Radio Telephony
Restricted radio licence

RTE: W. Botha
071 303 4764

Introduction:

In Aviation good radio procedures are essential. Not only do they help streamline air traffic, they are also essential to the safety of the aircraft and it's passengers. It is an absolute necessity that pilots understand the air traffic system and are able to work smoothly within it.

Radio telephony procedures, the use of radio equipment and the restricted radio licence exam commonly creates fear among many new pilots. This fear can be reduced significantly by good ground preparation and ultimately by being current with radio telephony theory and procedures.

Being proficient in radio telephony is of vital importance as it will ultimately reduce the changes of aviation incidents and accidents occurring.

During this slideshow we will discuss the different types of airspaces, different air traffic services, Routes, radio procedures and emergency Procedures.

Points of discussion:

- Abbreviations
- Aeronautical information
  - CATS/CARS, AIP'S, NOTAM'S, AIC.
- Airspaces
  - Controlled airspaces
    - ATZ, CTR, TMA, CTA.
  - Uncontrolled airspaces
    - ATZ, FAD, FAR, FAP, SRA.
- Air traffic services
  - Objectives
  - Types of services
    - Control Service, Flight information service, Alerting service.
- Flight rules
- Altimeter Setting procedures
- Flight plans
- Terms, Codes and Signals
- Practical Communication
- Radio Failure
- Radio Communications

Before we start with the airspaces, let first look at some abbreviations that will help one during the different radio theory.

Abbreviations (AIP GEN 2.2)

A/C	Aircraft	EAT	Expected approach time
Abm	Abeam	ELEV	Elevation
ADA	Advisory area	ETA	Estimated time of arrival
ADR	Advisory route	FIR	Flight information region
AGL	Above ground level	FIS	Flight information service
ALT	Altitude	FL	Flight level
AMSL	Above mean sea level	FPL	Filed flight plan
ATC	Air traffic control	GND	Ground
ATSU	Air traffic service unit	IFR	Instrument flight rules
ATZ	Air traffic Zone	VFR	Visual flight rules
Avlb	Available	MSL	Mean sea level
COM	Communications	PTT	Press to talk
CTL	Control	RMK	Remark
CTR	Control Zone	RT	Radio Telephony

Aeronautical information:

- **Civil aviation Technical standards and regulations (CAT's/CAR's);**

The CAT's and CAR's are documents that contain aviation legislative matters. They are the aviation air law in South-Africa and override all other aviation publications. The CAT's and CAR's are divided into specific aviation sections, each covering different aviation aspects for example,

Part 12 – Incidents and accidents

Part 61 – Pilot licencing

Part 62 – Recreational flying

Part 67 – Aviation medicals

Part 91 – General flight rules

Part 71 – UAS Personnel licencing

Part 101 – Unmanned aircraft systems

The CAT's and CAR's can be found on the civil aviation authority (CAA) website under Information for the industry > Legal and aviation compliance > Legislation. Link to CAT's/CAR's: https://caa.mylexisnexis.co.za/

- **Aeronautical information Publication (AIP);**

The AIP's are documents that contains navigational matters. These manuals contains basic aeronautical information of a lasting character essential to air navigation. The AIP's are divided into three separate sections namely,

1. General section.
2. En-Route section.
3. Airports Section.

(Scan for AIP's)

The AIP'S can be found on the civil aviation authority (CAA) website under Information for the industry > Aeronautical information > Important links (Aeronautical information publication).

https://www.caa.co.za/industry-information/aeronautical-information-aip/

- **Aeronautical information circular (AIC);**

The aeronautical information circulars contains explanatory or advisory information regarding technical, administrative or legislative matters of civil flying which does not qualify for inclusion into the AIP's. Aeronautical information circulars are numbered in series from A to F. The following information is contained in the different AIC's,

Series A - General information

Series B – Operation of aircraft

Series C – Personnel licensing

Series D – Air navigation services

(Scan for AIC's)

Series E – Aerodromes

Series F – Airworthiness

The AIC'S can be found on the civil aviation authority (CAA) website under Information for the industry > Aeronautical information > Important links (Index of AIC's).

Link to AIC's: https://www.caa.co.za/industry-information/aeronautical-information-index-of-aics/

❑ Notice to airmen (NOTAM'S);

Notam's contains information of a non-permanent nature pertinent to navigation or safety of aircraft as well as information which will at a later stage be included in the AIP's. Notam's are transmitted immediately to air traffic service units.

Notam's fall under the following classes;

(Scan for Notam's)

Class A – Interest to long international flights.

Class B – For regional flights to neighbouring countries.

Class C – Of interest to domestic flights

The NOTAM'S can be found on the civil aviation authority (CAA) website under Information for the industry > Aeronautical information > Important links (NOTAM summaries and PIB). https://www.caa.co.za/industry-information/aeronautical-information-notam-summaries/

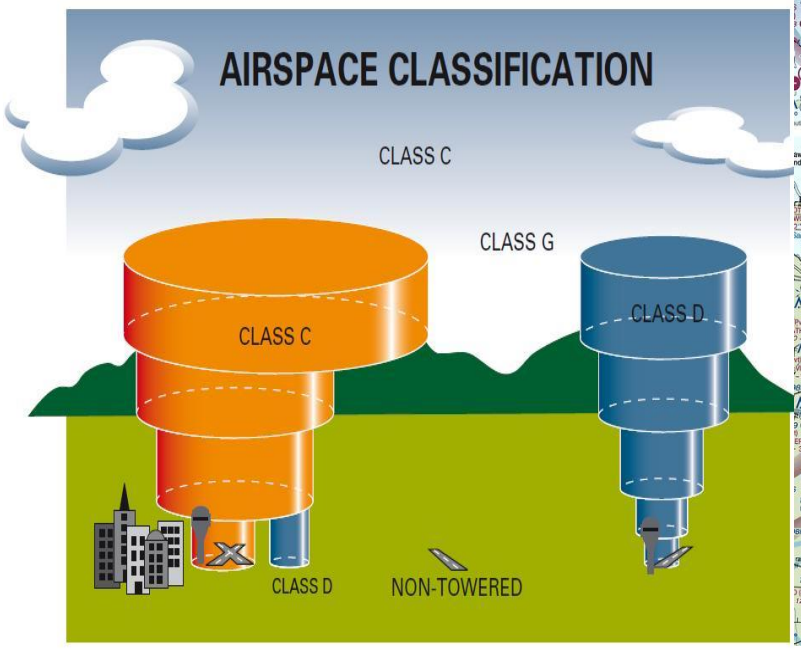
Airspaces:

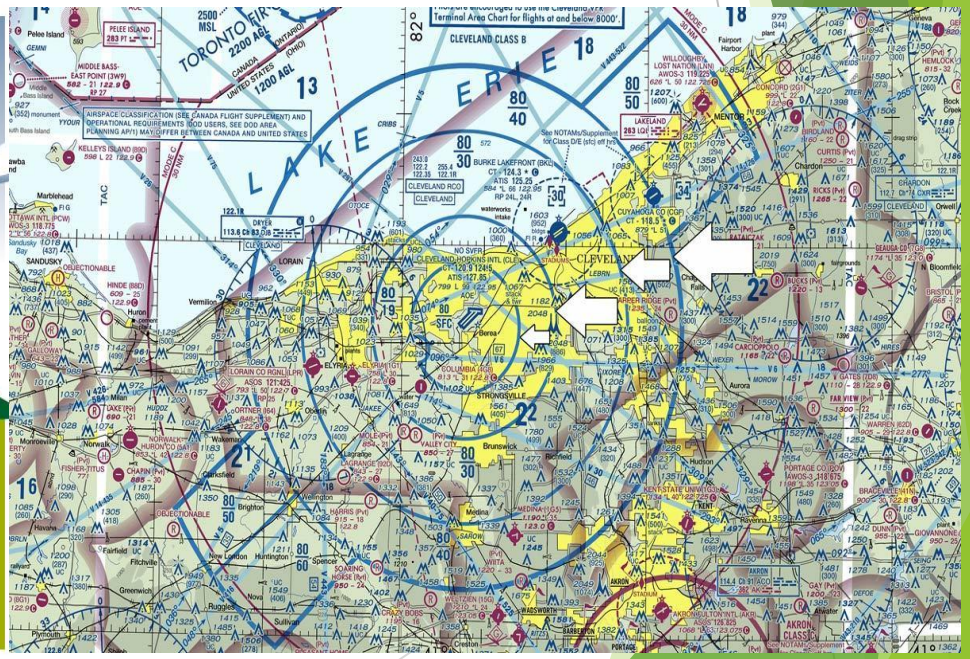
Definition: An airspace is a three dimensional block of air with lower limits, upper limits and lateral limits.

This three dimensional block of air can either be controlled or uncontrolled.

If controlled – It means that there is an Air traffic controller controlling all aircrafts or movements in the block of air.

If uncontrolled – It means that there is no Air traffic controller controlling aircraft or movements in the block of air.





Controlled airspaces:

A controlled airspace is a three dimensional block of air with lower limits, upper limits and lateral limits. This three dimensional block of air is controlled (ATC) thus it means that there is an Air traffic controller controlling all aircrafts or movements in the block of air.

All aircraft flying through controlled airspace must :

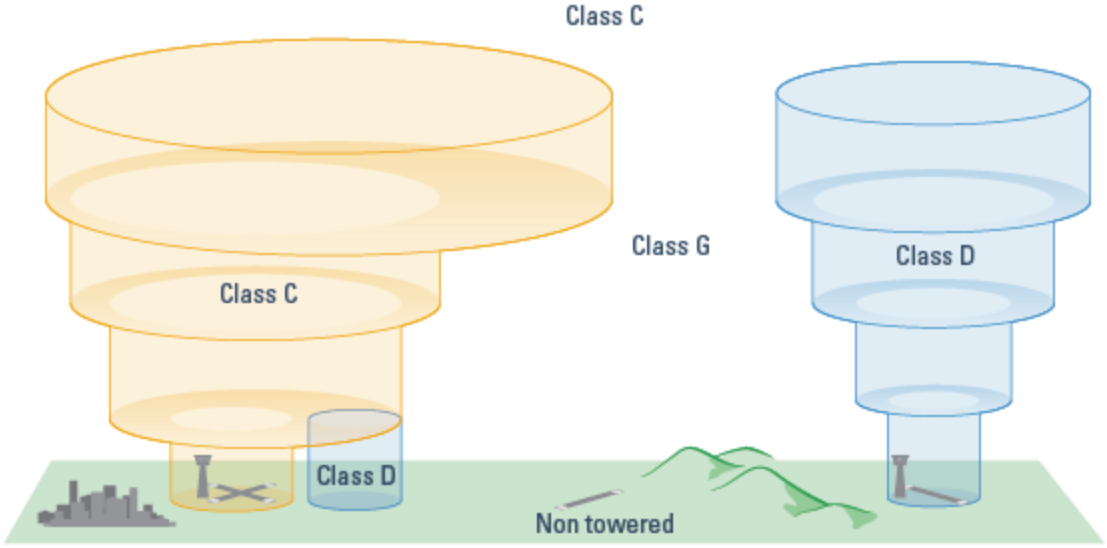
- Be equipped with a radio and talk to the appropriate ATSU or frequency.
- Strictly adhere to air traffic control instructions.
- Navigate accurately
- Supply ATC with accurate position estimates.

A pilot flying from uncontrolled to controlled airspace must contact the ATC at **least 10minutes** before entering the controlled airspace. Under **no circumstances may** any pilot enter controlled airspace without permission.

Uncontrolled airspaces:

A uncontrolled airspace is a three dimensional block of air with lower limits, upper limits and lateral limits. This three dimensional block of air **is uncontrolled (No ATC)** thus it means that **there is no Air** traffic controller controlling aircrafts or movements in the block of air.

Uncontrolled airspaces are those that have not been declared as being controlled airspace, the airspace in between the controlled airspaces. In South-Africa all airspace above FL460 or 46000ft is also uncontrolled airspace.



When flying in uncontrolled airspace (Not in contact with ATSU), pilots are required to broadcast their flight attentions and position on set/specific frequencies in order to ensure that mid-air collusions are avoided and to ensure basic separation between aircrafts flying.

Uncontrolled broadcasts: TIBA (Traffic information broadcast by aircraft)

Pilots should use the TIBA broadcast/transmission system when flying in uncontrolled airspace (Not in contact with ATSU). During TIBA broadcasts/transmissions pilots are required to transmit the following information to other pilots,

- ❑ Present position
- ❑ Aircraft altitude
- ❑ Pilot intentions
- ❑ Any other useful information

When should be use the TIBA system?

Pilots will use TIBA when flying under the following conditions or in these airspaces,

- ➢ Flying in uncontrolled airspace below 1500ft AGL,
- ➢ Flying in flight training areas (FAD's),
- ➢ Flying at uncontrolled airfields,
- ➢ Flying in a special rules area (SRA).

Different Classes of airspaces we use in Aviation (ENR 1.4)

Airspaces (Controlled & Uncontrolled) can be divided into seven different classes (A-G), all with different requirements, sizes, permitted flight rules and separation information. In South-Africa we only use four of the seven different classes, these being;

Class – A, C, D and G.

Class	Permitted Flight rules	Type	Separation information
A	IFR only	Controlled	All flight separated
C	IFR & VFR		IFR flight separated from all traffic, VFR separated from IFR
D	IFR &VFR	Controlled	IFR flights separated from IFR flights IFR receives traffic info about VFR flights VFR receives traffic info about all traffic
G		Information	All traffic receives traffic info

Class A, C and D are controlled airspace:

- Pilots may not enter this airspace without permission from air traffic control.
- Flight are controlled by ATC with regard to altitude and routing.
- Pilots must ask permission from the ATC to change altitude or routing.

Class G is uncontrolled airspace:

- Pilots talk to flight information service
- FIS will give the pilot information, but not positive control.
- Pilots are responsible for their own separation.

Control airspaces (A, C and D) can take Different forms, such as:

- ATZ
- CTR
- TMA
- CTA

ATZ – Aerodrome traffic zone Class C:

An Aerodrome traffic zones is a three dimensional block of air with lower, upper and lateral limits which is usually established at airfields. They extend from ground level to an upper limit of around 1000ft or 1500ft above ground level and have a lateral limit of approximately 15nm.

Aerodrome traffic zones are usually in the shape of a circle and can be identified by dotted lines on a aeronautical chart. These zones are controlled when Class C (ATC controls aircraft in the airspace) and are considered to be the smallest of all of the controlled airspaces when compared to the others.

Examples include: **Rand airport and Grand Central.**

RAND / JHB ATZ

❑ CTR – Control Zone:

A Control zone is a three dimensional block of air with lower, upper and lateral limits which is usually established at airfields for the protection of IFR traffic, and may encompass one or more ATZ'S. They extend from ground level to an upper limit of around 2000ft or 3000ft above ground level and have a lateral limit of approximately 25nm.

Control zones are usually in the shape of **a racecourse pattern** and can be identified **by dashed lines** on a aeronautical chart. These zones are controlled when Class C (ATC controls aircraft in the airspace) and are considered to be a larger controlled airspace than an ATZ. All control zone's in South – Africa are class **C airspace.**

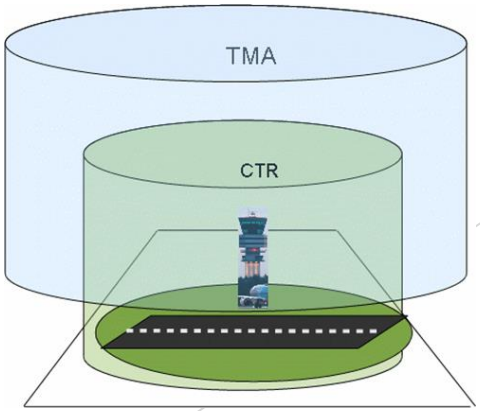
Examples include: **Wonderboom, Lanseria and O.R Tambo.**

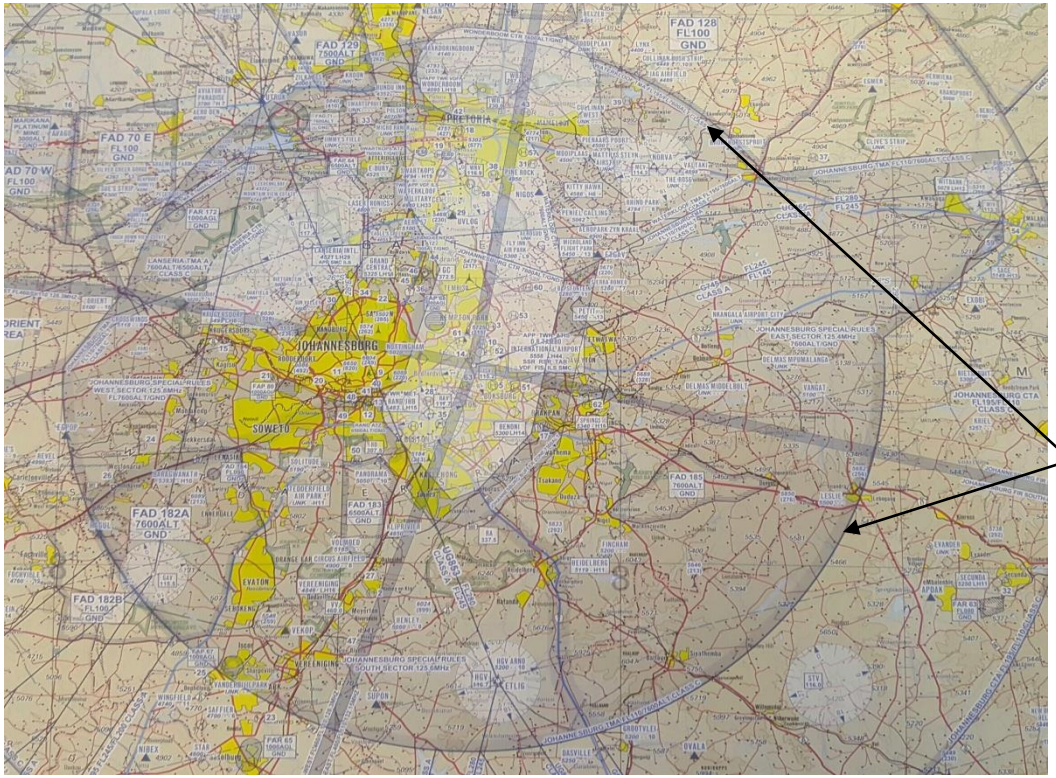
WONDERBOOM/
LANSERIA CTR

❑ TMA – Terminal control Area:

A Terminal control area is a three dimensional block of air with lower, upper and lateral limits which is usually established at busy centres with a lot of IFR traffic. They extend from a lower to an upper limit and are usually positioned above one or more CTR'S or ATZ'S. **All TMA'S in South –Africa are class C airspace**. Terminal control areas are larger controlled airspaces **than an CTR's and ATZ's.**

Examples include: **Johannesburg Terminal control area.**

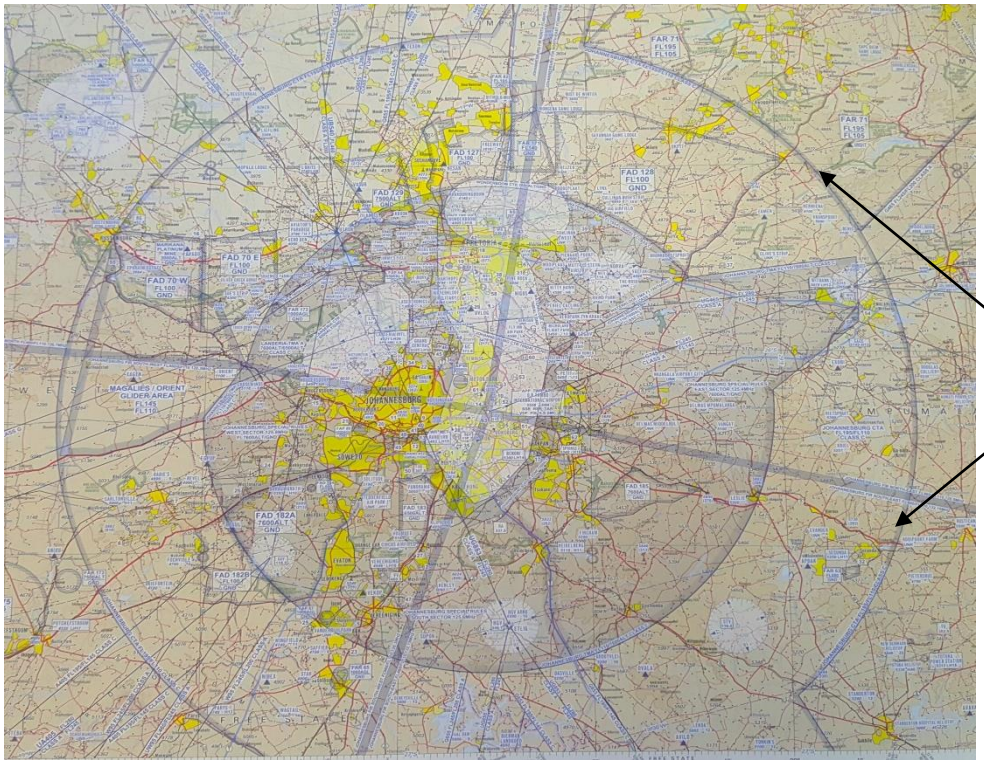




❑ CTA: Control Area

A control area is a three dimensional block of air with lower, upper and lateral limits which is usually established at busy centres with a lot of IFR traffic. They extend from a lower to an upper limit and are usually positioned above one or more CTR'S, ATZ'S OR TMA'S. All CTA'S in South –Africa are class C airspace. Control areas are larger controlled airspaces than an ATZ'S, CTR'S and TMA'S. Control areas extent up to FL195.

Examples include: **Johannesburg control area.**



JOHANNESBURG CTA

Uncontrolled airspace:

All of the uncontrolled airspaces in South-Africa are Class G airspace, in which aircrafts are not subject to air traffic control and are not separated from each other. In class G airspace all aircraft in contact with an ATSU will only receive traffic information, if requested and far as it is known.

Uncontrolled airspaces can take the form of:

- ATZ – Class G
- Danger Area (FAD)
- Restricted Areas (FAR)
- Prohibited Areas (FAP)
- Special rules area (SRA)

- **ATZ : Aerodrome traffic Zone class G – Port Alfred aerodrome**

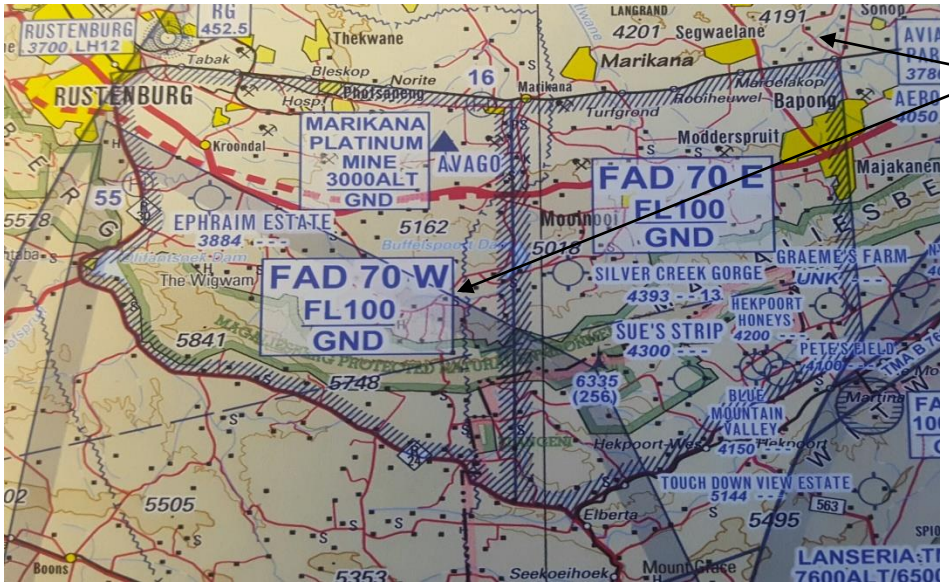
An ATZ Class G is a three dimensional block of air with lower, upper and lateral limits which is usually established airfields comprising the circuit area. They extend from a lower to an upper limit and also have lateral limits.

In an ATZ class G an air traffic service unit only supplies aerodrome flight information service (AFIS), it passes on information about the aerodrome and not the aircrafts. The phraseology used by the AFIS differs slightly from those used in ATZ's Class C.

❑ Danger Areas:

A Danger area is a uncontrolled three dimensional block of air with lower, upper and lateral limits where dangers to aircraft exists. They can be military or civilian flight training areas or explosive factories. Danger areas are class G airspace.

Aircraft flying in danger areas are not subjected to air traffic control and pilots are required to use TIBA (Traffic information broadcast aircraft) when flying in these areas. Danger areas may be entered without permission but pilots are advised to be careful and keep a good look-out.



MAGALIES FLIGHT TRAINING AREA
FAD 70 E

Danger areas Information obtained;

Aeronautical information publications (AIP)

ENR 5.1 (Navigational warnings).

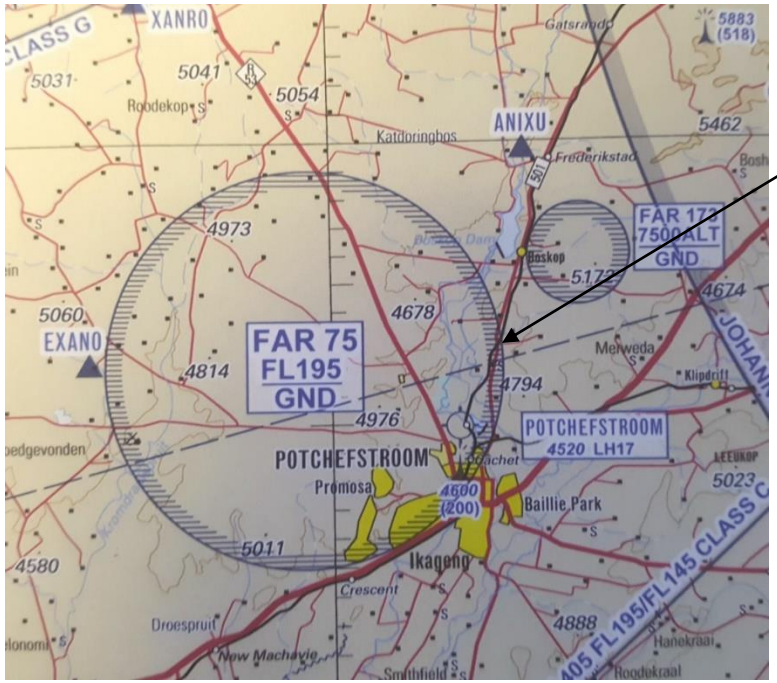
Frequency to be used during TIBA – 124.4 unless specified.

Identification of Danger areas: Danger areas are named **FAD** followed by a two or three digit number.

Example FAD70

❑ Restricted Areas:

A restricted area is a uncontrolled three dimensional block of air with lower, upper and lateral limits where aircrafts cannot enter without permission from the applicable authorities. Restricted areas are usually military areas or explosive factories. Restricted areas are class G airspace.



POTCHEFSTROOM MILITARY
SHOOTING RANGE
FAR 75

Restricted areas Information obtained;

Aeronautical information publications (AIP)

ENR 5.1 (Navigational warnings).

Identification of Restricted areas: Restricted areas are named **FAR** followed by a two or three digit number.

Example FAR75/ FAR173

❑ Prohibited Areas:

A Prohibited area is a uncontrolled three dimensional block of air with lower, upper and lateral limits where aircrafts cannot enter under no circumstances. Prohibited areas could be sensitive nature reserves, National monuments, explosive factories or Nuclear powerplants. Prohibited areas are class G airspace.

PELINDABA NUCLEAR POWER PLANT
FAP64

Prohibited areas Information obtained;

Aeronautical information publications (AIP)

ENR 5.1 (Navigational warnings).

Identification of Prohibited areas: Prohibited areas are named **FAP** followed by a two or three digit number.

Example FAP60/ FAP64

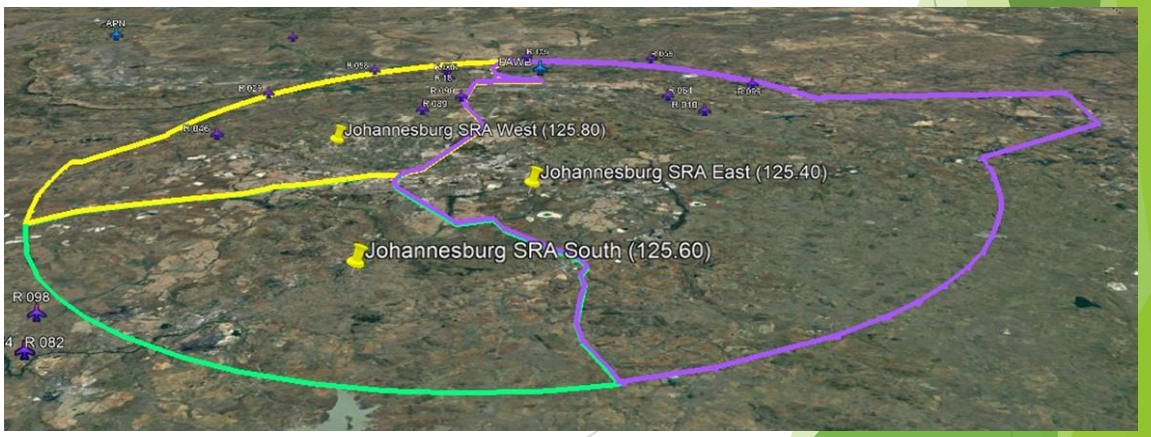
❑ SRA – Special Rules area: ENR 2.2

Special rules for pilots flying under VFR may be published when flying in specific areas. The special rules may include special routes to follow, altitudes to fly and specific frequencies to use. Special rules areas are usually published when flying at large airports such as O.R Tambo and Cape Town international. The area below a TMA is usually declared as being a special rules area for example, the area below the Johannesburg TMA is revered to as the Johannesburg Special rules area.

The Johannesburg special rules area:

The uncontrolled airspace below the boundaries of the Johannesburg and Waterkloof TMA'S, excluding the general flying areas has been declared the "Johannesburg Special Rules area". The Johannesburg special rules area is divided into three sectors these being the Eastern, Southern and Western Sectors. In this Special rules area pilots must broadcast their position on,

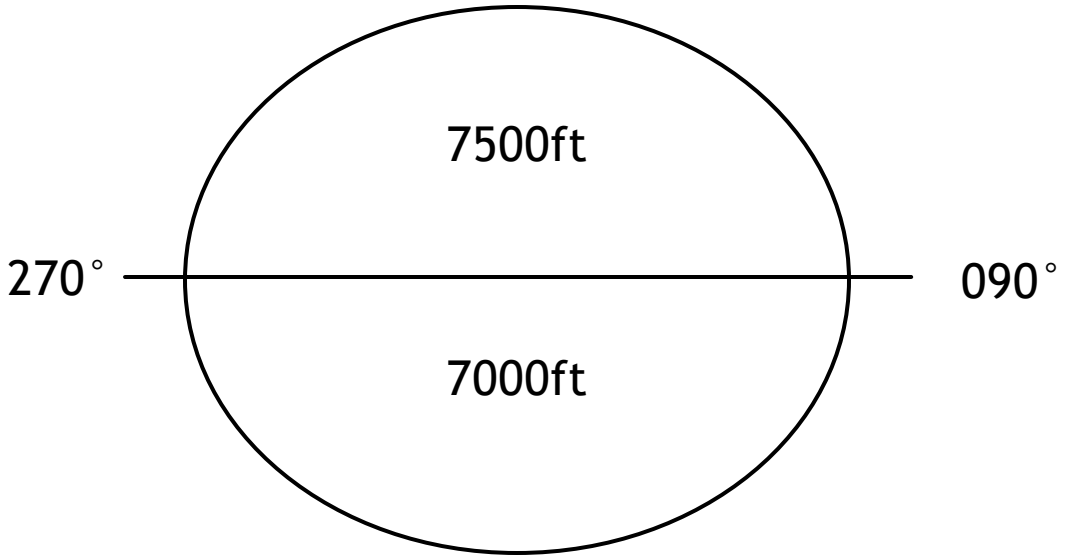
- 125.4 for the Eastern Sector
- 125.6 for the Southern Sector
- 125.8 for the Western Sector



Altitudes to fly in the Johannesburg Special rules area:

When a Pilot decides to fly below the Johannesburg TMA (Special rules Area) he needs to adhere to certain rules. The most important rule is the altitude rule. The Altitude rule needs to be strictly followed to maintain safe aircraft clearance.

The Altitude Rule in the Special rules Area:



- An aircraft flying a Magnetic track between 271° and 089° (Flying in a Northerly direction) shall fly 7500ft.
- An aircraft flying a Magnetic track between 090° and 270° (Flying in a Southerly direction) shall fly 7000ft.

If an aircraft flies in the Johannesburg special rules area and is unable to comply with the altitude rule, then he should stay at 6500ft and below.

General rules in the Johannesburg special rules area:

- ❑ Aircraft should maintain a Maximum speed of 180knots or less.
- ❑ Operate with their landing lights on.
- ❑ Broadcast their intentions on the applicable frequency.

Appendix II – TIBA frequencies and aircraft Nationalities;

When flying in uncontrolled airspace and when not in contact with an air traffic service unit (ATSU) pilots are required to broadcast their **flight intentions (TIBA) on the applicable frequency**. The frequency that needs to be used will ultimately depend on the uncontrolled airspace the pilot is flying through. The following frequencies should be used when flying through these airspaces,

- ❖ **Uncontrolled/Unmanned airfields:**

Pilots should TIBA on the applicable frequency of the unmanned airfield as specified in the AIP'S (ENR 2.2.4).
When the airfield is in uncontrolled airspace and does not have a specific allocated frequency then the pilots should TIBA on **124.8.**

❖ **Flight training areas (FAD's) frequencies to use:**

Pilots should TIBA on the applicable frequency of the danger area. This information can be found in the AIP'S (ENR 5.1 and 2.2.4.) If no designated frequency is given for the **FAD** then pilots should TIBA **on 124.4.**

❖ **Low level flying:**

When a pilot decides to **fly below 1500ft in uncontrolled airspace (Outside SRA),** the pilot needs to TIBA his/her intentions **on 124.8** (Low level frequency).

❖ **General chat frequency:**

Pilots are urged to keep radio communication to a minimum during flight in order to avoid flooding frequencies. When discussing non-aviation related information or information that does not concern a particular flight, pilots are urged to use the general chat frequency of **123.45.**

Air traffic Services: (ENR 1.6/2.1)

Air traffic service at most civilian aerodromes in South-Africa is provided by the air traffic and navigation services company.

Objectives:

The objectives of air traffic services are:

- To prevent collisions between aircrafts
- To expedite and maintain an orderly flow of air traffic
- To provide advice and information to aircrafts

❑ Control Service:

A Control service is provided to IFR traffic in class A and class C airspace and to VFR flights in class C airspace. Control services are further given to all special VFR flights. Control services are provided in all controlled airspaces and they issue clearances and instructions to pilots/aircrafts. These clearances and instructions should be adhere to at all times in order to prevent incidents and accidents. Control services can be divided into,

- Area control service
- Approach control service
- Aerodrome control service

Area Control Service:

Area control service controls VFR and IFR flights in CTA'S, UTA'S, and airways. It will issue instructions like flight levels, headings, altitudes and routes to fly. It will also pass on any other useful information.

Approach control service:

Approach control service controls all flights in a TMA. Clearances and instructions include flight levels or altitudes.

Aerodrome control Service:

Aerodrome control service controls all traffic in CTR'S, ATZ'S in visual met conditions. Example, aircrafts on the taxiways, and runways.

- **Flight information service:**

Information service provides pilots with useful information, It does not issue clearances or instructions and does not provide traffic or terrain clearance, they may warn pilots about conflicting traffic. Information service is provided in all airspaces, controlled and uncontrolled, as long as two way radio contact can be maintained.

The radio call-sign flight information service is the name of the flight information centre providing the service followed by the word “Information” for example Johannesburg information.

Aerodrome flight information service (AFIS):

Aerodrome flight information service is given to all aircraft operating within an aerodrome traffic zone. Aerodrome flight information service only issue information not clearance or instructions. The phraseology used will include information such as the runway is clear. Aerodrome flight information service may declare a aerodrome IMC, which means it is closed for VFR traffic. AFIS will pass on to pilots any necessary information about the airfield, the weather and other traffic. The call sign of an AFIS is the name of the airfield plus the word “radio” for example Port Alfred radio.

- **Alerting Service:**

Alerting service is provided in all airspaces by all air traffic service units to all aircraft in need of search and rescue.

For all other flights search and rescue will only be instituted for overdue aircrafts which have requested SAR **under ITEM 18 of the flight plan.** Search and rescue are divided into 3 different phases and are declared by the station co-ordinating the search.

Search and rescue phases:

- Uncertainty phase
- Alert phase
- Distress phase

Uncertainty phase:

The uncertainty phase will be declared if uncertainty exists as to the safety of an aircraft and its occupants namely:

- Not in contact 30 minutes after the ETA at the next reporting point
- When the aircraft operating on overdue at destination only is not in contact with an ATSU within one hour after the ETA.
- When the aircraft has not contacted an ATSU by the pre-arranged time.

Alert phase:

The alert phase will be declared if apprehension exists to the safety of an aircraft and it's occupants namely:

- Following the Uncertainly phase
- When information is received which indicates that the aircraft is experiencing difficulties
- When an aircraft is not operating under normal circumstances or is lost.

Distress phase:

The Distress phase will be declared when there is reasonable certainty that an aircraft and it's occupants are threatened by grave and imminent danger or require immediate assistance namely:

- Following the Alert phase.
- When information is received that the aircraft has made a forced landing or crashed.
- When the fuel as stated in the flight plan is exhausted.
- When an aircraft after take-off fails to report within 5 minutes after being expected to do so.

Flight rules:

An pilot can elect to fly under either one of the following two sets of flight rules:

1. VFR – Visual flight rules
2. IFR – Instrument flight rules

VFR and IFR flight have their own rules. IFR flight have to adhere to more strict rules than VFR flights.

VFR – Is only legal in Visual Meteorological conditions

IFR – Is legal in Visual and instrument Meteorological conditions

Visual flight rule requirements:

- The pilot can maintain visual contact with the ground
- The aircraft is not above cloud covering more than 3/8 of the ground
- The pilot adhere to the Cloud ceiling, Visibility requirements.

Special VFR:

Air traffic control may grant special VFR to an aeroplane to fly in a CTR that has been declared IMC provided that:

- It is during day
- The ceiling is at least 600ft
- The ground visibility is at least 1500m
- The aircraft stays clear of clouds
- The aircraft has two-way contact with ATC.

Pilots must note that, when granted special VFR the air traffic controller will apply the separation standards associated with IFR flights. When special VFR is granted, it is the pilot's responsibility to stay clear of cloud and within sight of the ground. If it is not possible the controller must be notified immediately, and the flight terminated. Normal minimum heights must still be observed.

Special VFR can only be granted in a CTR and not in an ATZ.

The Semi-Circular Rule: (AIP's ENR: 1.7.7)

Introduction:

The semi-circular rule is the basic rule for flight level or altitude selection which depends on the aircrafts **magnetic track** in order to ensure basic vertical separation.

Odds and Even flight levels:

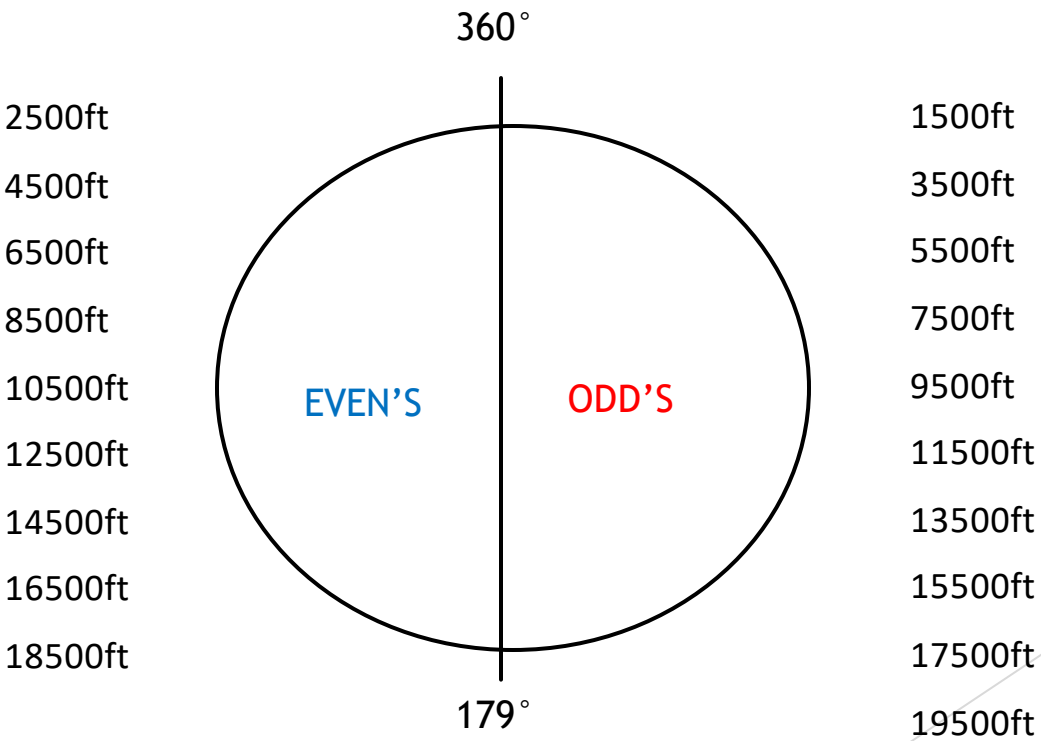
For answering to the need of flight level/Altitudes separation between the same types of flight, flight levels/Altitudes have been separated in two categories: The even and the odd flight level/Altitudes:

Even Levels/Altitudes: This refers to even flight levels or altitudes. Eg. Flight levels - FL045, FL065, FL085.

Altitudes – 4500ft, 6500ft, 8500ft.

Odd Levels/Altitudes: This refers to odd flight levels or altitudes. Eg. Flight Levels – FL035, FL055, FL075.

Altitudes – 3500ft, 5500ft, 7500ft.



How does this apply to VFR flying?

The semi-circular rule is based on the aircrafts magnetic track. For a VFR flight our magnetic track will decide whether we fly odd FL/ALT or even FL/ALT.

The following rules apply:

- If our aircraft flies a magnetic track between 000° and 179° (Flying in easterly direction) then we have to fly **ODD'S.**
- If our aircraft flies a magnetic track between 180° and 359° (Flying in a Westerly direction) then we have to fly **EVEN'S.**

By following the semi-circular rule, a VFR aircraft will limit possible conflicts between another aircraft coming in opposite direction with providing 1000ft separation between opposite west/east tracks.

NB. The Semi-Circular is only applicable to aircrafts flying at or above 1500ft AGL in uncontrolled airspace.

List of available FL/Altitudes for a VFR flight:

ODD'S (000° - 179°)	EVEN's (180° - 359°)
1500ft	2500ft
3500ft	4500ft
5500ft	6500ft
7500ft	8500ft
9500ft	10500ft

Flight plans:

What is a flight plan:

A flight plan is a coded description of the details of a particular flight, which is provided to air traffic services before the flight is commenced. It aids in traffic planning and provides information in case search and rescue becomes necessary.

When is a flight plan mandatory:

A flight plan **may** be filed for any flight; it **must** be filed for the following flights:

- All flights conducted wholly or partly in controlled airspace.
- All international flights.
- All flights for which Search and rescue is required.
- Commercial Transport

When is a flight plan not mandatory:

A flight plan is not mandatory when:

- On a local flight
- A flight crossing an airway or advisory route at right angles
- Flying from a controlled to an uncontrolled airfield and Vice Versa

How do one file a flight plan:

Before departure:

A flight plan can be filed up to 5days before the flight but must be filed at least 30min before the departure time.

A flight plan can be filed in any of the following ways:

- By **telephone** to briefing offices or ATC.
- By **hand personally** to briefing office or ATC.
- By **fax** to briefing offices but **MUST be confirmed by telephone in order to get a reference number.**
- By **radio** if there are no telephones at point of departure.
- By **File2Fly**

When filing a flight plan in person or via telephone, the pilot should have the information ready in the correct order and format. It is probably best to fill in a flight plan form and then read the information from that form. After filing the flight plan the pilot should obtain a flight plan reference number for this flight plan. It sometimes happens that flight plans gets lost in the system and this helps finding them.

Filing a flight plan during flight:

Filing a flight plan in flight is only permissible in exceptional circumstances. Possibly where there were no communication facilities at the departure aerodrome, or the pilot's plans change during the flight due to weather or other unforeseen circumstances.

If a flight plan is filled during flight, it needs to be filled at least 10minutes before entering the applicable airspace. The following information must be supplied to the ATSU:

- Aircraft registration
- Flight rules
- Type of flight
- Aerodrome of departure
- Cruising speed and flight level
- Route to follow
- Destination aerodrome
- Persons on board
- Fuel endurance

Activation of the flight plan:

If a flight plan has not been activated within 1 Hour of the stipulated departure time, the flight plan will automatically be cancelled. If a flight is delayed for more than one hour, the pilot must either amend the old flight plan before the hour is up or file a new one.

NB Please note that just filing a flight plan and even activating it does not automatically incorporate a clearance to fly into controlled airspace later during the flight.

Notification of changes:

In the event of a controlled flight inadvertently deviating from its current air traffic service plan the following actions shall be taken:

- Ac off track – Actions shall be taken to adjust the heading of the Ac to regain the original track ASAP.
- Ac deviates from its flight level/alt – Actions shall be taken to correct it ASAP.
- If the average TAS varies by more than five present of the TAS indicated on the flight plan, the ATSU shall be notified.
- If the ETA at the next reporting point varies by more than two minutes, the ATSU will be notified.

Closing of a flight plan:

A flight plan will be automatically closed when landing at a controlled airfield.

When search and rescue was requested and the destination is an uncontrolled airfield, the pilot must specifically close the flight plan with ATC before or after landing. This may be done over radio by transmitting something like " Field in sight landing in 5 minutes" to ATC. You may also close the flight plan by telephone after landing.

NB failure to close a flight plan in which alerting action was requested could result in an unnecessary and costly search, for which the pilot may be held financially responsible.

The Actual flight plan:

The flight plan form is divided into shaded and white areas. The shaded areas are for ATC use, and only the white areas must be completed by the pilot.

Below is an simple example of a flight plan:

Form Approved OMB No. 2120-0026
09/30/2006

U S Department of Transportation
Federal Aviation Administration

International Flight Plan

PRIORITY
<=FF

ADDRESSEE(S)

<=

FILING TIME

ORIGINATOR

<=

SPECIFIC IDENTIFICATION OF ADDRESSEE(S) AND / OR ORIGINATOR

3 MESSAGE TYPE
<=(FPL

7 AIRCRAFT IDENTIFICATION

8 FLIGHT RULES

TYPE OF FLIGHT

<=

9 NUMBER

TYPE OF AIRCRAFT

WAKE TURBULENCE CAT.
/

10 EQUIPMENT
/

<=

13 DEPARTURE AERODROME

TIME

<=

15 CRUISING SPEED

LEVEL

ROUTE

<=

16 DESTINATION AERODROME

TOTAL EET
HR MIN

ALTN AERODROME

2ND ALTN AERODROME

<=

18 OTHER INFORMATION

<=

SUPPLEMENTARY INFORMATION (NOT TO BE TRANSMITTED IN FPL MESSAGES)

19
ENDURANCE
HR MIN
E/

PERSONS ON BOARD
P/

EMERGENCY RADIO
UHF VHF ELBA
R/

SURVIVAL EQUIPMENT
POLAR DESERT MARITIME JUNGLE
/

JACKETS
LIGHT FLUORES UHF VHF
/

DINGHIES
NUMBER CAPACITY COVER COLOR
D /

<=

AIRCRAFT COLOR AND MARKINGS
A/

REMARKS
N /

<=

PILOT-IN-COMMAND
C/

)<=

FILED BY | ACCEPTED BY | ADDITIONAL INFORMATION

FAA Form 7233-4 (7-93)

Completing the flight plan:

Item 7 – Aircraft identification

Insert the aircraft radio call sign to be used in flight as up to 7 Alphanumeric characters without hyphens or symbols:

Example: ZSABC (Zulu Sierra Alpha Bravo Charlie)

ZZZZ – For irregular call signs on internal flights only. Specify the name in item 18 under remarks.

Item 8 – Flight rules and type of flight

ITEM 8 – Flight rules

V – VFR

I – IFR

Y – IFR then VFR

Z – VFR then IFR

NB: The point where flight rules are changed should be indicated in item 15

Type of flight:

G – General

S – Scheduled

N – Non-Scheduled

M – Military

P – SAAF VIP flight

X – Any other flights other than the above (RPAS Flight)

Note: Drone/ RPAS flight insert "X" and then under field 18 specify STS/ ATFMX

STS – Reason for special handling by ATS

ATFMX – Flights with approved ATC exemptions including a RPAS flight

Item 9 – Number , Type , and Wake turbulence category:

Number – Leave blank if the flight plan is for one aircraft only and insert the number if it's more than one aircraft.

Type of aircraft - ZZZZ – If no designator has been assigned or if there is more than one type in the formation. Specify the types in Item 18 under type.

Drones/ RPAS flights to specify in field 18. TYP/Multi-Rotor RPAS or Fixed Wing RPAS.

Wake turbulence Category:

Light if below 7000 kg; Medium if above 7000kg but below 136000kg; Heavy if above 136000kg

Item 10A – Communication and Navigation equipment:

Insert up to 64 alphanumeric characters to indicate the communication and navigation capabilities of the flight.

Navigation equipment:

- D – DME
- F – ADF
- L – ILS
- O – VOR
- R – RNAV
- S – STANDARD EQUIPMENT
- Z – OTHER (GPS)
- V - VHF

Secondary Surveillance equipment:

- N – No SSR
- A – Mode A
- C - Mode C and A

Drone/RPAS flights to include in item 10 “ZV/N” if equipped with GPS, VHF Radio and no transponder.

Insert in item 18. NAV/GPS when specifying “Z” in item 10.

Item 13 – Departure aerodrome and time:

Departure aerodrome – Insert the ICAO four letter indicator.

ZZZZ – No ICAO indicator has been allocated (Specify in ITEM 18 the name of the departure aerodrome)

Note: Drones/RPAS flights to specify "ZZZZ" in field 13 and in item 18 specify DEP/Co-Ordinates

Time of departure – Time in UTC (Subtract 2 hours for South- Africa)

ITEM 15 – Cruising speed, level and route:

Cruising speed – TAS

N – Knots (N0100)

M – Mach number

Level – Flight level or altitude

F – Flight level (EX. FL 080)

A – Altitude (EX. 7500FT)

Drones/RPAS can specify height above ground when flying under VFR:

Example: LEVEL: VFR
Item 18: VFR/100ft AGL

Route – Route also includes changes in speed, levels and flight rules.

Designated ATS routes (Airways, Advisory or Information routes)

Significant points/ Radio beacons (NDB, VOR)

Compulsory reporting points (Solid triangles)/ Geographical co-ordinates

ITEM 16 – Destination, Total EET, and alternate aerodrome:

Destination – Insert the ICAO designator

ZZZZ – No ICAO designator, name of aerodrome must be specified in ITEM 18.

Total EET – Total estimated elapse time

Note: Drones/RPAS flights to specify “ZZZZ” in field 16 and in item 18 specify DEST/Co-Ordinates

Alternate aerodrome – Insert the ICAO designator

ZZZZ –No ICAO designator, specify the name of the alternate aerodrome in ITEM 18.

ITEM 18 – Other information:

Other information can include:

EET – Elapse time to FIR boundaries

REG – Other Ac registration

OPR – Operator name

TYPE – Details of ZZZZ specified in ITEM 9

COM – Info relating to com equipment

NAV – Info relating to Nav equipment

DEP – Name of departure aerodrome when ZZZZ is specified

DEST – Name of destination aerodrome when ZZZZ is specified

ALTN – Name of alternate aerodrome when ZZZZ is specified

SAR – Type of search and rescue required

ITEM 19 – Supplementary information:

Endurance – Ac endurance, Insert the total fuel endurance in hours and minutes as a four-figure group.

Persons on board – Number on board, Insert the total number of people on board, passengers and crew.

TBN – To be notified if unknown.

Ac color and markings – Complete Ac color and markings

Remarks – FAK/S (First aid kit and markings)

Name of PIC – Complete the name of the PIC

Flexible use of Airspace (FUA):

ATNS's Central Airspace Management Unit (CAMU) manages the functions of the slot allocation programme alongside managing the **flexible use of airspace (FUA**), facilitating military exercises and operations, special and unusual events and any other activity which might require the use of airspace for a particular time period.

The Unit is also responsible for the re-routing of traffic affected by adverse weather and temporary restricted or special use airspace in consultation with the aviation community in a collaborative decision making (CDM) process. In addition, CAMU balances demand against capacity using the ATFM system after CDM with the appropriate aviation community members.

Applying for Flexible use of airspace (FUA):

Steps to follow:

Step 1:

Download google earth on your device and then install the “RSA DATA File” on google earth. The RSA DATA file can be found on the ATNS Website or scan the above QR Code (https://atns.com/products-services/aim/aeronautical-information-managementrsa-airspaces-in-3d/7423/). The RSA DATA KMZ file is an initiative undertaken by ATNS to illustrate the definitions and complexities of airspace, routes, aerodromes and navigational facilities within South Africa to the public in the interest of safety. It allows the user to visualise airspaces in 3D.

Step 2:

Open google earth on your device and locate your area of operation. Once you have located the area of operation draw a square around the area of operation.

Step 3:

Write down the co-ordinates of each corner of the “Box” drawn around the area of operation.

Example:

Point A: 26 17’ 34’’ S 28 37’ 47’’ E

Point B: 26 16’ 46’’ S 28 38’ 47’’ E

Point C: 26 17’ 10’’ S 28 38’ 56’’ E

Point D: 26 17’ 27’’ S 28 38’ 50’’ E

Step 4:

Log on to the ATNS website (https://atns.com/air-traffic-flow-management/fua-application/8232/.) or scan the QR code and complete the Flexible use of airspace application form.

Step 5:

Submit the FUA Application form. You should get an email confirming submission.

(FUA Application form processing time can be between 12 – 72 hours)

FILING OF FLIGHT PLANS FOR REMOTELY PILOTED AIRCRAFT SYSTEMS (RPAS)

INTRODUCTION

The purpose of this Aeronautical Information Circular (AIC) is to inform users and the industry of the recommendations that have been formulated by the South African Civil Aviation Authority (SACAA) in conjunction with the Air Traffic and Navigation Services Company (ATNS) in the absence of any Standard Recommendations or Procedures/ Practices (SARPS), offered by the International Civil Aviation Organisation (ICAO).

It is important to note that all RPAS Operators wishing to conduct flights inside controlled airspace must follow these procedures:

1. *Complete a Flexible Use of Airspace (FUA) application form with the ATNS Central Airspace Management Unit (CAMU). This link can be found on the ATNS website. www.atns.co.za select "Flexible Use of Airspace" icon.*

2. *Must file a Flight Plan (FPL) with The Aeronautical Information Management Unit (AIMU) on the Internet Briefing Service – (File2Fly – https://file2fly.atns.co.za/aes/login.jsp). The Flight Plan must state the CAMU reference number in Field 18. The FPL may be filed up to 5 x days before the proposed flight. This link can also be accessed via the ATNS website.*

3. *The RPAS Pilot must discuss the intended operation (as per FPL filed) with the relevant Air Traffic Services Unit (ATSU) prior to flight. This can be done by contacting via telephone, the relevant Pool Manager, Officer in Charge, Tower Controller or Ground Controller of the relevant ATSU.*

4. *All RPAS Operators wishing to fly outside the ambits of Part 101 of the Civil Aviation Regulations, 2011 (e.g. requesting to fly higher than the permitted 400ft AGL in uncontrolled airspace), must complete an FUA application form with the CAMU and await authorization to do so. This authorization takes approximately 48 hours. This will be granted on submission of a valid ROC and Operations Specification (OPS SPEC), displaying approval for the requested operations.*

5. *All other RPAS flights operating within the ambits of Part 101, must contact either the AIMU or the CAMU – except for local RPAS flights.*

With the advent of the continued development and expansion of RPAS, combined with a growing number of RPAS Operators conducting RPAS flights inside controlled airspace, and in order to standardize the filing of RPAS Flight Plans, please be advised of the following when filing an RPAS Flight Plan:

The ICAO Flight Planning formatting process will be complied with thus ensuring seamless processing and management of the FPL information. The following guidelines should be used for the filing of RPAS Flight Plans:

A) **FIELD 7 (AIRCRAFT IDENTIFICATION)** – insert the RPAS's registration, e.g. ZTABC;

B) **FIELD 8 (FLIGHT RULES)** – Insert 'V' for all RPAS flights which will be flown at a VFR height AGL, OR

C) **FIELD 8 (FLIGHT RULES)** – Insert 'I' for all flights which will be flying Beyond Visual Line of Sight (BVLOS) or those RPAS flights which will be climbing through a Transition Altitude and thus flying at a Flight Level. All these flights (BVLOS) will be considered to be flying under IFR and will therefore select IFR Flight Levels according to the Semi-circular Rule;

D) **TYPE OF FLIGHT** – Insert 'X'. Follow this by inserting in Field 18 – STS/ATFMX (this will indicate it is an RPAS flight);

E) **FIELD 9 (NUMBER)** – insert '01' (or the number of RPAS's involved);

F) **TYPE OF AIRCRAFT** – insert 'ZZZZ'. Follow this by inserting in Field 18 – TYP/ multi-rotor or aeroplane or helicopter;

G) **WAKE TURBULENCE CATEGORY** – Insert 'L' (This means it is a light aircraft);

H) **FIELD 10 (EQUIPMENT)** – insert a 'V' (VHF Radio – this is compulsory equipment in controlled airspace). Next to the 'V' place a 'Z' (GPS). Then, after the forward slash, insert your transponder equipment such as 'N' (nil), 'C' (mode C) or 'S' (mode S) – 'C' or 'S' are compulsory in controlled airspace, except if exemption has been obtained from the Director of Civil Aviation, the CAMU or the relevant ATSU. When specifying 'Z' (GPS) in this Field, follow this by inserting in Field 18, NAV/ GPS;

I) **FIELD 13 (DEPARTURE AERODROME)** – Insert ICAO aerodrome designator. If operating from a non-ICAO designated aerodrome, insert 'ZZZZ'. Follow this by inserting in Field 18 – e.g. DEP/Brakpan Mall XXXXS and XXXXXE (e.g.; coordinates S & E – e.g. 2503S 02659E - no seconds required);

J) **TIME** – simply fill in your estimated time of departure (ETD) in UTC, e.g. 0730;

K) **FIELD 15** (CRUISING SPEED) – insert the RPAS cruising speed in knots – e.g. 'N0025';

L) **LEVEL** – insert 'VFR' if flying 'V' or insert a Flight Level, e.g. 'F090' if flying 'I' and ensure this Flight Level complies with the semi-circular rule; Should you utilize 'VFR' in this Field, indicate in Field 18, VFR level/height/altitude – e.g. VFR/400FT AGL.

M) **ROUTE** – the following is an example for a VFR flight conducting a film shoot over Checkers at the Brakpan Mall, e.g. 'DCT 2503S02659E (Latitude and Longitude – no seconds required) OR define a 'filming box' by plotting four sets of coordinates overhead the Checkers precinct. (eg. DCT 2356S 01835E 2352S 01846E 2354S 01819E DCT. This could be a box measuring 300 square meters and will indicate that you will remain inside that box at all times.

N) **FIELD 16 (DESTINATION AERODROME)** – Insert ICAO aerodrome designator. If operating from a non ICAO designated aerodrome, insert 'ZZZZ'. Follow this by inserting in FIELD 18 – DEST/ BrakpanMall 2503S 02659E XXXXS and XXXXXE degrees south and east – no seconds required, (this would probably be the same point you departed from);

O) **TOTAL EET** – simply insert the total estimated flying time of the operation, e.g. '0035';

P) **ALTERNATE AERODROME** – one can leave this box blank or if flying IFR (BVLOS) simply insert 'EN ROUTE';

Q) **FIELD 18 (OTHER INFORMATION)** – this Field is used to do all the explaining of the items unexplained above, e.g. all the ZZZZ's, the routing, etc., e.g. STS/ATFMX (space) TYP/multirotor (space) NAV/ GPS (space) DEP/Brakpan Mall xxxxx Exxxx S (space) VFR/100FT AGL (space) DEST/BrakpanMallxxxxxS xxxxE (space) OPR/RPAS FLIGHT 0725552345 (space) RMK/SARNIL;

*R) **FIELD 19 ENDURANCE** – insert the RPAS flying endurance (this is usually the battery endurance).*

*S) **AIRCRAFT COLOUR AND MARKINGS** – self-explanatory*

*T) **PILOT IN COMMAND** – self-explanatory.*

Flight Planning queries can be directed to: AIMU File2Fly Helpdesk – 011-928 6423

Flexible Use of Airspace (FUA) queries can be directed to CAMU – 011-928 6433.

Flight plan Scenario one:

It's a Friday afternoon 09:00 local time, your favourite band is playing at Sun City, you can't miss this band because it's their last show in South-Africa for the year. You and your friend decide go to Sun City to see them life. Only one problem, you don't have any transport to Sun City and your friend lives near Wonderboom airport in Pretoria. As you are the holder of a PPL (Private pilot's licence) you decide to fly to Wonderboom, pick up your friend at Wonderboom airport and then fly to Sun City.

Helpful information on scenario: (FARA – MEV – FAWB – FAPN)

You will take off from Petit airfield (FARA) and route direct to MEV (VOR ground beacon). From MEV you will then route direct to Wonderboom (FAWB) airport and make a full stop at Wonderboom airport. **At Wonderboom airport you will then file a flight plan for Pilanesberg international (FAPN).** Once the flight plan has been filed you will take off from Wonderboom airport and route direct for Pilanesberg International where you will do a full stop.

Flight details for scenario:

- Aircraft identification: ZS – MOC
- Aircraft max all up weight (MAUW): 2400Kg's
- Departure time from Wonderboom airport: 14:25 (Local).
- Flight rules: Visual flight rules.
- Cruising speed: 130 knots.
- Persons on board: 2
- Aircraft type: C172
- Aircraft endurance: 04:30
- Equipment: VHF, VOR and ILS, Mode C transponder.
- Flight time: 01:15
- Search and Rescue: Normal
- Operator: Ntsu training 082 454 3554
- Type of flight: General flight.
- Aircraft Colour: White aircraft with blue stripes.
- Pilot in command: You.
- Emergency equipment: VHF and ELT.
- Alternate aerodrome: Lanseria international.
- Additional emergency equipment: First aid kit, Signal stripes and emergency water
- Point of leaving the special rules area: 2636S 02802E

SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division: Air Traffic Services
Physical address: Ikhaya Lokundiza, 16 Treur Close, Waterfall Park, Bekker Street, Midrand, Gauteng
Postal address: Private Bag X73, Halfway House 1685 Website: www.caa.co.za

Form Number: CA 172-04

AFTN FLIGHT PLAN

Tel: 0860 FLY NOW (0860 359 669) +27 11 928 6518 Fax: +27 (0)11 928 6514 SITA: JNBXTYF

Priority « ≡ F F ▶ Addressee(s)

Filing time ▶ Originator « ≡

Specific identification of addressee(s) and/or originator

3. Message Type « ≡ (FPL - 7. Aircraft identification - ZSMOC
8. Flight rules - V Type of flight G « ≡

9. Number - 01 Type of Aircraft C172 Wake turbulence cat L - 10. Equipment S/C « ≡

13. Departure aerodrome - FAWB Time 1225 « ≡

15. Cruising speed - N0130 Level A070 ▶ Route DCT 2636S 02802E / N0130 F085 DCT « ≡

16. Destination aerodrome - FAPN Total eet Hr. Min. 0115 ▶ Altn. Aerodrome FALA ▶ 2nd altn. aerodrome XXXX

18. Other information - RMK/SAR NML OPR/NTSU TRAINING 082 454 3554 « ≡

Supplementary information (not to be transmitted in FPL messages)

19. Endurance Hr. Min. - E / 0430 Persons on board ▶ P / 002 Emergency Radio ▶ R / X UHF V VHF E ELT

Survival equipment ▶ X / Polar P Desert D Maritime M Jungle J Jackets ▶ X Light L Fluores F UHF U VHF V

Dinghies Number ▶ X / Capacity Cover ▶ X Colour « ≡

Aircraft Colour and Markings A / WHITE AIRCRAFT WITH BLUE STRIPES

Remarks ▶ N / FAK/S AND EMERGENCY WATER « ≡

Pilot in command C / W. BOTHA 071 303 4764 « ≡

FILED BY:

(PIC)	W. BOTHA	13/01/2024
SIGNATURE AND CAPACITY	NAME IN BLOCK LETTERS	DATE

Terms, Codes and Signals:

Units of measurement:

In South-Africa the following units of measurement are used:

- Long distances, as in navigation – Nautical miles
- Short distances, as a runway length – Meters
- Altitudes, elevations and heights – Feet
- Horizontal speed of aircraft and wind – Knots
- Vertical speed – Feet per minute
- Wind direction – Degrees Magnetic
- Temperature – Degrees Celsius
- Weight - Kilograms

Numerals:

Number		Number	
0 - Zero	Ze roh	5 - Five	fife
1 - One	wun	6- Six	six
2 - Two	too	7 - Seven	Sev en
3 - Three	tree	8 - Eight	ait
4 - Four	Fow er	9 - Nine	Nin er

Numeral Pronunciation: (AIC D005/2018)

As far as possible a pilot should pronounce all numerals (Digits) separately when doing radio calls except when the numbers contain whole **hundreds (7500ft)** or **thousands (15000ft).**

7500ft Pronounced as: "Seven tousand fife hundred feet"

15000ft Pronounced as: " Wun fife tousand feet"

Examples of Pronunciation:

Frequency - 120.6 "Wun too zero deh see mil six"

Rwy - 10 " Wun zero"

QNH - 1025 " Wun zero too fife"

Runway length - 600m " Six zero zero metres"

Phonetic Alphabet:

When transmitting on the aircraft radio, all groups of letters, aircraft call signs have to be spelt out using the phonetic Alphabet.

Pilots must learn the phonetic Alphabet below before attempting to use the radio installation in an aircraft.

Letter		Letter		Letter	
A – Alpha	**al** fah	L - Lima	Lee mah	W - Whiskey	Wiss key
B – Bravo	**bra** voh	M - Mike	mike	X – X-ray	Ecks ray
C – Charlie	**char** lee	N - November	No vem ber	Y - Yankee	Yank key
D – Delta	**dell** tah	O - Oscar	Oss cah	Z- Zulu	Zoo loo
E – Echo	eck oh	P - Papa	Pah pah		
F – Foxtrot	foks trot	Q - Quebec	Keh beck		
G – Golf	golf	R - Romeo	Row me oh		
H – Hotel	hoh tell	S - Sierra	See air rah		
I – India	in dee ah	T - Tango	Tang go		
J – Juliet	jew lee ett	U - Uniform	You nee form		
K - Kilo	Key loh	V - Victor	Vik tah		

Squawk - 2000 “ Too tousand”

Squawk - 2304 “ Too tree zero fow”

Altitude - 6500ft “ Six tousand fife hundred feet”

Flight level - 140 “ Wun fow zero”

Q – Codes:

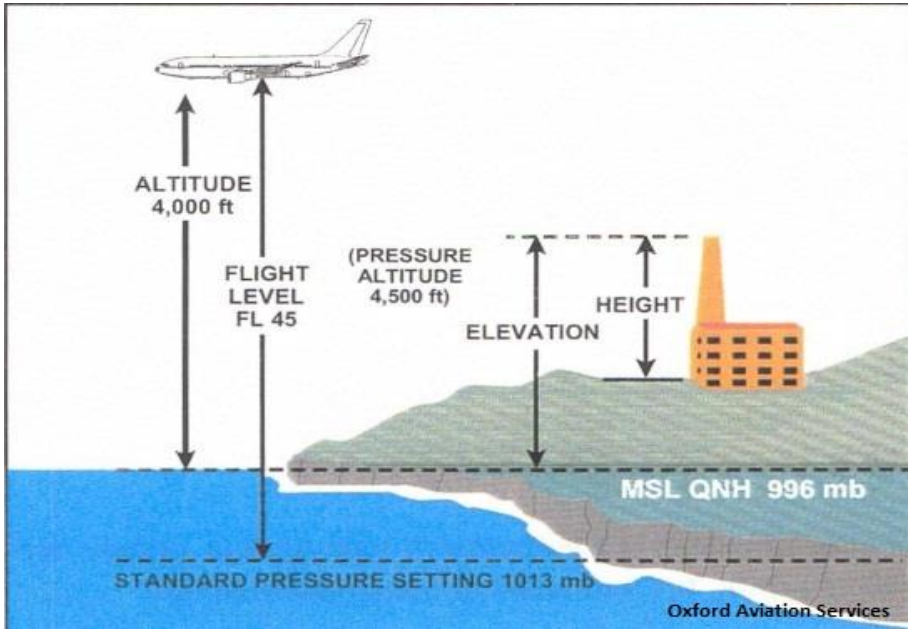
Q- Codes were invented in 1912 in the days of cumbersome radio telephony as a short cut to communications. They are three letter groups, all starting with Q.

Three important Q-Codes that we still use today:

QNH – The height of a aircraft above mean sea level. When the QNH is selected on the ground the altimeter will show the airfield elevation.

QNE – The height of a aircraft above the standard pressure setting of 1013.25 hPa. This is also known as pressure altitude or flight levels.

QFE – The height of the aircraft above airfield elevation. When the aircraft is on the ground and the QFE is selected the altimeter will show zero.



Transition Altitude and Level:

Transition altitude:

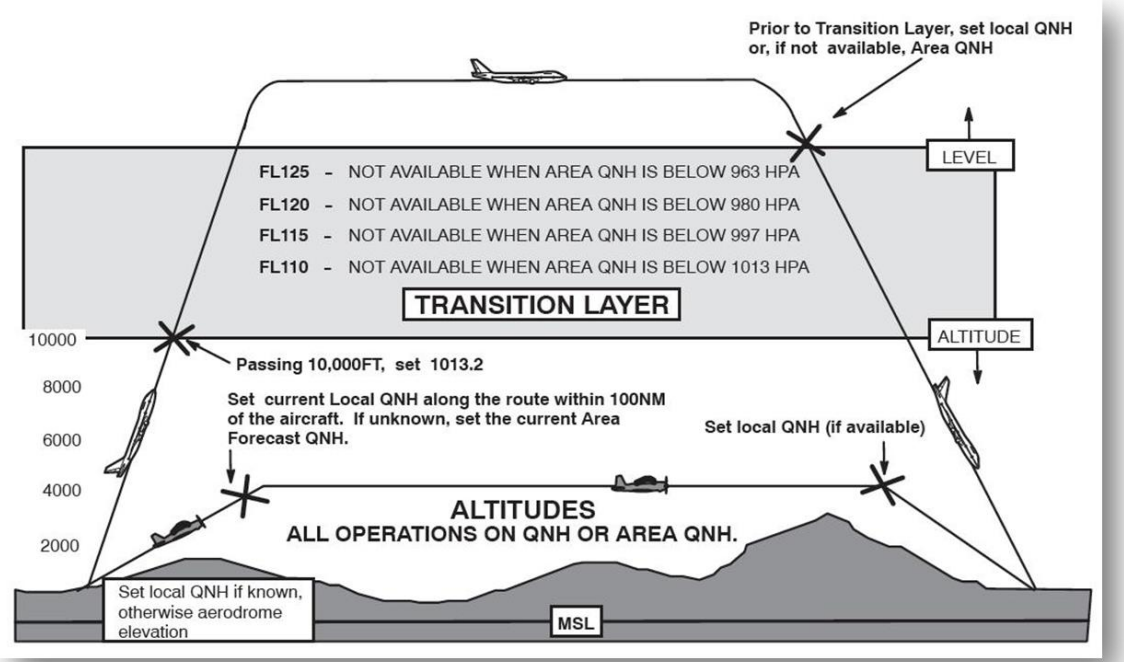
Transition altitude is the altitude at which the pilot of a climbing aircraft changes the subscale setting of his altimeter from local QNH to Standard setting 1013.2 hPa (QNE).

Parameters : **1000FT above highest ground** within a **25nm radius of the airfield.**

Publications in RSA AIP for TA.

Remember: Non listed airfields the following applies –

In VMC: 2000FT AGL



Transition Level:

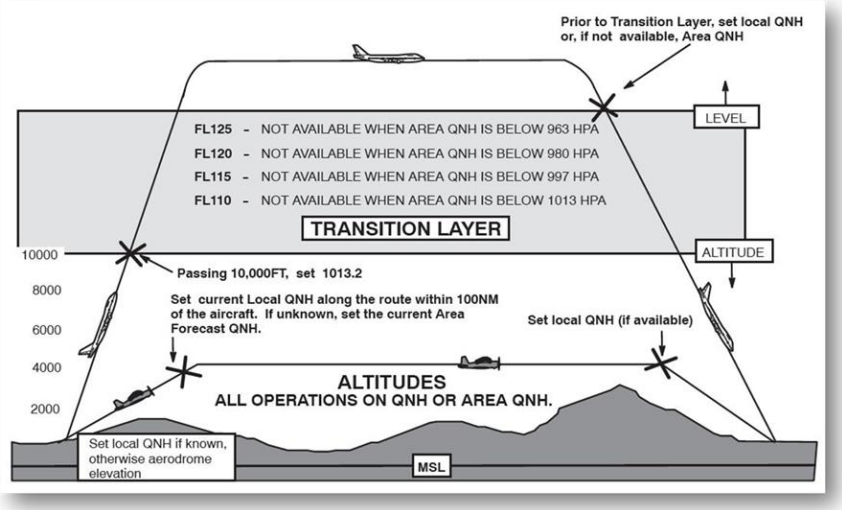
Transition level is the Flight Level at which the pilot of a descending aircraft changes the subscale setting of his altimeter from Standard setting 1013.2 hPa (QNE) to a local QNH.

Parameters : 1000FT above the Transition Altitude.

For controlled aerodromes or those with AFIS, and for all airfields within 25nm of those, TL is as given by ATC or broadcast on ATIS and/or at least 1000ft above the listed TA.

Remember: Non listed airfields the following applies –

In VMC: 3000FT AGL



Radio Test Procedures:

When there is any doubt as to the proper operation of radio equipment, the following test procedures must be used. The aircraft wanting to test its equipment shall say:

Identification of the station called

Aircraft call sign

“Radio check”

The frequency

The reply to this test procedure is:

Aircraft call sign

Identification of station calling

“Reading you” – Plus the number according to the readability scale below:

The following readability scale shall be used:

1 – Unreadable

2 – Readable now and then

3 – Readable but with difficulty

4 – Readable

5 – Perfect readable

Example of a test Procedure:

Aircraft: Wonderboom tower, Zulu Sierra Alpha Bravo Charlie, Radio check on one one eight decimal three five.

Reply: Zulu Sierra Alpha Bravo Charlie, Wonderboom tower, reading you strength five.

Interception Signals:

It may sometimes be necessary to investigate the identity of an aircraft, to lead an aircraft away from a prohibited area, or to make an aircraft land at a specific airfield. In these cases it will be intercepted. The intercepted aircraft should try to establish communications with the interceptor on the international distress frequency of **121.50MHz.** Should it not be possible to establish communications, the visual signals below should be used.

Intercepting aircraft signals:	Meaning:
Rocking wings from a position slightly above and ahead of, and normally to the left of, the intercepted aircraft.	Follow me away from a Prohibited area
An abrupt break-away maneuver from the intercepted aircraft consisting of a climbing turn of 90 degrees.	You may proceed
Circling aerodrome, lowering landing gear and overflying runway in direction of landing.	Land at this aerodrome.
Raising landing gear (if fitted) and flashing landing lights while passing over runway in use.	Aerodrome is inadequate to land on.
Rocking wings from a position slightly above and ahead of, and normally to the right of, the intercepted aircraft.	Follow me to a landing area

Speed Restrictions:

Speed restrictions apply in certain airspaces as stated below, giving maximum permitted indicated airspeeds, If the safe indicated airspeed for a particular aircraft is more than the maximum permissible speed, the aircraft may be flown at the minimum safe speed.

Within a CTR or ATZ class C:

- Reciprocating engines = 160 knots
- Turbine engines = 200 knots

In the Johannesburg Special rules area:

- All aircrafts 180 knots

In uncontrolled airspace below 10000ft:

- Maximum airspeed 250 knots

Practical Communication:

General Considerations:

When speaking on the radio remember the following general rules:

- ❑ Make sure you have selected the correct frequency, turned the volume control up, sufficiently and set the squelch.
- ❑ Make sure the radio is switched on and that the audio panel switches are correctly set to headphones or speaker. Also make sure that the transmit switch on the audio panel is set to the correct radio.
- ❑ Anticipate the reply. If you expect detailed instructions or numbers, such as runway in use, QNH or altitudes, have a pen and paper ready and write down as you receive it.
- ❑ Listen out at least 5 seconds before pressing the push to talk switch, so that you don't interrupt other stations.

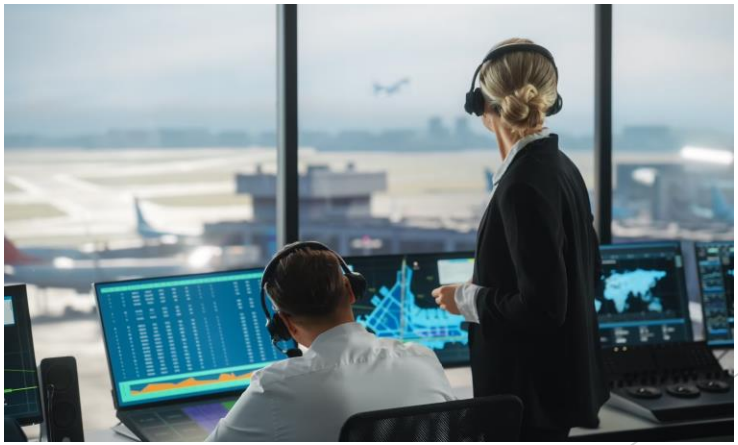
- Keep the microphone close to your mouth at an even distance
- Speak in a normal Conversational tone, not too fast or to slow.
- Pronounce the words clearly and distinctly.
- After having made a mistake, don't give lengthy apologies, simply say correction and transmit the correct version.
- If you don't receive a immediate reply, wait at least 20 seconds before calling again, the controller may be busy.

Phraseology:

Standard words used by Pilots and air traffic controllers:

Whenever possible the standard words and phrases given below should be used. This makes communications easier, prevents misunderstandings and keeps talk over the radio short and precise.

Standard words used:



Affirm	Yes
Approved	Permission is granted
Break	Indicate separation between different portions of a message
Break Break	Indicates separation between messages to different aircraft
Check	Examine a system or procedure
Cleared	You are authorised to proceed with
Confirm	Have I correctly received
Contact	Change frequency to
Correction	I made an error, the correct version is
Disregard	Consider the transmission as not sent
Read back	Read back all or a specified part of the message
Say Again	Repeat all or a specified part of a message again.
Maintain	Continue as specified.
Stand by	Wait, I will call you back.

Radio Failure Procedures:

Fault finding:

When calling an ATSU and getting no reply, the pilot should at first presume that the fault lies with himself or his radio installation and should check the following:

- Correct frequency selected
- Aircraft within range of the applicable station
- Aircraft master is on
- Radio master is on
- Radio set is on
- Radio set switched to COM and not NAV
- Squelch set correctly
- Relevant circuit breakers is in
- Headset plugged in

If after a second call to the ATSU there is still no reply, the pilot should try the following:

- Tapping the microphone
- Another radio set
- Another microphone or headset
- Checking the antenna wires
- Another frequency

All of the above should be common sense, for example if there is a general silence in a busy environment, the fault is most likely on the receiving side.

Radio Failure – Visual flight rules:

If the above fault finding procedures do not solve the problem, and the aircraft is within range of the station, a radio failure must be assumed.

The following steps should be followed when flying in Uncontrolled airspace:

- ❑ Continue to fly in VMC and uncontrolled airspace
- ❑ Squawk 7600
- ❑ Land at nearest suitable uncontrolled airfield
- ❑ Contact the ATSU after landing

The following steps should be followed when flying in Controlled airspace:

- ❑ Leave the controlled airspace on the shortest possible route
- ❑ Squawk 7600
- ❑ Land at nearest uncontrolled airfield
- ❑ Contact the ATSU after landing

NB. If an Ac is in the circuit of a controlled airfield and experiences a radio failure, the pilot can continue to fly in the circuit and land at the airfield instead of routing to a uncontrolled airfield.

Transmitter and Receiver failures:

Possible transmitter failure - If an Ac can hear transmissions from other stations or Ac, then the Ac is experiencing a transmitter failure.

Possible receiver failure - If an Ac can transmit to other Ac but cannot receive transmissions, the Ac is experiencing a receiver failure.

NB. When experiencing a radio failure the pilot should always assume that it is a transmitter failure, the pilot should use the pre-fix '**TRANSMITTING BLIND'.**

Radio Communications: (AIC D005/2018):

Radio commination's in the aviation industry can be divided into **six (6) different** categories, All arranged according to their Priority and as such a message with a higher priority will be first assisted. The six different categories of messages are described below,

1. Distress communications
2. Urgency communications
3. Communications relating to Direction finding
4. Flight safety messages
5. Meteorological messages
6. Flight regularity messages

1. Distress:

Distress is defined as a situation in which an aircraft is in serious or imminent danger and in need of immediate assistance. A distress situation is for example, an engine failure or engine fire in flight.

An aircraft in distress should make a radio call containing as much as possible of the following information:

- The word **May-Day x 3**
- The station addressed
- The aircraft identification
- Intention of the pilot
- Present position
- Any more useful information

Distress communications have absolute priority over all other traffic messages, and all other communication messages shall cease until the distress call is cancelled or over.

2. Urgency:

Urgency is defined as a situation concerning the safety of an aircraft, ship or vehicle which does not require immediate assistance. An urgency situation might be an engine failure with a suitable forced landing field in sight.

An aircraft sending out an urgency message should state as much as possible of the following information:

- The word PAN spoken three times
- The station addressed
- The identification of the aircraft
- The nature of the urgency
- The intention of the pilot
- Present position
- Any other useful information

Urgency communications have priority over all other traffic messages, except distress.

3. Communications relating to Direction finding:

Used by a pilot when he/she is not sure about their position when flying an aircraft. The pilot may ask an air traffic control for a “Heading” to fly to a specific station.

4. Flight safety messages:

These are normal communication messages between air traffic controllers and pilots when flying in controlled or uncontrolled airspaces. These can include Take-off and landing clearances, Position reports, instructions etc.

5. Meteorological messages:

These messages relates to weather information. These messages provides a pilot with weather information that may be needed to safely navigate His/her aircraft.

6. Flight regularity messages:

These messages are considered to be internal messages/ communication between air aircraft and the operator. The messages can relate to changes in flight schedules, mechanical issues, delays etc.

END