



Surveying &



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Presentation Outline

- ▶ What is surveying?
- ▶ Importance of surveying
- ▶ Core disciplines of surveying
- ▶ Uses of Surveying
- ▶ What is Aviation?
- ▶ The relationship between surveying and Aviation
- ▶ Variations in Aviation in relation to Surveying.
- ▶ Conclusion

What is surveying?

Surveying is the scientific technique to determine the position of points and angles & distances between them. The process of **surveying** is used to fulfill various purposes. It is necessary for making maps, planning a project etc. To accomplish all civil engineering works or projects successfully, **surveying** is used

Surveying and its importance

Surveying is important and most of us depend on it so as to ensure order in the physical world around us. **Surveyors** play an integral role in land development, from the planning and design of land subdivisions through to the final construction of roads, utilities and for landscaping and aviation purposes.

Surveying Importance continued.....

Land surveying involves measuring and mapping the world around us using mathematics, advanced software and equipment. Land Surveyors are experts in measuring and determining **land size**. They also provide advice and information to help designers, architects, developers and pilots in their work.

The core disciplines of surveying

- ▶ Land surveying (also known as Cadastral Surveying) ...
- ▶ Engineering surveying.
- ▶ Mining surveying.
- ▶ Hydrographic (Bathymetric) surveying.
- ▶ Geodetic surveying.
- ▶ Aerial (Photogrammetry and remote sensing)..
- ▶ Topographic (Detailed survey)

among others.....

Uses of Surveying

- ▶ Topographical maps showing hills, rivers, towns, villages, forests etc. are prepared by surveying.
- ▶ For planning and estimating new engineering projects like water supply and irrigation schemes, mines, railroads, bridges, transmission lines, buildings etc. surveying is required.
- ▶ Cadastral maps showing the boundaries of fields houses and other properties are prepared by surveying.
- ▶ Engineering maps showing the position of engineering works like roads, railways, buildings, dams, canals etc. are prepared through surveying.
- ▶ To set out works and transfer details from map to ground knowledge of surveying is used.
- ▶ For planning navigation routes and harbors, marine and hydro-graphic surveying are used.
- ▶ To help military strategic planning, military maps are prepared by surveying.
- ▶ For exploring mineral wealth, mine surveys are necessary.
- ▶ To determine different strata in the earth crust, geological surveys are required
- ▶ Archeological surveys are used to unearth relics of antiquity.



What is Aviation?

- Airlines
- Airports
- Aircraft Manufacturers
- Aircraft and Airport maintenance
- Regulation
- Air Traffic Control
- Safety, Security and the Environment
- Interest groups
- Government Policy



What is Aviation technically?

- ▶ Aviation is derived from the word AVIS | (the Latin word for BIRD)
- ▶ Aviation also refers to flying using an aircraft, like an aeroplane. It also includes the activities and industries related to flight, such as air traffic control, Aeronautical Information, Communication Navigation and Surveillance among others. The biggest of the many uses of civil air travel and military operations.

The relationship between Surveying and Aviation?

Surveyors play a vital role in the aviation industry in a number of ways;

- ❖ Design.
- ❖ Development.
- ❖ Production.
- ❖ Operation and use of Aircraft.
- ❖ Data acquisition and management.

DESIGN

Design involves Architectural and infrastructure-related requirements the way the terminal building is designed, the aprons, the runways and other movement areas (i.e taxiways).



STATIONNEMENT DES AERONEFS LIGNE DE GUIDAGE

AGADIR AL MASSIRA

AIP / MAROC

VAR 6° W (1992)

S.I.

V.I.P.

AEROGARE

B.P.

A.F.

SANDE ROUGE

TABLEAU DES CARACTERISTIQUES DES AVIONS UTILISANT
L'AEROPORT AL MASSIRA

TYPE AVION	ENVERGURE (m)	LONG (m)	HAUT. (m.)	Poids MAX. Décollage T.	ANGLE de VIRAGE	REFERENCE de MARQUAGE au Sol	LONGUEUR des Lignes D'Orienta- Finale
AIR BUS A300	44,83	53,70	16,70	142	45°	ADT	
A 310	43,90	46,66	15,94	138 / 150	"	ADT	
A 320	33,91	37,57	11,80	66 / 72	"	C	60 m
A 330	58,65	62,56	16,74	206	"	Q	
A 340	58,65	59,39	16,74	251	"	Q	60 m

POSTE

POSTE	
C-1	72
C-2	

DEVELOPMENT

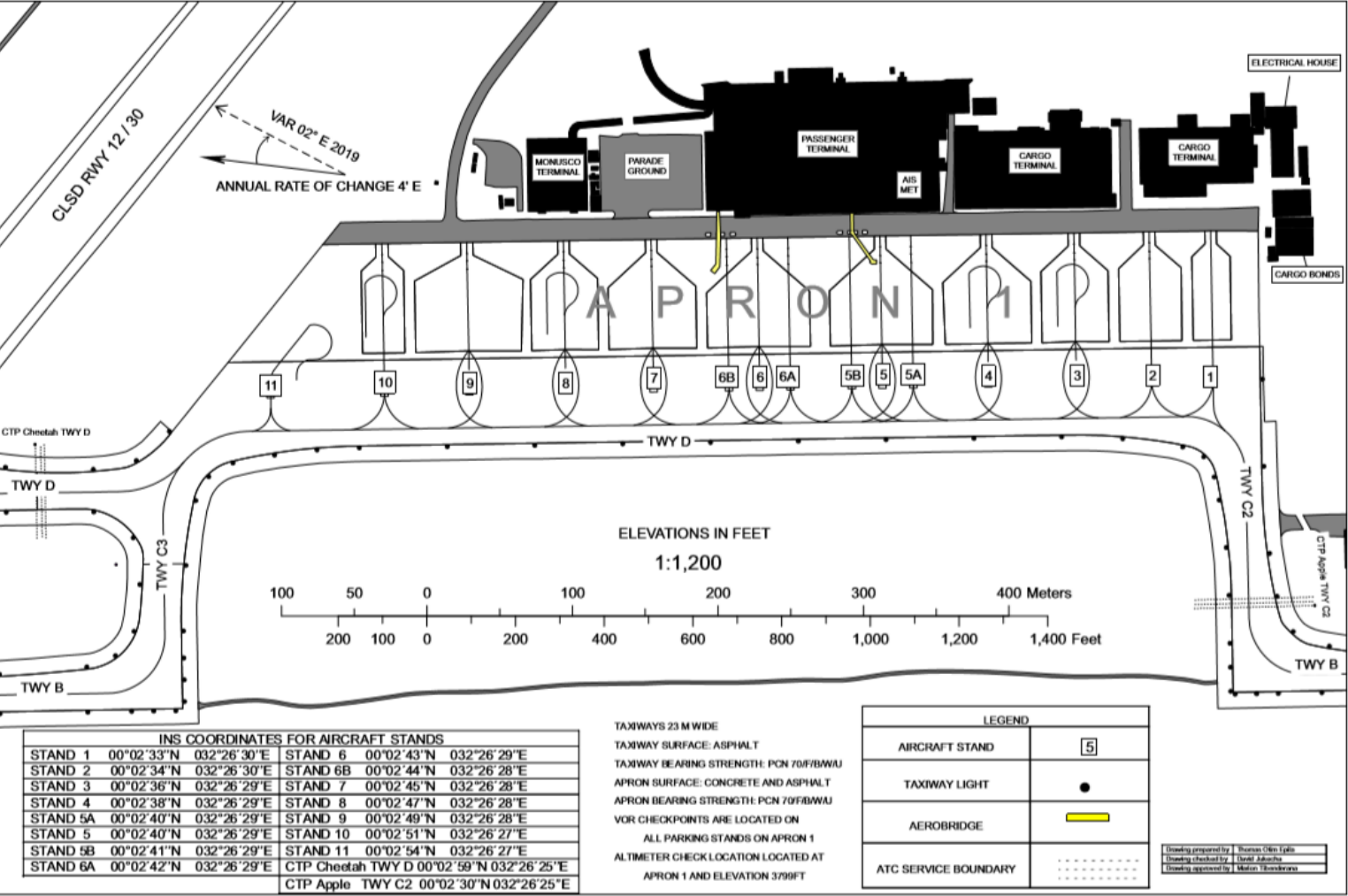
This involves the development of infrastructure at the airport and among others development of Procedures all to be used by aircraft either on ground or in air traversing the Ugandan airspace and other stake holders using the airport.

APRON 1 AIRCRAFT
PARKING / DOCKING CHART

APRON ELEV 3799 FT

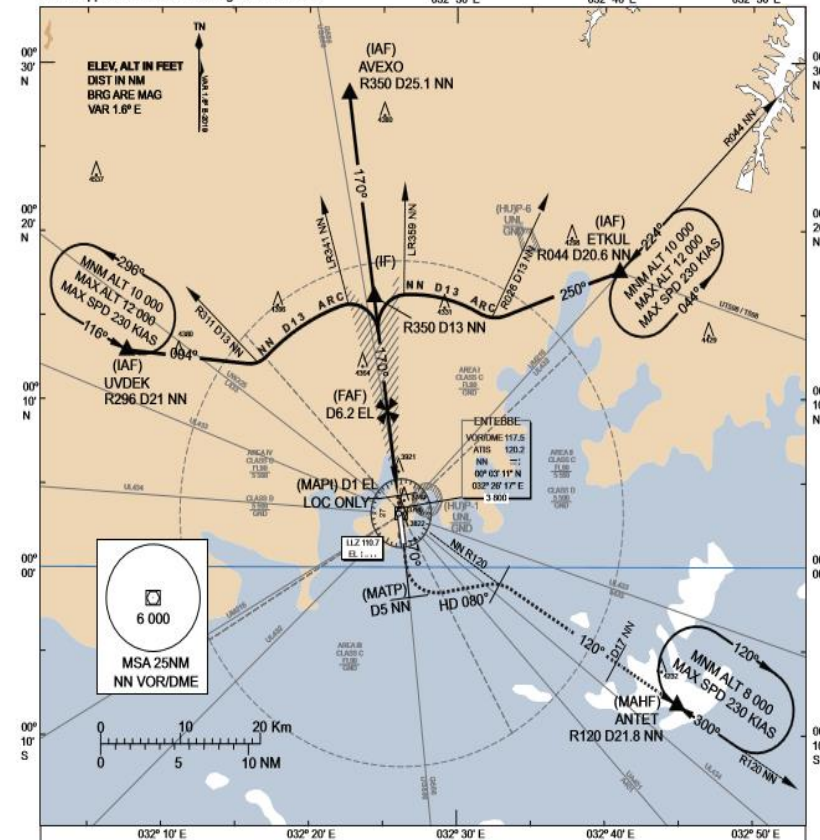
TWR 118.1
APRON 121.9

KAMPALA / ENTEBBE (INTL)



INSTRUMENT APPROACH CHART - ICAO **AERODROME ELEV 3784ft** **ENTEBBE APP 126.6** **Entebbe Intl(HUEN)**
HEIGHTS RELATED TO **TWR 118.1** **ILS Y or LOC Y**
THR RWY 17 -ELEV 3780 ft *** ATIS 120.2** **RWY 17**

Note : Approach under ICAO Flight Procedures.



TRANSITION ALT 7 000

MISSED APPROACH

Climb to NN 5000 on Track of 170°, then turn LEFT heading 080° till intercept and outbound NN R-120 at or below 7,000ft until 17DME and hold as published(ANTEP).

(IAF) ETKUL
AVEXO
UVDEK₁

(IF) R350 D13 NN
7 700
(3 920)

(FAF) D6.2 EL
5 800

(MAPt) LOC ONLY
D1 EL

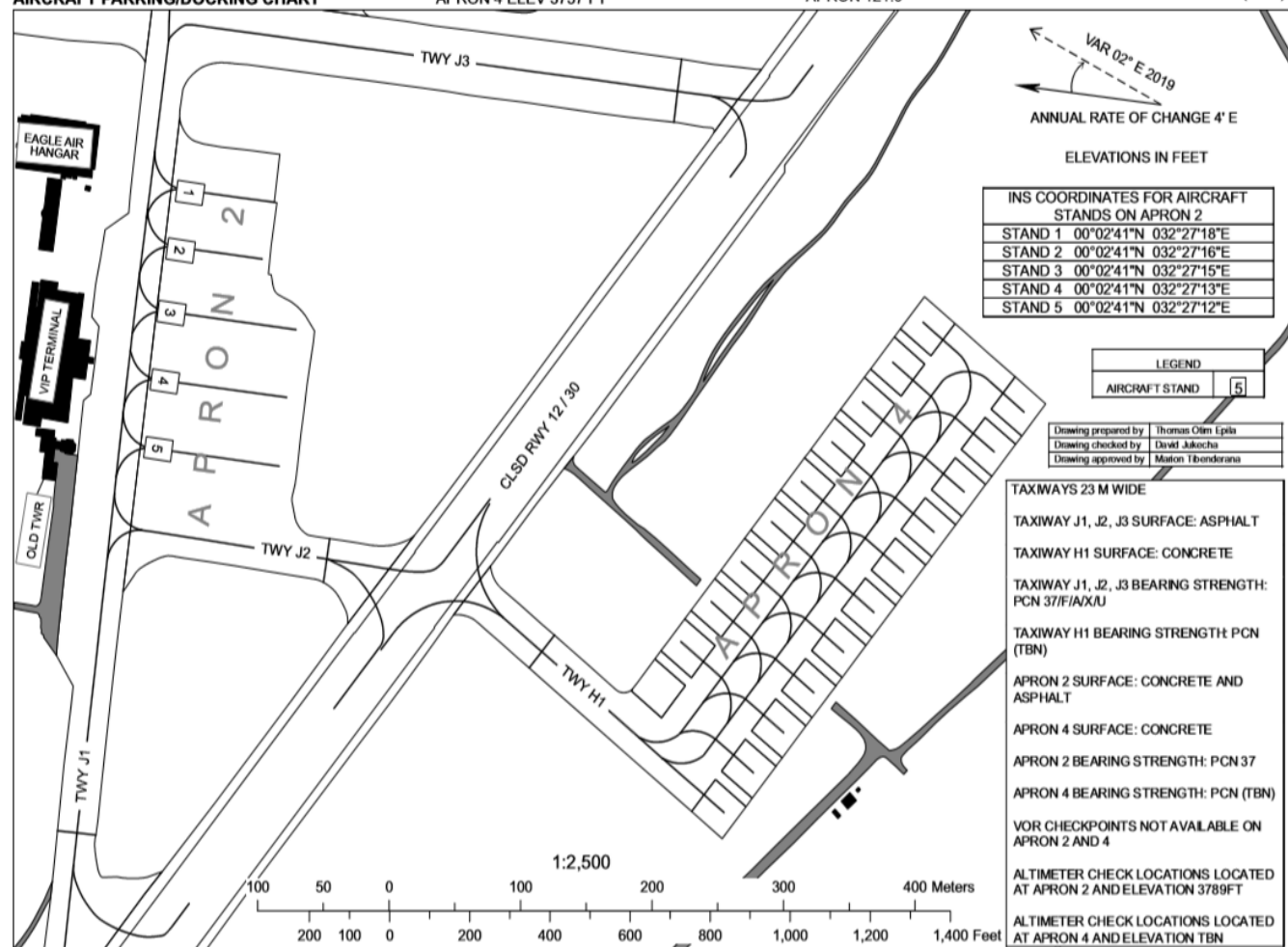
(MAHF) ANTEP

APRON 2 AND 4 AIRCRAFT PARKING/DOCKING CHART

APRON 2 ELEV 3760 FT
APRON 4 ELEV 3757 FT

TWR 118.1
APRON 121.9

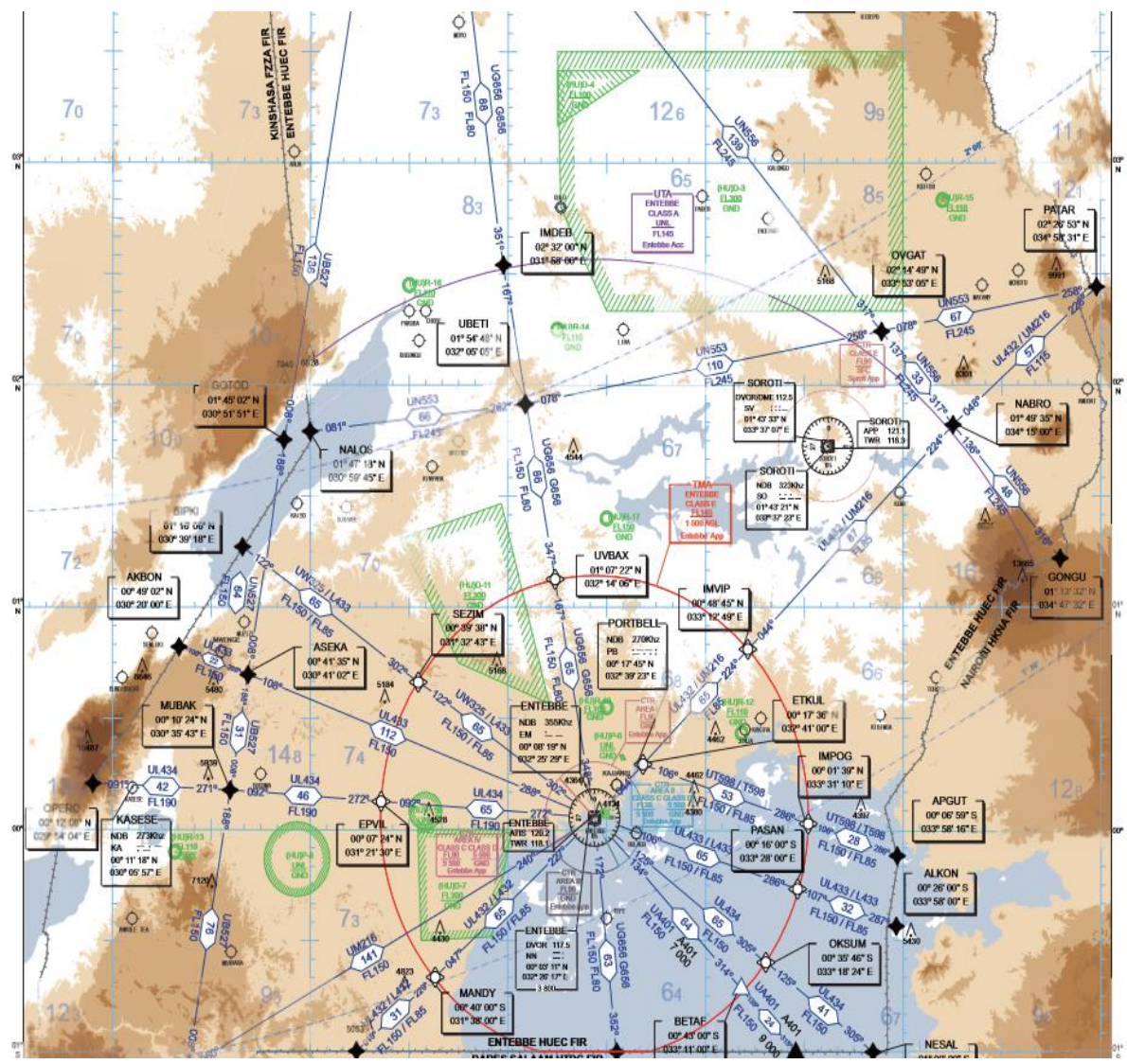
KAMPALA /ENTEBBE (INTL)



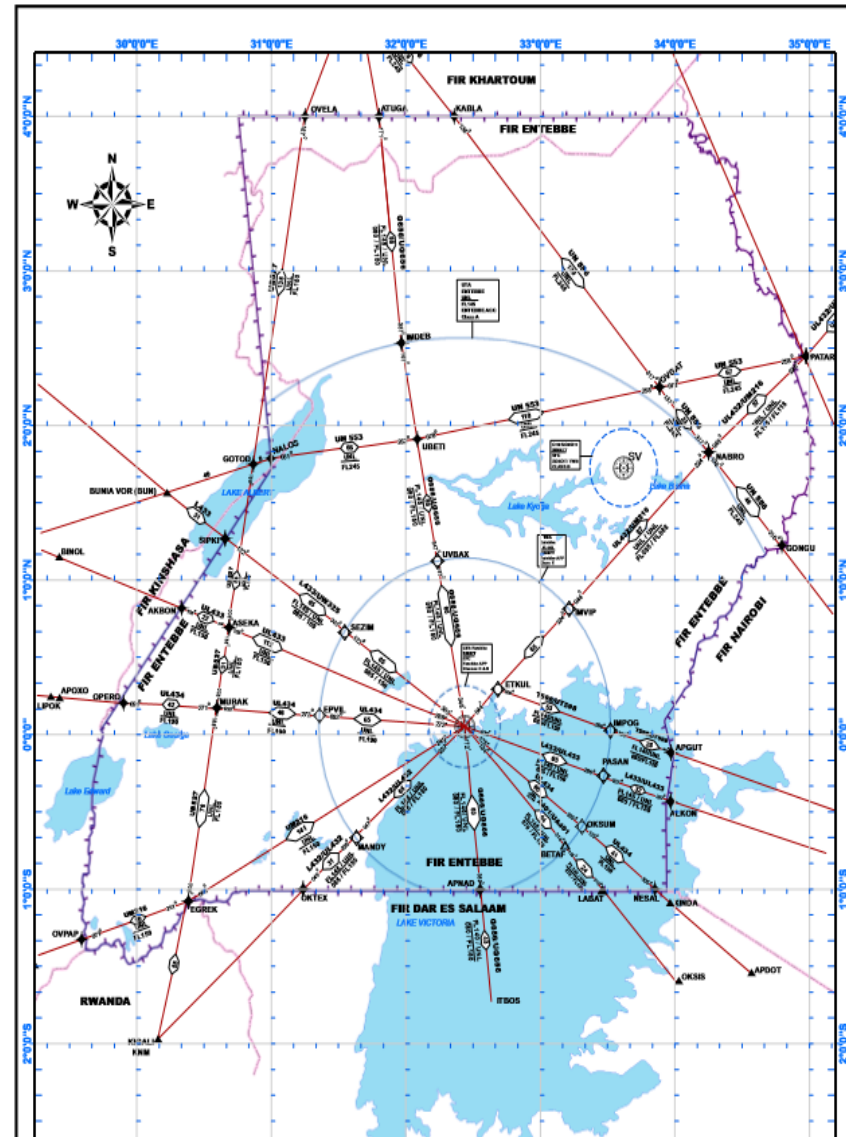
PRODUCTION

This involves the production of Aeronautical charts and maps which facilitate pilots, Air traffic controllers and all other stakeholders with the direction, location and exact position of a point or route.

This brings about the introduction of Cartography which is the study and practice of making maps, which maps depict what is written in so many words in a more defined picture and cartography which is also a branch of surveying solves this mystery.



AIR TRAFFIC SERVICES ROUTE SYSTEM - INDEX CHART



OPERATION OF AIRCRAFT

Operation involves procedures, instructions and guidance for use by ground personnel and pilots operating aircraft. Operation means safe operation of the aircraft, precise and accurate measurements that result in precise location of facilities. Navigation Aids, masts, etc.



Data Acquisition and management

Data Acquisition

- ▶ Surveying is one of the most reliable and most times the only source of data used in aviation for both civil and military operations.
- ▶ Currently there's need to acquire data for terrain and obstacle management as a requirement by the International Civil Aviation Organisation (ICAO) to make the skies safe for flying, which is a very vital aspect in aviation. In this Surveying is the primary means of collecting this data.

Data Management

- ▶ Data acquired from the different surveying disciplines i.e. Cadastral surveys, Engineering Surveys, Aerial surveys, Lidar surveys and topographic surveys is used in a number of softwares to be able to produce Aeronautical charts and maps and these are:
 - ArcGIS
 - AutoCAD
 - Global mapper
 - Bentley Microstation
 - Avitech Automated Aeronautical Information manangement System.

Variations in relation to aviation and surveying.

- ▶ In aviation the horizontal reference system is the World Geodetic System- 1984 (WGS84). Reported aeronautical geographical coordinates (Indicating latitude and longitude) shall be expressed in terms of the WGS-84 geodetic reference datum.
- ▶ In aviation the vertical reference system is measured according to the mean sea level (MSL) datum, which gives the relationship of gravity-related height (elevation) to a surface known as the geoid.

Conclusion

- ▶ Surveying like any other discipline you know about is applicable and important in the operations, design, development, production, data acquisition and survival of the aviation industry because of :
 - The need to know where to go, determine location.
 - Graphical representation of data in form of Aeronautical charts and maps.
 - Precise capture of ground data which can be used as a reference for many operations and help prevent collisions, accidents and incidents.

Conclusion continued.....

The surveying disciplines employed in Aviation are:

- ❖ Land surveying in opening boundaries for airports to confirm ownership and prevent people from encroaching on Airport land.
- ❖ Engineering surveying this is employed during the construction of runways, aprons, taxiways and terminal buildings whose structure is similar to roads and buildings.
- ❖ Aerial Surveying this is employed in a bid to assess and identify the terrain and obstacles that could be harmful to operation of aircraft within the country.
- ❖ Topographic surveying is employed to get a clear picture of the area around any airport to allow proper planning and efficient use of land available.

THANK YOU