SAFETYSENSE LEAFLET 22b - RADIOTELEPHONY

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1 INTRODUCTION

a. Radiotelephony (RTF) is essential for the safe operation of aircraft in a busy environment. RTF enables a pilot to obtain aerodrome information, weather information, and instructions relating to the safe movement of air traffic. Many student pilots find the process of learning to use the radio more daunting than learning to fly.

b. Radio waves are not confined by national boundaries and for this reason radiocommunications are regulated at International, European and national levels. The International Telecommunications Union (ITU) Radio regulations, which are reviewed regularly at World Radio Conferences, form the foundation of international agreements on the use of the radio frequency spectrum. The European Conference of Postal and Telecommunications Administrations (CEPT) committees supported by the European Radiocommunications Office (ERO) provide a forum for the discussion of regulatory issues for posts and telecommunications for the member states, with the UK Office of Communications (Ofcom) representing the interests of the UK with participation from the UK Civil Aviation Authority.

2 WIRELESS TELEGRAPHY (WT) ACT

a. Under the Wireless Telegraphy (WT) Act 1949 it is an offence to install or use radio transmission equipment without a licence. The Office of Communications (Ofcom) is responsible for managing that part of the radio spectrum used for civil purposes in the UK as set out in the Communications Act 2003 and has contracted the Civil Aviation Authority (CAA), Directorate of Airspace Policy (DAP) to administer WT Act radio licences for aircraft, aeronautical ground stations and navigation aids on their behalf.

b. An Aircraft Licence is required for radio equipment installed in an aircraft. A Transportable Licence is required for any handheld VHF radio equipment (even if only for 'back-up' use), with an integral antenna and power supply, for use on multiple aircraft as well as gliders, microlight aircraft, balloons, hand gliders and for other aviation related activities such as parachuting and paragliding.

c. The aircraft radio equipment, whether installed or handheld, is required to have been approved either by the UK CAA under the British Civil Airworthiness Requirements (BCARs) or by the European Aviation Safety Agency (EASA), who are now responsible for all aircraft radio equipment approvals, under the European Technical Standard Order (ETSO) Authorisations process.

d. An Aeronautical (Ground) Station Licence is required for the operation of any radio equipment on the ground; even for handheld VHF radio equipment already covered by a Transportable Licence for use in aircraft.

3 FLIGHT RADIOTELEPHONY OPERATORS LICENCE

a. Under Article 26 of the Air Navigation Order the CAA issues 'appropriate licences' for aircraft station flight radiotelephony operators, generally being a Flight Radiotelephony Operators Licence (FRTOL) issued either as a stand-alone licence or in conjunction with a flight crew licence. Operators of Aeronautical Radio Stations providing Air Traffic Services are also required to be similarly qualified, either holding an Air Traffic Controllers Licence, Flight Information Service Officer's Licence or Radio Station Operator's Certificate of Competence. Glider pilots and student pilots under training are, subject to certain conditions, exempt under ANO Article 26 from the requirement to hold a FRTOL. However, glider pilots without a FRTOL are not permitted to use the radio to communicate with an Air Traffic Control (ATC) unit.

b. The Flight Radiotelephony Operators Licence (FRTOL) entitles the holder to operate the radio equipment in any aircraft. FRTOLs issued prior to April 1998 contain the word 'Restricted', this is often mistaken for a 'VHF Only' limitation which, if applicable, will be endorsed on the reverse of the licence (the frequencies that will be used by a General Aviation aircraft are almost exclusively VHF, the 'VHF Only' limitation will not therefore be likely to cause any difficulties). In the UK the term 'Restricted' referred only to the type of equipment that may be operated (see ANO Schedule 8). Older radio equipment designed for use by specialist radio operators who were 'Unrestricted' is no longer in use, therefore the word 'Restricted' has been eliminated from the FRTOL. The privileges however remain unchanged.

c. When the FRTOL is limited to 'VHF Only', the holder may not use transmitting equipment operating in the HF aeronautical bands below 30 MHz. This limitation may be removed by obtaining a pass in the HF written examination with an RTF Examiner authorised to conduct the HF examination, or by obtaining a pass in the JAA Navigation group examinations at CPL/ ATPL level.

d. It is essential that the holder of a FRTOL is familiar with the phraseology and procedures used for aeronautical communication. ATC frequencies are often busy, necessitating the use of concise phrases without ambiguity. **Long winded radio calls waste time and may endanger others.**

e. On 27th March 1977 two heavily laden Boeing 747s collided on the runway at Los Rodeos airport Tenerife in poor visibility, resulting in 575 fatalities. A KLM 747 commenced take-off whilst a Pan Am 747 was still taxiing towards it on the same runway. There was clearly a breakdown in communication; perhaps a misunderstood radio call! The Pan Am aircraft had been asked by the controller, who was unable to see either aircraft due to low cloud**, 'Are you CLEAR of the runway'?** The KLM aircraft had already commenced the take-off roll without clearance; could the KLM pilot have mistaken the call to the other aircraft thinking that he was **'CLEAR to Take-Off'?** The answer remains a mystery; the cure is straightforward, use the correct RTF phraseology, which is designed to be unambiguous, acknowledge and read back all clearances and above all, if in doubt **ASK!!**

f. As a direct result of aircraft accidents RTF phraseology has been progressively modified to avoid any possibility of ambiguity or confusion. Specific phrases have well defined meanings and should not be modified by the operator. Some recreational pilots consider that they don't need to know the full vocabulary used for RTF communication, yet when communicating with an Air Traffic Service Unit (ATSU) they may encounter any aspect of it. Every radio user must be fully conversant with the nature of the air traffic service provided, and be able to understand the radio calls they may hear.

4 AIRCRAFT VHF RADIO EQUIPMENT

a. Aircraft VHF radio equipment used for communications operates in the aeronautical mobile band 117.975 MHz to 137.000 MHz with a channel spacing of either 25 kHz or 25 kHz/8.33 kHz. Channel spacing of 25 kHz and 8.33 kHz provide 760 and 2280 frequencies respectively within the band. At present, the mandatory carriage of 8.33 kHz capable VHF radio equipment is only required in certain airspace within Europe which is unlikely to be used by a GA pilot. However, due to the congestion in the VHF aeronautical mobile band, the introduction of 8.33 kHz channel spacing to other airspace or users may be necessary at some time in the future.

b. GA aircraft VHF radio equipment typically has 760 channels spaced at 25 kHz; some older radios may have only 720 channels with an upper limit of 135.975 MHz, these are not allowed for IFR flight, or for VFR flight in certain countries including Germany.

c. Some installed and handheld VHF radio equipment also includes coverage of the aeronautical radio navigation band 108.000 MHz – 117.975 MHz which is used by radio navigation facilities such as VOR and ILS. Air Traffic Information Services (ATIS) broadcasts of aerodrome information to aircraft may be carried on some VORs in addition to ATIS frequency assignments in the aeronautical mobile band.

d. Aircraft VHF radio equipment is fitted with a minimum of controls. Rotary knobs or switches select the operating frequency, allowing it to be adjusted in steps of 1 MHz, 100 kHz, and either 50, 25 or 8.33 kHz. On some equipment an additional switch selection is necessary in order to select 25 kHz resolution. This may take the form of a toggle switch or require a rotary selector knob to be pulled out. Many radios do not display the third decimal of the frequency. This creates the impression that the frequency ends in a (. x2) or a (. x7) rather than (. x25 or .x75). E.g.

121.025	shown as	121.02
121.050	shown as	121.05
121.075	shown as	121.07

This may mislead the user into thinking that a particular frequency cannot be selected (although it is important to remember that ATC will transmit such frequencies using only two digits after the point).

Frequencies spaced at 8.33kHz are at present only used above FL245 in the UK but at lower levels over parts of Europe. 8.33 kHz frequencies are currently designated as “channels” with 6 figures, e.g. 118.033, 118.058 etc. Channels such as 118.055 may be allocated, and these apply to communications on what would be a normal 108.05 frequency, but requiring equipment with a narrow enough bandwidth to use it without causing interference to the neighbouring 8.33 kHz channels.

e. All too often the receiver VOLUME and SQUELCH controls may be incorrectly set. SQUELCH is an electronic switch that mutes the receiver audio output when no signal is received. This facility is designed to reduce operator fatigue, which can result from continuous exposure to background noise. When a continuous radio signal (carrier) is received, it activates or ‘lifts’ the SQUELCH causing the speaker or headphones to be activated. Where a variable SQUELCH control is fitted, this allows the operator to determine the strength of the received signal required to lift the SQUELCH, which may also be activated by bursts of noise. The correct setting procedure for the SQUELCH control is:

- set the volume control to approximately halfway;
- turn the SQUELCH control up until a hiss appears, this is background ‘static’ noise;
- turn back the SQUELCH control until the hiss just stops, this occurs quite abruptly;
- leave the SQUELCH control in this position.

Some radios are not fitted with an external SQUELCH control, but incorporate a switch marked TEST. Operating this switch ‘lifts’ the SQUELCH and allows the volume control to be set at a level where the background hiss is audible, or alternatively where the receiver volume is acceptable.

Note:

- The SQUELCH cannot be set correctly whilst you are receiving a station.
- If the VOLUME control is set excessively high, distortion may occur within the radio making it more difficult to hear stations. Ideally the VOLUME control should not exceed 70% of its rotation.

f. VHF aeronautical radios use amplitude modulation (AM), the same system used by broadcast radio stations in the long and medium wave bands. When two AM stations transmit simultaneously on the same frequency the signals can mix together and may render one or both stations unreadable. If the two transmitters are not exactly on the same frequency, an annoying whistle or 'heterodyne' equal to the difference between the two frequencies may be heard. **Do not transmit at the same time as another station or you may render both signals unreadable. Always listen before speaking and keep transmissions short.**

g. If you experience difficulty contacting another station the following checks should be made:

- The correct frequency is selected *
- Frequencies ending (. 025 MHz) and (. 250 MHz) are easily transposed.
- The correct radio has been selected on the comms panel e.g. COM 1, or COM 2. (Transmit and receive switching are often independent)
- The ground station is open for watch
- The station is within range (This varies with altitude)
- Volume and Squelch are correctly set

h. Many light aircraft are fitted with a an intercom system which may be integrated into one of the radios or a be a separate unit. Before flight these should be checked and adjusted independently of the radio equipment. It is important to obtain a good balance between intercom volume and radio volume to prevent radio calls being swamped by the intercom. Always seek instruction if you are unfamiliar with a particular radio installation. KNOW THE EQUIPMENT.

i. Most light aircraft are equipped with a **Transponder**. This important aid to flight safety permits an air traffic controller to positively identify an aircraft. The transponder transmits a 4 digit code (SQUAWK), set by the pilot, to the ground station where it is displayed on the radar screen. The code is either issued to the specific aircraft by an air traffic controller or, if no specific code has been issued, one of the special use codes may be selected by the pilot to indicate the type of flight being undertaken by the aircraft. Most transponders incorporate Mode C (Charlie), which transmits and displays the aircraft's level (relative to 1013.2 mb) on the ATC radar screen when the transponder mode switch is selected to 'Altitude' (ALT). **Adjustment of the altimeter pressure setting has no effect on the Mode C altitude information.** A switch marked 'IDENT' is provided on the transponder, this enables the symbol shown on the radar display to be modified so that the controller can positively identify the aircraft. The IDENT switch should not be operated unless requested by ATC.

j. In recent years an Airborne Collision Avoidance System (ACAS) has been employed in airliners and helicopters in order to provide automatic collision avoidance information. Mode C information from the transponder is important for ACAS to be effective. **Pilots should always fly with their transponder switched on, with ALT selected, unless advised otherwise by ATC.** One of the most commonly known ACAS systems is the Traffic Alert and Collision Avoidance System (TCAS) pronounced 'TEEKAS'.

k. In the absence of a code allocated by ATC, the pilot should set the "conspicuity code" 7000 on the transponder, or in the case of specialist activities the appropriate code.

5 USE OF PHRASEOLOGY

a. The correct radio phraseology to be used in the UK is detailed in CAP413 Radiotelephony Manual. In some cases it may seem very pedantic, however, it must be remembered that it has evolved for a purpose, primarily to avoid ambiguity. Many incorrect phrases are regularly heard.

b. **FINAL** is a position in the circuit pattern between 4 nautical miles and the landing threshold, in circuit parlance it is singular not plural! An Air Traffic Controller Officer hearing a call such as **'ON FINALS'** might easily believe the traffic to be **'LONG FINAL'** (a position between 4 and 8 miles from the landing threshold); in poor visibility, such a mistake could result in the controller giving another aircraft clearance to Take-Off as he believes the landing traffic to be in excess of 4 miles away, when in reality, it may be as little as only half a mile away! There is no official report 'SHORT FINAL' however; the distance from the landing threshold may serve as a more accurate indication of position i.e. 'Half Mile Final'.

c. At Aerodromes with an Aerodrome Flight Information Service (AFIS), the phrase **'at your discretion'** is used to indicate that the Flight Information Service Officer (FISO) is not issuing a clearance. Pilots should NOT respond using the phrase '**at my discretion**' but rather reply with their intentions, for example '**landing**'.

d. **'Land at your discretion'** is not a clearance to land. Pilots must exercise their own judgement and comply with the rules of the air. e.g. An aircraft may not land on a runway whilst another aircraft is on that runway unless authorised to do so by an air traffic controller. (Rules of the Air Rule 17).

e. **Requests for 'landing instructions'** should not be made.

f. **Requests for 'instructions' should not be made to stations providing a A/GAGCS or FIS.** A/GAGCS operators and Flight Information Officers (FISO) are not permitted to give instructions.

g. Public correspondence messages (including air to air conversations) are not permitted on the VHF aeronautical band.

6 MICROPHONE TECHNIQUE

a. Use a headset, it cuts out aircraft noise and avoids the distraction of a handheld microphone.

b. Keep the microphone close to your mouth.

c. Speak directly into the microphone.

d. Don't 'clip' your transmissions - ensure that the transmit button is held firmly pressed BEFORE you speak until AFTER you have finished speaking.

7 AERODROME AERONAUTICAL RADIO STATIONS

a. The nature of the ground radio facilities at an aerodrome is usually dependent upon the number of air traffic movements. Some minor aerodromes have no provision for radio at all, whilst others may have an allocated frequency but the AGCS is seldom maned. The majority of aerodromes have a ground radio station and provide one of three types of air traffic service:

- Air/Ground communication service (AGCS) Callsign **'RADIO'**
- Flight Information Service Callsign **'INFORMATION'**
- Air Traffic Control (ATC) service Callsigns: **'GROUND; TOWER; APPROACH; RADAR; DIRECTOR; DELIVERY'**

Each service employs different procedures and it is important for pilots to be familiar with the differences and the implications for the pilot's actions in response. Small aerodromes may provide an AGCS or aerodrome FIS utilising a single frequency, whereas a busy airport will have an ATC service with separate frequencies for Radar, Approach, Tower, Ground and possibly an Automatic Terminal Information Service (ATIS).

b. **SAFETYCOM** (**135.475 MHz**) is a common frequency allocated for use by aircraft flying in the vicinity of aerodromes not assigned a discrete frequency. Because there is no frequency assigned for the aerodrome there is no ground radio station. SAFETYCOM is designed to allow pilots to broadcast their intentions to other aircraft that may be operating on or in the vicinity of the aerodrome. Transmissions shall only be made when the aircraft is below 2000 ft aal or below 1000 ft above circuit height within 10 miles of the aerodrome. Calls should be kept concise. Aircraft taxiing, taking-off, landing and flying in the circuit pattern should self announce their position and intentions on the SAFETYCOM frequency to alert other pilots of their presence. Initial calls should be addressed to '*Airfield Name'* with the suffix **'TRAFFIC'**.

e.g. ***'WILTON TRAFFIC G-ABCD downwind 24 left to land'.***

The intention of the airborne aircraft is then obvious to a pilot taxiing or waiting to back-track the runway. The pilot of the taxiing aircraft may choose to broadcast his intentions,

e.g. ***'WILTON TRAFFIC G-ZZXY holding point 06 awaiting landing traffic'*** in order to make his intentions known to the traffic in the circuit.

Avoid using the word 'CLEAR', it may be mistaken as a clearance!

Announce your intentions in order to assist other traffic whilst making your presence noticed. Altimeter settings will need to be determined in relation to the aerodrome elevation. The QNH of a neighbouring aerodrome will be approximately correct whereas the regional pressure setting, which has a built in safety margin will result in the aircraft being higher than shown on the altimeter..

c. An **Air/Ground communication service (AGCS) Station** is the simplest form of aeronautical radio communication. The call sign uses the aerodrome name followed by the suffix '**RADIO**'. The ground radio operator is not an air traffic controller and **must not give any air traffic instructions or clearances however he may relay instructions and clearances given by a controller e.g. an airways clearance to departing traffic.**

This service provides aerodrome and traffic information only. In some instances the AGCS station may be located in a flying club or building that does not have an unrestricted view of the aerodrome.

In order to operate an AGCS station the operator must be in possession of a Radio Operators Certificate of Competence (CAA Form CA1308), which must be countersigned by the aeronautical radio station licensee.

AGCS operators will **NOT** use the expression: **'At your discretion'**.

The AGCS operator may pass information to a pilot such as the runway, pressure settings, wind velocity and details of any known reported traffic. **Pilots should not request clearances or instructions, as they cannot be given.**

Before entering the Aerodrome Traffic Zone (ATZ) during the published hours of operation of an aerodrome with a notified AGCS service, a pilot must obtain **'information'** from the AGCS radio station operator to ensure that the flight can be conducted safely. The AGCS radio station operator may pass messages on behalf of the aerodrome operator but any such message must be passed as information and must include details of the originator of the message.

e.g. ***'G- AYZZ Message from the airport manager. You are requested to report to the Control Tower after landing'***

On arrival at an aerodrome with an AGCS service, taxiing and parking are also the responsibility of the pilot. The AGCS operator may not give taxi instructions but, may suggest a suitable parking location if requested by the pilot.

'is there a convenient parking space? G-ZZ'

'G-ZZ there is parking space available next to the blue Cessna'

AN AGCS STATION CANNOT GIVE CLEARANCES OR INSTRUCTIONS TO AN AIRCRAFT.

d. A Flight Information Service Officer is qualified to provide an aerodrome Flight Information Service (FIS) in order to pass:

- 'Instructions' to vehicles and persons on the aerodrome, to aircraft on the ground up to the holding point and, in the case of aircraft landing, after the landing roll is completed;
- 'Information' for the safe conduct of aerodrome traffic on the runway and within an ATZ.

In practice, there is little difference between AFIS and AGCS service, however the FISO is required to undergo training and is tested by the CAA. The FIS call sign uses the suffix **'INFORMATION'** to identify the type of service. **Air traffic clearances must not be given, but may be relayed by a FISO.**

The service may revert to AGCS if a qualified FISO is not available, it is promulgated by NOTAM, and the AGCS operator is appropriately certificated. The call sign suffix then reverts to **'RADIO'**.

The phrase 'At your discretion' may be used by a FISO and will follow any advisory information. Pilots requesting departure may be advised: ***'Take off at your discretion'***

The pilot **should not respond** by repeating the phrase: **'at my discretion'.** No clearance has been given, there is no requirement to read one back. The pilot should simply respond:

'G –XX Roger' or 'G- XX taking off'

e. Examples of AGCS and FISO RTF phraseology are contained in CAP413 Radiotelephony Manual.

An aerodrome Flight Information Service Officer (FISO) may control aircraft on the ground up to the holding point and after the landing roll is complete. Pilots are reminded that they are responsible at all times for the safety of their aircraft and collision avoidance, LOOKOUT is always paramount.

8 AIR TRAFFIC CONTROL SERVICE

a. Pilots familiar with small aerodromes providing either an AGCS or FIS may find larger aerodromes somewhat daunting. Busy aerodromes will employ separate controllers for Ground, Tower, Approach and possibly Radar. If the purpose of each is fully understood, it will help to eliminate any confusion regarding who to talk to and when.

b. The **GROUND** controller is responsible for all movements on the manoeuvring area; this will include all taxiing aircraft and vehicular traffic equipped with radio. Initial calls will be made to GROUND, including taxi clearance, (start clearance at some aerodromes), departure clearance* if applicable, and, normally, all calls up to the holding point. Landing traffic will normally be instructed to change to GROUND after vacating the runway.

The departure clearance tells a pilot what he is required to do on departure and will include any frequency changes required, together with routeing instructions and altitude restrictions. Note: this is **NOT a clearance to take- off or to enter an active runway.*

c. The **TOWER** controller is responsible for all traffic using the runway and in close proximity to the aerodrome, including the circuit. Normally an aircraft will be instructed to change to TOWER when at the holding point, at which time the pilot should have completed all of his

checks and be ready for departure. The first call will usually be:

***'WRAYTON TOWER G-ABCD holding point RW 30 Ready for departure'*.**

Aircraft remaining in the circuit will remain with **TOWER**, whereas departing aircraft will change to either **APPROACH** or **RADAR**. Pilots arriving at an aerodrome will usually be instructed by APPROACH to contact TOWER at a suitable point in order to obtain circuit joining instructions. After landing, aircraft should vacate the runway, unless otherwise instructed, at the first available taxiway that the aircraft reaches having slowed to taxiing speed and advise the controller:

'Runway Vacated G-XX'

The pilot will normally then be instructed to change to the GROUND frequency. **Do not use the phrases:**

'Clear the Active' or 'Clear of the Runway'

d. **GROUND** and **TOWER** controllers are located in the glass uppermost part of the ATC Tower; they are invariably located side by side and should have a good view of the aerodrome and circuit.

e. **APPROACH** controllers are usually located in the lower part of the ATC tower and have no visual contact with the aerodrome. Control may be either radar or non-radar. At busy aerodromes RADAR controllers may be used in addition to the APPROACH controller to provide services for traffic transiting the area.

f. It is not uncommon for controllers to conduct more than one function when traffic is light; The **RADAR** and **APPROACH** controllers work in close proximity such that the jobs may be combined. The **GROUND** and **TOWER** controllers are also ideally situated to combine functions. At the very small provincial airports, **TOWER** and **APPROACH** control may also be provided by one controller. Occasionally at smaller airports the service may revert to a **FIS** outside the busy period at weekends, in which case, the service will be apparent from the Callsign Suffix **'INFORMATION'** and no clearances or instructions will be given.

g. **ATIS** uses a dedicated frequency on which a recording of aerodrome information is broadcast continuously. This information is updated at least hourly. Such a facility allows pilots to obtain weather and aerodrome information without having to establish radio contact with the aerodrome, thus considerably reducing the workload of the controller and enabling the pilot to plan ahead. ATIS information is coded using a letter of the alphabet to enable both pilot and controller to ascertain which broadcast the pilot has received.

e.g. ***'This is Langford information Delta time zero nine five zero'***

the message concludes:

***'on initial contact with Langford advise information Delta received'*.**

The pilot advises ATC on his initial call that he has received ATIS Delta. Pilots who call ATC without passing the ATIS code may be asked if they have received the latest 'ATIS information'. **To the unwary this may cause confusion!**

If a pilot does not report the latest broadcast identification letter the controller will advise the pilot of any updated information.

9 OTHER SERVICES

Lower Airspace Radar Service (LARS) is available to pilots when flying outside controlled airspace below FL95. The General Aviation Safety Sense Leaflet 8 provides details of Air Traffic Services Outside Controlled Airspace.

10 MILITARY ATC

a. Military ATC units often provide a LARS. The terminology used by military controllers differs in some details from that used by civil controllers. Military controllers are not obliged to adhere to civil Rules of the Air when issuing instructions, and it is possible that you may be asked to fly in a manner that might not conform to civil practices or law. It is the pilot's responsibility to advise the controller if he/she is unable to comply with the instruction and why, e.g. being asked to over fly a built up area below 1000 ft or at a height where it is not possible to glide clear, or if altitude changes might place an unqualified pilot in IMC.

b. Military ATC use frequencies in the UHF band (225- 380 MHz) for their primary function of providing services to military aircraft whilst operating VHF frequencies that facilitate communication with civil aircraft is normally a secondary function. When calling a military ATC unit on VHF always allow time for the controller to reply as he may be in communication with a military aircraft on UHF. Often you will hear only one side of the conversation when transmissions are made on both VHF and UHF simultaneously; you hear the VHF transmission from ATC, but not the reply from the aircraft on UHF. Information on operating at and in the vicinity of military aerodromes is contained in SafetySense leaflet 26 "Operations at Military Aerodromes".

11 RADIO OPERATION

a. It is not intended to reproduce CAP 413 Radiotelephony Manual, but rather to highlight certain aspects of radio operation.

b. **Radio Check.** Before embarking upon a flight it is essential to know that the radio equipment is working. Listening to other stations will check the radio receiver but in order to check the transmitter, it is necessary to talk to another station and let them confirm that they have received your transmission in an intelligible form. It is also important to be sure that the equipment switches channels and that the channel indicated is the correct one. Where two frequencies are in use at an airfield, radios may be checked by selecting the frequencies alternately. The transmitter may be checked on the initial call for the aerodrome information. When more than one radio is installed, the second radio should be checked on a subsequent call.

c. The golden rule of RTF operation is: **know what you are going to say before you say it**. Whilst this may seem obvious, once the transmit switch is pressed the human brain often forgets the obvious. Secondly, **anticipate what the reply is likely to be**. That way, it will not be a surprise. For example when calling for aerodrome information, the reply will include the QFE, QNH, surface wind and runway (R/W) in use. The pilot may get an idea of the pressure settings in advance by using the altimeter, whilst a good indication of the R/W in use and wind direction can be obtained by observing the windsock and any other traffic. **Always read-back the reply in the same order that it was given – avoid reversing the order.**

d. A **Departure clearance** can often pose problems for the inexperienced; it may be a lengthy clearance, which must be read back to the controller. Prior to departure it is normal to 'Book- Out' with the ATSU, specifying your departure details; flying instructors should allow students to observe and practice this procedure as part of the learning process. If the pilot has any questions about the departure route or the clearance that he is likely to receive, it is a good idea to ask when Booking Out rather than to wait until having to ask on the radio. The departure clearance will normally be a confirmation of the routeing already requested, although occasionally it may involve changes. It should therefore be no surprise when the controller passes a clearance that closely resembles the information passed by the pilot when 'Booking Out'. If a frequency change is required on departure it will be to a published frequency. Know where to look it up and whenever possible, select it on a second radio as a reminder. Invariably, when departing VFR, the first two digits of the transponder code will remain the same for a particular ATSU.

Remember: The departure clearance is NOT a clearance to enter a runway or to take- off!

After take- off you are required to follow the departure clearance, remember the basic rule:

- **Aviate**
- **Navigate** and then
- **Communicate**

When safely airborne and established in the climb you can expect TOWER to instruct you to change frequency:

e.g. ***G-ABCD to APPROACH 126.1***

To omit this call could result in uncertainty over your whereabouts!

e. **En-Route** calls usually take the form of position reports. The initial call to an ATSU should begin:

- **Station** being called
- Aircraft ***Callsign*** in full
- **Request**

e.g. ***'WILTON RADAR G- AAXX request Radar Information Service'***

Do not say any more until the ATSU invites you to 'pass your message'. If you are advised to "Standby", do so but **do not acknowledge**. When requested to **"pass your message"** it should consist of:

- **Full call sign** – so that the controller can write it down.
- **Type** – PA28, C172, Robin 400 etc
- **Departure/Destination** –the point of departure and destination; – the controller will write these on a handling slip. **do not include a list of turning points.** If you are returning to the point of departure it is satisfactory to say ***Navex from Wilton to Wilton.***
- **Present Position** – should be given relative to a point on a 1:500,000 chart, the controller may not be familiar with small features in the area.
- **Altitude/ Level** – together with the pressure setting this will enable the controller to assess if there is any confliction with other traffic in the vicinity at the same level!
- **Additional details** – What service or information do you require? e.g. Flight Information Service (FIS), regional pressure settings next turning point etc.

Common mistakes are a failure to make any request of the controller, and inadequate or misleading position reporting, leaving the controller unaware of your present position and/ or the next turning point. In order to provide you with a Service, the controller needs to know:

- **Who you are**
- **Where you are** and
- **What you want**

Then **WAIT...**

If you cannot remember what to say, **stop transmitting.** The controller will ask you for anything you miss out!

f. Many pilots will avoid flight through a Control Zone (CTR) by flying a longer route around it. The majority of CTRs in the UK are designated Class D airspace, which permits VFR flight subject to an ATC clearance. In the case of a CTR designated Class A airspace, a Special VFR (SVFR) clearance is required if the aircraft is being flown visually. Requesting a VFR or SVFR clearance is straightforward. The controller will form a mental picture of a pilot from the radio calls made. He is unaware of a pilot's qualifications, experience or status from the aircraft call sign alone. A radio call delivered in a professional manner will be treated accordingly, whereas a poorly structured and hesitant call may lead the controller to be cautious about issuing a clearance that is complex or requires the pilot to fly very accurately. A badly delivered request for a clearance may result in a routing that avoids controlled airspace rather than the route requested. For example

'SOLENT APPROACH G- ABCD request zone transit'

followed by:

***'G- ABCD; Cessna 172; Popham to Sandown VFR; 10 miles North of Winchester; Altitude Two Thousand Feet on One Zero Zero Six. Estimate Sierra Alpha Mike, Two Five; request zone transit'*.**

will probably result in a reply:

'G- CD is cleared to enter the Southampton zone abeam Winchester VFR not below altitude two thousand feet Solent QNH One Zero Zero Nine. Report Sierra Alpha Mike'

Whereas a call:

'SOUTHAMPTON this is G- ABCD Err! a 172 at two thousand feet Err! Point of departure Popham. 4 Persons on board. Err! Can we transit over Southampton to the Isle of Wight Sir? or if not we will go round. Err! we are North of Winchester. Over'

may result in the reply:

'G- ABCD remain outside controlled airspace. Route via Romsey, Totton and Calshot for the IOW., Solent QNH One Zero Zero Nine. Report Romsey'.

g. **Aerodrome Arrival.** Unless you have filed a Flight Plan (CA48) or have telephoned in advance, (essential at PPR aerodromes) VFR flights usually arrive at an aerodrome without prior knowledge of ATC, the FISO or AGCS radio station operator. You may arrive at the same time as other VFR or IFR traffic. If the aerodrome provides a RADAR service it is a good idea to talk to them as soon as you are within range, they may look after you until you are in visual contact with the aerodrome at which point you will be asked to contact **TOWER**. If there is no radar service the initial call will be to **APPROACH** not greater than 25 nm from the aerodrome. Joining procedure will depend upon the type of traffic when you arrive, if there is IFR traffic arriving and departing it is unlikely that you will be able to join overhead. You may be asked to report your position relative to one of the established Visual Reference Points (VRPs). Occasionally, you may be asked to route via a position not obvious to you, **if in doubt ASK.** The change to **TOWER** can occur quite late. On landing you may be asked to vacate the runway at a specific point and change to **GROUND**. Be prepared for references to published ground positions, stand numbers and holding points. In other words, use a plan of the aerodrome! For arrival at a small aerodrome with either **AGCS** or **AFIS**, initial contact should be made within 10 miles of the aerodrome. If unfamiliar with the aerodrome an overhead join is preferred (but not always permitted – see the UK AIP) as it enables orientation with the aerodrome and circuit traffic. Remember you must establish radio contact with the aerodrome **BEFORE** you enter the ATZ. See General Aviation Safety Sense Leaflet 6B, Aerodrome Sense.

h. Any pilot arriving at an unfamiliar aerodrome will experience a high workload and may not recognise geographical features. The aircraft has to descend; there are checks to be completed and frequencies to be selected. It is essential to **LOOKOUT**, **listen out** and keep your wits about you. Be prepared, have a plan and select the required frequencies as far in advance as possible. **Check the Aeronautical Information Publications (AIP) and NOTAMs prior to departure and do not use out of date documents.**

12 EMERGENCY PROCEDURES

a. Fortunately emergencies are rare. However, there have been a number of occasions when a pilot has recognised the need to land as soon as possible, (e.g. no oil pressure but the engine is still running OK) but has not wanted to 'make a fuss about it'. Clearly if a situation arises where there is a possibility of danger or a worsening situation it is in your best interest to make an URGENCY call, that way immediate help, or a priority landing, is available to prevent the situation getting out of hand.

b. **The states of EMERGENCY are**:

- **Distress**. (MAYDAY) A condition of being threatened by serious or imminent danger and of requiring immediate assistance.
- **Urgency**. (PAN PAN) A condition concerning the safety of an aircraft or other vehicle, or some person on board or within sight, ***but does not require immediate assistance.***

c. The EMERGENCY MESSAGE advises others:

- **Who you are!**
- **What the problem is,**
- **What you intend to do about it and**
- **Where you are!**

The format is as follows:

- **MAYDAY** (repeated 3 times) or **PAN PAN** (repeated 3 times)
- **STATION** addressed when appropriate
- **CALLSIGN** (once)
- **TYPE** of Aircraft
- **NATURE** of emergency
- **INTENTION** of person in command
- **POSITION – HEIGHT and HDG**
- **Pilot qualification**: e.g. Student pilot, no instrument qualification, IMC rating or full Instrument Rating (IR) (Not required by ICAO).
- **Any other information** – POB, endurance etc

It is probable that in a real emergency you will not wish to be bothered with talking further on the radio. By ending the call: ***MAYDAY OUT*** you will convey the message that you do not expect a reply.

d. Further attention can be attracted in an emergency by selecting the appropriate code on the transponder:

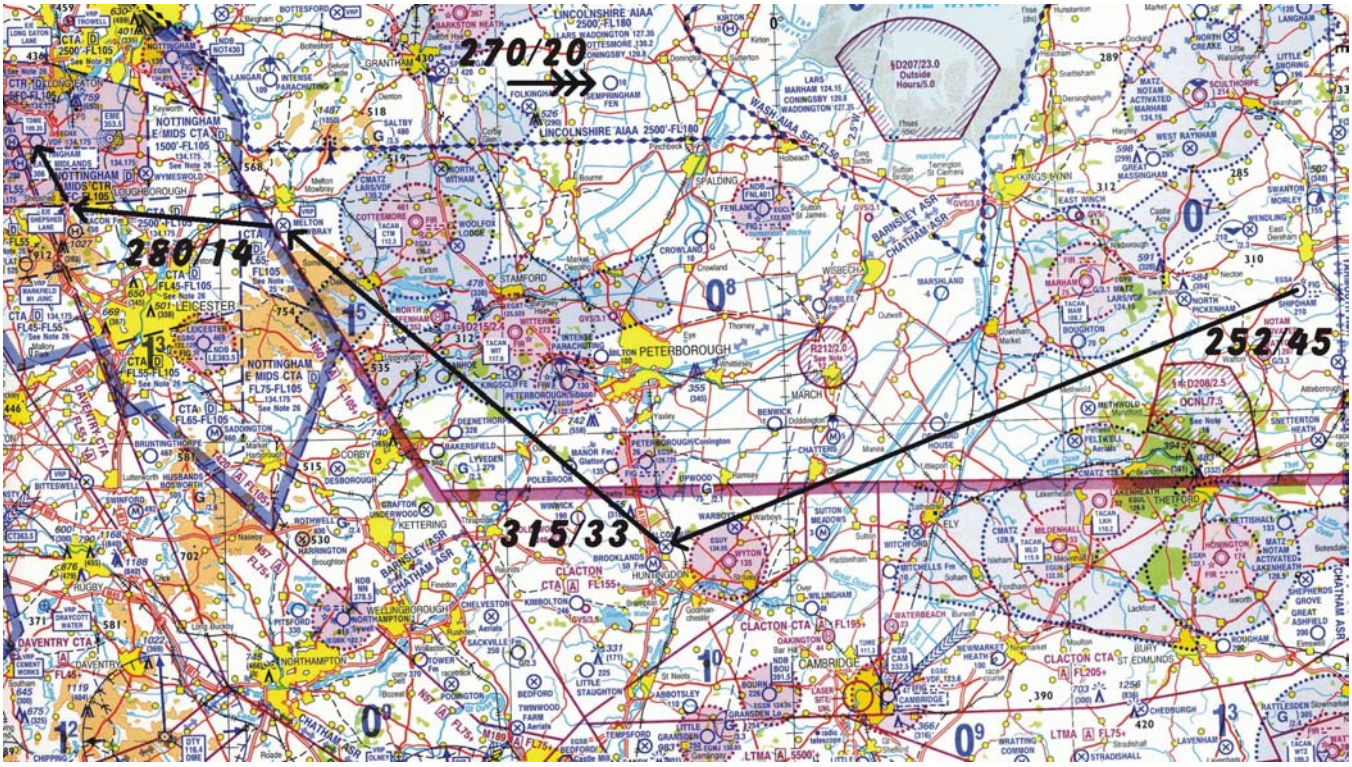
Emergency **7700**
Radio Failure **7600**

13 THE PRACTICAL COMMUNICATIONS TEST FOR THE FRTOL

a. Candidates wishing to obtain a FRTOL are required to sit a written examination and a practical communications test with an authorised RTF examiner. The practical test involves the use of an approved RTF simulator; this may provide basic radio facilities, or be a PC based system with a moving map and associated communications equipment. The candidate is briefed to follow a typical light aircraft route from one aerodrome to another passing through a Military Air Traffic Zone (MATZ) and possibly at some stage into or through a CTR. The candidate is required to make all the appropriate radio calls and frequency selections as if he were actually flying the route. The examiner performs the function of an AGCS radio station operator, FISO or controller. Other aircraft may be heard so the candidate is required to listen out. At some stage there will be an emergency involving either the candidate or another aircraft. At all stages of the test the candidate is required to make the appropriate radio calls. There are a number of options available to the candidate and in most cases it is the candidates responsibility to select an appropriate agency with whom to communicate with. The candidate is provided with a route map, a completed navigation flight plan and a list of all communications facilities available to him. The candidate must be familiar with the procedure for obtaining VHF Direction Finding (VDF) bearings from stations equipped with this facility.

b. A typical examination route would be for a C172 aircraft routeing from Shipdham in East Anglia to East Midlands Airport via Huntingdon and Melton Mowbray. The aircraft is equipped with a single channel radio and a transponder with no mode C. The pilot is assumed to be a PPL holder. On this particular route a LARS service is available for most of the route, it would be a shame not to use it. The route passes South of RAF Marham and then through the Combined MATZ (CMATZ) at RAF Wittering and RAF Cottesmore, finally arriving at East Midlands, which is in Class D airspace. Special entry and exit lanes are provided to assist VFR and SVFR traffic.

MAP OF ROUTE (1:500,000 CAA VFR Chart)



c. A typical narrative for the flight could be as follows:

Note: for the sake of clarity numerals are used in this example in preference to spelling out numbers.

Shipdham Radio G-ZAON request radio check 119.55

G-ZAON Shipdham Radio Readability 5

G- ZAON; request airfield information; Taxi VFR to East Midlands

G-ON RW 20; Surface Wind 250/ 07; QNH 1009;

R/ W 20; QNH 1009 G-ON

G-ON Ready for departure.

G-ON traffic is a Cessna 152 on a half-mile FINAL.

ROGER G-ON

G-ON reported traffic, surface wind 260/ 05.

Roger taking off G-ON.

G-ON ROGER

G-ON overhead altitude 2500 ft QNH 1009, changing to Marham 124.15

G-ON ROGER

Marham Approach G- ZAON request FIS

G-ZAON Marham Approach pass your message

G-ZAON
Cessna 172
Shipdham to East Midlands
2 miles North of Watton
Altitude 2500 ft 1009
Estimating Alconbury at 35
Request Radar Information Service and Chatham Pressure

G-ON Chatham 1005, Squawk 2632

Chatham 1005, Squawk 2632, negative Charlie, G-ON

G-ON identified 8 miles SE of Marham; Flight Information Service; report passing Chatteris

FIS;; WILCO G-ON

G-ON 5 milesNorth of Ely request change to Cambridge 123.6 for VDF

G-ON Squawk 7000 contact Cambridge 123.6

Squawk 7000; Cambridge 123.6 G-ON

Cambridge Homer
G-ZAON request true bearing G-ZAON

G- ZAON Cambridge Homer transmit for bearing.

True Bearing/ True Bearing G- ZAON request true bearing G- ZAON

G-ZAON Cambridge Homer true bearing 355 degrees class Bravo; I say again 355 degrees class Bravo

True bearing 355 degrees class Bravo; changing to Wyton 134.05 G- ZAON

G-ON ROGER

Wyton Approach G- ZAON request FIS.

G-ZAON Wyton approach pass your message.

G-ZAON
Cessna 172
Shipdham to East Midlands
2 miles South of Chatteris
Altitude 2500 ft 1005
Estimating Alconbury at 35
Request RIS

G-ON ROGER; Report turning at Alconbury The Wyton Circuit is active with three Vigilants.

WILCO G-ON

G-ON Overhead Alconbury Altitude 2500ft 1005
Estimating Melton Mowbray at 03

G-on ROGER Freecall Cottesmore on 130.2

Cottesmore 130.2 G-ON

Cottesmore Approach G- ZAON request MATZ penetration

G-ZAON Cottesmore Approach pass your message

G- ZAON
Cessna 172
Shipdham to East Midlands
3 miles South of Conington
Altitude 2500 ft Chatham 1005 Estimating Melton Mowbray at 03;
request MATZ penetration;
Radar Information Service and Barnsley pressure

G-ON Barnsley 1002 Squawk 6554

Barnsley 1002 Squawk 6554 G-ON

G-ON identified; Radar Information Service; maintain 2500 ft
Cottesmore QFE 993 millibars

Maintain height 2500 ft
QFE 993 millibars;

Radar Information Service, G-ON

G-ON ROGER, report abeam Oundle

WILCO G-ON

G-ON abeam Oundle

G-ON is cleared to cross the CMATZ at 2500 ft QFE 993 millibars; maintain VFR; report abeam Oakham

Cleared to cross the CMATZ at height 2500ft 993 millibars; Wilco G-ON

G-ON abeam Oakham

G-ON Squawk 7362

Squawk 7362 G-ON

G-ON contact East Midlands Radar 119.65

East Midlands Radar 119.65 G-ON

(If possible listen to East Midlands ATIS 128.225 MHz to obtain airfield information)

East Midlands Radar G- ZAON inbound from Shipdham with Information 'Golf' (The ATIS code)

G-ZAON Stand-by

G-ON expect zone entry via the Shepshed Lane VFR; RW 27 surface wind 270/ 08 QFE 998 millibars, report approaching Shepshed

Route via the Shepshed Lane RW 27 QFE 998 millibars, G-ON

Approaching the Shepshed Lane, G-ON

G- ON Cleared to enter the zone VFR report field in sight

Clear to enter the Zone VFR, WILCO G-ON

G-ON Field in Sight

G-ON contact East Midlands Tower 124.0

East Midlands Tower 124.0 G-ON

East Midlands Tower G-ZAON

G-ZAON join left base RW 27; QFE 998 millibars; No 2 to a Boeing 737 on a 1 mile FINAL.

Join left base RW 27; QFE 998 millibars; No 2. G-ZAON

G-ON report FINAL caution vortex wake the recommended spacing is 6 miles.

WILCO G-ON

G-ON FINAL

G-ON continue approach surface wind 265/ 07

Continue approach G-ON

G-ON Cleared to land RW 27 surface wind 270/ 07

Cleared to land RW 27 G-ON

G-ON landing time 1417 vacate next left

Vacate next Left, G-ON
G-ON contact East Midlands Ground 121.9
Ground 121.9 G-ON

East Midlands Ground G-ZAON Runway vacated

G-ZAON turn right onto taxi-way
Alpha turn left at Alpha 2 for the flying club

Taxi-way Alpha via Alpha 2 for the Flying Club G-ZAON

G-ON report closing down

WILCO G-ON

G-ON Closing Down

Notes:

At some stage in the practical test the candidate will be required to make both Urgency and Emergency calls. They must be made in accordance with CAP413. Failure to make these calls correctly will result in a mandatory failure of the test.

RTF practical tests are conducted using an approved RTF simulator where the candidate must be isolated from the examiner. Only Authorised RTF Examiners may conduct this test. Tests may not be conducted in an aircraft, with the candidate in the same room as the examiner, or without the RTF simulator equipment.

A radiotelephony training record form SRG 1171 is available on the SRG/PLD website to enable candidates to cover all test items with their flight instructor.

Useful References:

CAP 413 Radiotelephony Manual

AIC 19/2004 (White 95) Flight Radiotelephony Operators Licence (VHF and HF) Examinations

Listing of all authorised RTF Examiners can be found on the SRG/PLD website

CAA Flight Safety Poster FSP 4 'Cut the Chat'

The Private Pilot's Licence Course – Air Law and Radiotelephony by Jeremy M Pratt – AFE

The Air Pilots Manual – Volume 7 – by Trevor Thom – Airlife Publishing Ltd

CAA publications can be viewed or downloaded from the CAA web site www.caa.co.uk. Many are available in printed form for purchase from TSO.

14 SUMMARY

- **A Wireless Telegraphy (WT) Act Licence is required for aeronautical radio equipment installed or used in aircraft and aeronautical radio stations.**
- **Aircraft radio equipment must be approved either by the UK CAA or EASA.**
- **Know how to use the aircraft radio equipment**
- **Be familiar with CAP413, it is revised from time to time with new phraseology**
- **Use correct phraseology, it is designed to prevent ambiguity**
- **Use a headset, speak directly into the microphone positioned close to the mouth**
- **Listen out before transmitting**
- **Keep transmissions short**
- **If uncertain of what to say, STOP TRANSMITTING!**
- **Know the types of Air Traffic Service provided and the limitations**
- **Know the Emergency Procedures**