,162
	Abeche - Dakar	4,132
	Dar Es Salaam - Pointe Noire	3,033

EGNOS in AFI – CBA

Infrastructure Items	WAAS	EGNOS	MSAS	GAGAN	China SBAS	AFRICA
Land References	38	40	4	15	38?	135 ?
Master Control Stations	4	4	2	3	4?	17 ?
Uplink Stations	6	6	2	3	6?	23 ?
Geostationary Satellites	3	3	2	3	3?	14 ?
<p>The Land References, Control centers and Upper Link stations must be linked with reliable Communication Network</p>						

Over the next 30 years
Air navigation charges?

On-board Equipage

737 – LPV Walk around Chart



Displays System

- Software change to display “GLS(LPV)” and “GLS(GBAS)”



Head-Up Display

- No change



Flight Controls

- No change



Multimode Receiver (SBAS Capable)

- Software update for LPV feature
- Incorporate LPV database



Flight Management System (GE FMS U14)

- Software update for LPV feature
- Associated annunciations to integrate with current approach procedures



MCU

- No change



Navigation Control Panel

- Update to support LPV

On-board Equipage

LPV Summary

- Boeing currently does not offer LPV capability on any aircraft except 777-9
- SBAS capable MMR are certified and available on 737NG, 737MAX, and 777 aircraft
- 787 Integrated Surveillance System currently does not support SBAS or LPV capability
- An operator is expected to invest anywhere from 100K to 500K based on aircraft configuration, wiring changes required and equipage updates to enable LPV functionality including a SBAS multi-mode receiver
- LPV functionality requires flight management, displays, multi-mode receiver, panel and other changes on the aircraft.

African Air Transport Industry Marginalization

www.afraa.org



African Market \leq 3% World

African carriers' share 40%
Foreign airlines' share 60%.

African Market \leq 3% World

African carriers' share 45%
Foreign airlines; share 55%.



African Market \leq 2.5% World

African carriers' share 20%
Foreign airlines' share 80%.



African Market \leq 2.5% World

- African carriers' share 20%
- Foreign airlines' share 80%.
- **A third of African city-pair traffic through hubs outside Africa**
- **8 out of top 10 lucrative routes serviced by foreign carriers**

AFRAA

13



Accra – Lagos Return Trip Cost Breakdown

Fare: \$99

GH Tax: \$60

GCAA Safety Charge: \$20

NG Tax: \$100

NG Airport Charge: \$30

PCR Test Before Leaving GH: \$150

PCR Test on Arrival in NG: \$130

Pre-Departure PCR Test in NG: \$130

Total Air Fare : \$869

TAXES + CHARGES = **FARE X 2 Plus**

$$210 = (99 \times 2) + 12$$

Co-ordinated Supply Chain Productivity – Affordable Fares



Reduce Operating Costs by 60% – Reduce Total Air Fares by 50%

Accra – Lagos Return Trip Cost Breakdown

Fare: \$50

GH Tax: \$5

GCAA Safety Charge: \$8

NG Tax: \$5

NG Airport Charge: \$12

PCR Test Before Leaving GH: \$0

PCR Test on Arrival in NG: \$0

Pre-Departure PCR Test in NG: \$0

Total Air Fare : \$80

TAXES + CHARGES = 40% of FARE

Action by the Meeting

The Meeting is invited to:

- Acknowledge COVID-19 devastating effects on African economies and AFI Aviation
- Conclude the deferral for at least five (5) year of EGNOS implementation in AFI
- Independent continental CBA, the prerequisite of EGNOS implementation in AFI

CONTACTS

African Airlines Association
P.O.Box 20166 00200 GPO
Nairobi, Kenya

GSM: +254 20 2320144 | +254 20 23 20148
Cell: + 254 (0)722 20978 | +254 (0)735 337669



www.afraa.org

Better Skies for Africa