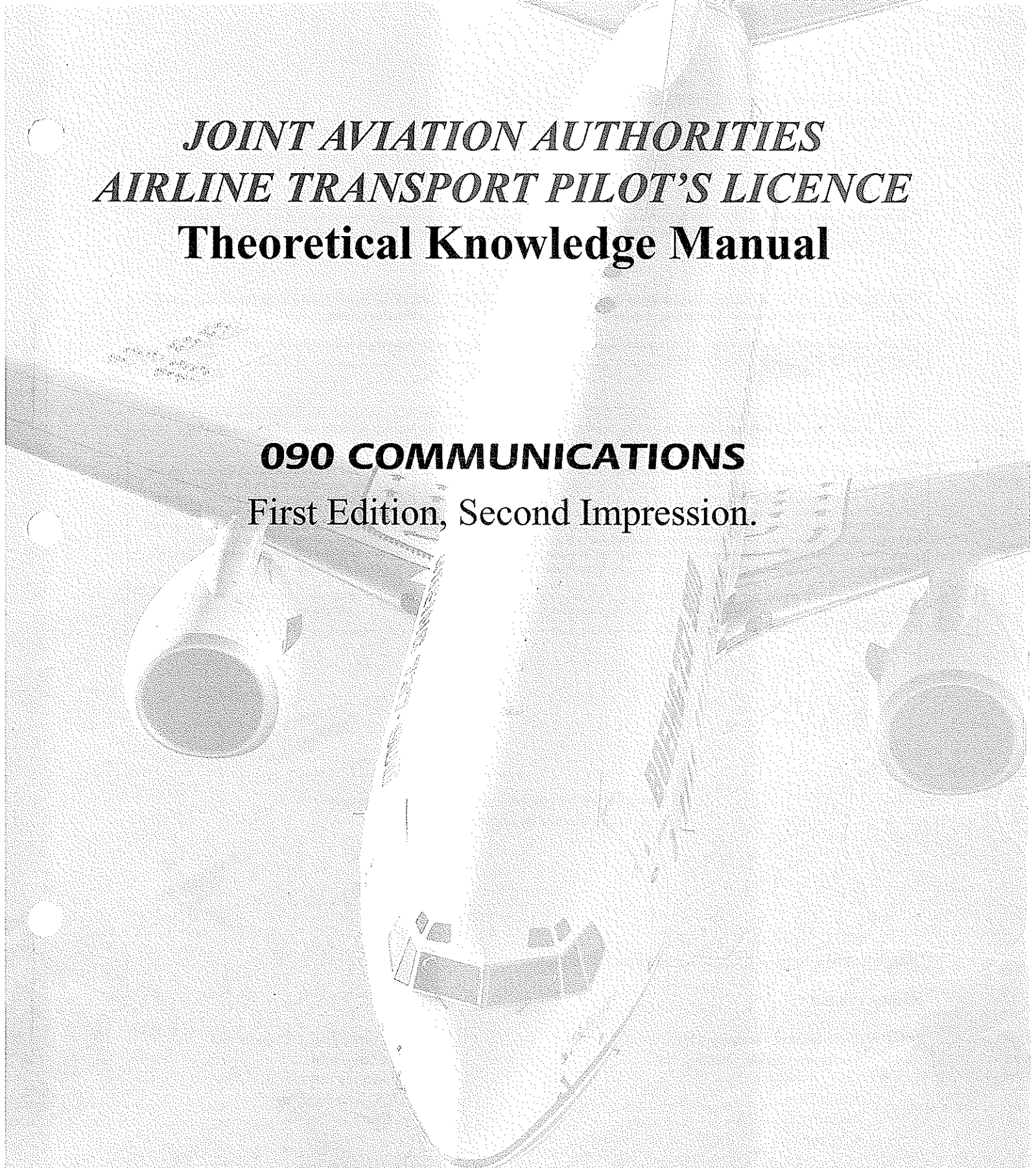
JOINT AVIATION AUTHORITIES
AIRLINE TRANSPORT PILOT'S LICENCE
Theoretical Knowledge Manual



090 COMMUNICATIONS

First Edition, Second Impression.

APPROVED

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CIVIL AVIATION AUTHORITY

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Published by: Jeppesen GmbH, Frankfurt, Germany

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ISBN: 0-88487-291-2

FOREWORD

Joint Aviation Authorities (JAA) pilot licences were first introduced in 1999. By the end of 2002, all 33 JAA member states will have adopted the new, pan-European licensing system. Many other countries world-wide have already expressed interest in aligning their training with the syllabi for the various JAA licences. These syllabi and the regulations governing the award and the renewal of licences are defined by the JAA's licensing agency, known as "Joint Aviation Requirements-Flight Crew Licensing", or JAR-FCL.

The introduction of JAA licences is, naturally, accompanied by associated JAR-FCL practical skill tests (tests of flying ability) and theoretical knowledge examinations corresponding to each level of licence: Private Pilot Licence, Commercial Pilot Licence (CPL), CPL with Instrument Rating and Air Transport Pilot Licence (ATPL). The JAR-FCL skill tests and the ground examinations, though similar in content and scope to those conducted by many national authorities, are inevitably different in detail from the tests and examinations set by any individual JAA member state under its own national scheme. Consequently, students who wish to train for JAA licences need access to study material which has been specifically designed to meet the requirements of the new licensing system.

As far as the JAA ATPL ground examinations are concerned, the subject matter to be tested is set out in the ATPL training syllabus contained in the JAA publication, 'JAR-FCL 1 (Aeroplanes)'. Inevitably, this syllabus represents a compromise between the differing academic contents of the national ATPL training syllabi it replaces. Thus, it follows that the advent of the new examinations has created a need for completely new reference texts to cover the requirements of the new syllabus. This series of manuals, prepared by Oxford Aviation Training and published by Jeppesen, aims to cover those requirements and to help student pilots prepare for the JAA ATPL theoretical knowledge examinations.

Oxford Aviation Training (OAT) is one of the world's leading professional pilot schools. It has been in operation for over thirty years and has trained more than 12, 000 professional pilots for over 80 airlines, world-wide. OAT was the first pilot school in the United Kingdom to be granted approval to train for the JAA ATPL. As one of the most active members of the European Association of Airline Pilot Schools, OAT has been a leading player in the pan-European project to define, in objective terms, the depth and scope of the academic content of JAA ATPL ground training as outlined in 'JAR-FCL 1 (Aeroplanes)'. OAT led and coordinated this joint-European effort to produce the JAA ATPL Learning Objectives which are now published by the JAA itself as a guide to the theoretical knowledge requirements of ATPL training.

In less than two years since beginning JAA ATPL training, and despite the inevitable teething problems that national aviation authorities have experienced in introducing the new examination system, OAT has achieved an unsurpassed success rate in terms of the passes its students have gained in the JAA ATPL examinations. This achievement is the result of OAT's whole-hearted commitment to the introduction of the new JAA licensing system and of its willingness to invest heavily in the research and development required to make the new system work for its students. OAT has not only been at the forefront of the effort made to document JAA ATPL theoretical knowledge requirements, but it has also produced associated academic notes of the highest quality and created computer-generated and web-based ATPL lessons which ensure that its students are as well-prepared as possible to succeed in the ground examinations.

continued....

OAT's experience and expertise in the production of JAA ATPL training material make this series of manuals the best learning material available to students who aspire to hold a JAA ATPL. Jeppesen, established in 1934, is acknowledged as the world's leading supplier of flight information services, and provides a full range of print and electronic flight information services, including navigation data, computerised flight planning, aviation software products, aviation weather services, maintenance information, and pilot training systems and supplies. Jeppesen counts among its customer base all US airlines and the majority of international airlines world-wide. It also serves the large general and business aviation markets.

The combination of Jeppesen and OAT expertise embodied in these manuals means that students aiming to gain a JAA ATPL now have access to top-quality, up-to-date study material at an affordable cost.

Manuals are not, of course, the complete answer to becoming an airline pilot. For instance, they cannot teach you to fly. Neither may you enter for the new JAA ATPL theoretical knowledge examinations as a "self-improver" student. The new regulations specify that all those who wish to obtain a JAA ATPL must be enrolled with a flying training organisation (FTO) which has been granted approval by a JAA-authorised national aviation authority to deliver JAA ATPL training. The formal responsibility to prepare you for both the flying tests (now known as "skill tests") and the ground examinations lies with your FTO. However, these OAT/Jeppesen manuals represent a solid foundation on which your formal training can rest.

For those aspirant airline pilots who are not yet able to begin formal training with an FTO, but intend to do so in the future, this series of manuals will provide high-quality study material to help them prepare themselves thoroughly for their formal training. The manuals also make excellent reading for general aviation pilots or for aviation enthusiasts who wish to further their knowledge of aeronautical subjects to the standard required of airline pilots.

At present, the JAA ATPL theoretical knowledge examinations are in their infancy. The examinations will inevitably evolve over the coming years. As the system evolves, syllabus or question modifications, as well as OAT's rapidly growing experience in preparing its students for the examinations, will inevitably lead to the need for changes or updates to the content of the books. The books are supported by a free updating service (available online at www.oxfordaviation.net/shop) which aims to keep pace with changes to the published JAA ATPL Learning Objectives. The online amendments also reflect the continual feedback that OAT receives from the hundreds of its students who pass the examinations, every year.

OAT's knowledge of and involvement in JAR-FCL developments are second to none. You will benefit from OAT's expertise both in your initial purchase of this text book series and in your subscription to the amendment service. OAT and Jeppesen have published what they believe to be the highest quality JAA ATPL theoretical knowledge manuals currently available. The content of these manuals enables you to draw on the vast experience of two world-class organisations, each of which is an acknowledged expert in its field of the provision of pilot training and the publication of pilot training material, respectively.

We trust that your study of these manuals will not only be enjoyable but, for those of you undergoing training as airline pilots, will also lead to success in the JAA ATPL ground examinations.

Whatever your aviation ambitions, we wish you every success and, above all, happy landings.

Oxford, England. January 2002

Textbook Series

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10	060 Navigation 1	061	General Navigation
11	060 Navigation 2	062	Radio Navigation
12	070 Operational Procedures		
13	080 Principles of Flight		
14	090 Communications		
15	Reference Material		

COMMUNICATIONS

TABLE OF CONTENTS

AMENDMENT SERVICE

An amendment service to this series is provided free of charge on the Oxford Aviation Training website at http://www.oxfordaviation.net/products/studyaids/amend.htm

First Edition : May 2001

Second Impression : October 2001 - incorporating Amendment List 1 to Edition 1

CHAPTER ONE - DEFINITIONS

Contents

1.1 INTRODUCTION

The standard for aeronautical operations was laid down by International Civil Aviation Organisation (ICAO) in its 1944 Chicago convention. Most of the standards for Communication (equipment, standards and procedures) are laid down in Annexe 10 Vol.2 to the convention. The UK guidance to pilots is the CAA publication CAP 413 which you should have in your possession. These procedures have improved upon ICAO over the years especially in the words/phrases used.

The JAR-FCL Communications examination is divided into two ½ hour sections: VFR and IFR comms. It is not possible to separate entirely VFR and IFR communications because much of the detail is equally valid to both phases of flight. In the initial lessons we will concentrate on those sections that can be placed solely on the VFR section. Please note that what you learn in the VFR section may be tested again by similar (if not identical) questions in the IFR exam.

NOTE. The JAR-FCL standard for the exam is ICAO. Most of CAP 413 is valid for the exam but it differs especially in the use of R/T for take-off and for altitude instructions. These notes are based only on ICAO.

1.2 TRANSMISSION OF LETTERS AND NUMBERS

In some circumstances it could be difficult to hear clearly what is said over the radio. Perhaps the aircraft is noisy, or the reception poor, or there may be words that sound similar and could be confused. For example, the letter 'A' could be confused with the number '8', or the letter 'C' (see) which sounds like 'D'(dee) or 'V'(vee). To help overcome these problems a standard way of saying letters, spellings, numbers and so on has been devised. You must know these.

Letters

The standard alphabet has a phonetic pronunciation for each letter. The sound should be the same whatever the speaker's natural language! A word should be spelt whenever its meaning is not clear technically or when using proper names, service abbreviations and words of which the spelling is doubtful. The phonetic alphabet is shown in figure 1.1 below.

A	ALPHA	AL FAH
B	BRAVO	BRAH VOH
C	CHARLIE	CHAR LEE
D	DELTA	DELL TAH
E	ECHO	ECK OH
F	FOXTROT	FOKS TROT
G	GOLF	GOLF
H	HOTEL	HOH TELL
I	INDIA	IN DEE AH
J	JULIETT	JEW LEE ETT
K	KILO	KEY LOH
L	LIMA	LEE MAH
M	MIKE	MIKE
N	NOVEMBER	NO VEM BER
O	OSCAR	OSS CAH
P	PAPA	PAH PAH
Q	QUEBEC	KEH BECK
R	ROMEO	ROW ME OH
S	SIERRA	SEE AIR RAH
T	TANGO	TANG GO
U	UNIFORM	YOU NEE FORM
V	VICTOR	VIK TAH
W	WHISKEY	WISS KEY
X	X-RAY	ECKS RAY
Y	YANKEE	YANG KEY
Z	ZULU	ZOO LOO

Figure 1.1.

Numbers

Similarly numbers must also be said precisely especially when discussing height, altitudes or flight levels. Any confusion could easily be deadly! See figure 1.2 for the pronunciation of numbers.

0	ZERO	
1	WUN	
2	TOO	
3	TREE	*DECIMAL : DAY-SEE-MAL*
4	FOW-ER	*HUNDRED : HUN-DRED*
5	FIFE	
6	SIX	*THOUSAND : TOU-SAND*
7	SEVEN	
8	AIT	
9	NIN-ER	

Figure 1.2.

Combinations

When transmitting messages containing call signs, altimeter settings, flight levels, altitudes, wind velocity, frequencies etc. etc. each letter and digit is pronounced. Figure 1.3 shows an example of a message with a combination of letters and numbers.

London Control Clears Golf Bravo Echo Juliet Victor to join controlled airspace at — route Golf Wun Flight Level Ait Zero squawk 3217 contact London now frequency Wun Too Tree Day-se-mal Fower.

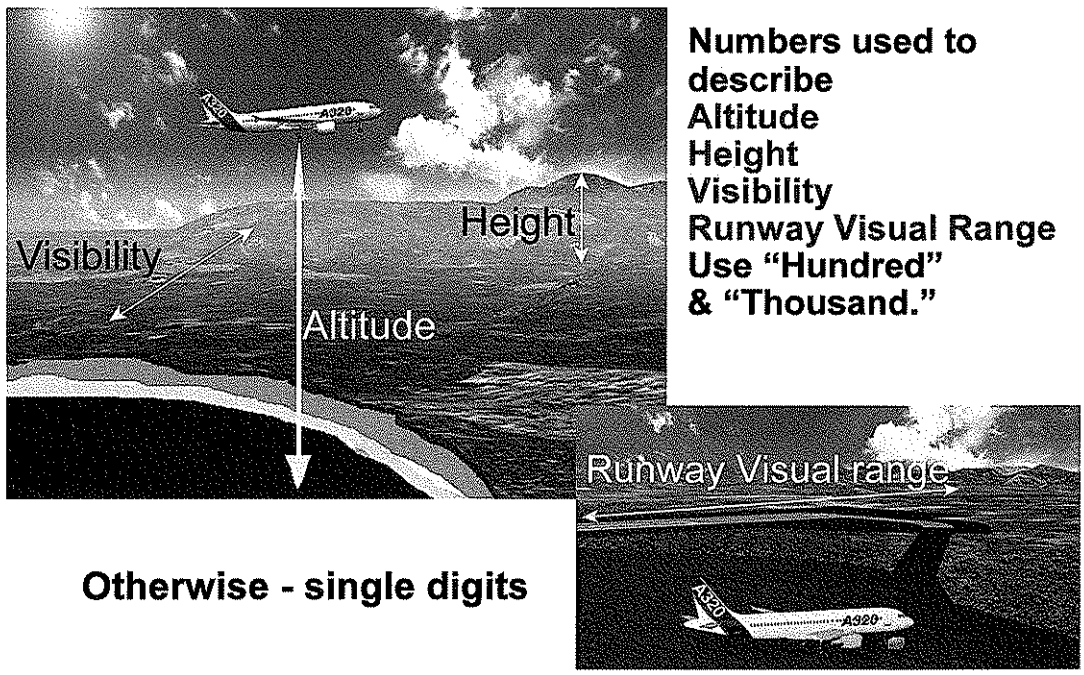
Figure 1.3.

Exceptions

Numbers used to describe Altitude, Height, Visibility, and Runway Visual Range (RVR) which contain whole HUNDREDS or THOUSANDS use "Hundred" and "Thousand", otherwise single digits e.g. Squawk 6500 - "Squawk six fife zero zero". See Figures 1.4 and 1.5.

10	WUN ZERO
100	WUN HUNDRED
2500	TOO TOUSAND FIFE HUNDRED
11 000	WUN WUN TOUSAND
25 000	TOO FIFE TOUSAND

Figure 1.4.



Courtesy of Airbus Industrie

Figure 1.5

1.3 DEFINITIONS

We have prepared a list of definitions which must be learned. Sadly there is no easy way to do it. However, some definitions may not be obvious to you so the following additional notes may help to clarify them.

Station

A station is simply a piece of equipment which is used to transmit or receive aeronautical information. It could be a radio in an aircraft or on the ground, or even a network of teleprinters or computers used by controllers, or operations departments.

Aeronautical Fixed Telecommunication Network

This is a network of fixed local based stations used to send information such as NOTAMS, WEATHER, FLIGHT PLANS, DEPARTURE & ARRIVAL INFORMATION etc. Formerly this was mostly teleprinter information but now it is increasingly a digital (computer) network usually called AFTN.

Aeronautical Mobile Service

This is the service that you will use whenever you use your radio. It is all stations on the ground or in the air involved in the day-to-day operations of the aircraft.

Blind Transmission

In this case one station is receiving no reply; it could be just his own receiver is not working. So he transmits 'blind', hoping that Control can hear him.

ICAO DEFINITION. A transmission from one station to another in circumstances where two-way communication cannot be established but where it is believed that the called station is able to receive the transmission.

Read Back

Some important instructions or information must be readback to confirm or to check accuracy of reception.

1.4 SOME PRINCIPAL TERMS USED IN THE MANUAL

Note: Definitions of other terms will be found in appropriate ICAO documents.

Aerodrome control service. Air traffic control service to aerodrome traffic.

Aerodrome traffic. All traffic on the manoeuvring area of an aerodrome and all aircraft flying in the vicinity of an aerodrome.
Note: An aircraft is in the vicinity of an aerodrome when it is on, entering or leaving a traffic circuit.

Aerodrome traffic circuit. The specified path to be flown by aircraft operating in the vicinity of an aerodrome.

Aeronautical mobile service. A mobile service between aeronautical stations and aircraft stations; or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radio beacon stations may also participate in this service on designated distress and emergency frequencies.

Aeronautical station. A land station in the aeronautical mobile service. In certain instances, an aeronautical station may be located on board ship or on a platform at sea.

Air-ground communication. Two-way communication between aircraft and stations or locations on the surface of the earth.

Air-ground control clearance. Authorisation for an aircraft to proceed under conditions specified by air traffic control service.

Air traffic service. A generic term meaning, variously, air traffic control unit, flight information service, alerting service, air traffic advisory service, air traffic control service, approach control service or aerodrome control service.

Air traffic services unit. A generic term meaning variously, air traffic control unit, flight information centre or air traffic services reporting office.

Airway. A control area or portion thereof established in the form of a corridor equipped with radio navigational aids.

Altitude. The vertical distance of a level, a point or an object considered as a point, measured from mean sea level.

Approach control service. Air traffic control service for arriving and departing controlled flights.

Apron. A defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading and unloading passengers, Mail or cargo, fuelling, parking or maintenance.

Area control centre. A unit established to provide air traffic control service to controlled flights in control under its jurisdiction.

Automatic terminal information service. The provision of current, routine information to arriving and departing aircraft by means of continuous and repetitive broadcasts throughout the day or a specified portion of the day.

Blind transmission. A transmission from one station to another station in circumstances where the communication cannot be established but where it is believed that the called station is able to receive the transmission.

Broadcast. A transmission of information relating to air navigation that is not addressed to a specific station or stations.

Clearance limit. The point to which an aircraft is granted an air traffic control clearance.

Control Area. A controlled airspace extending upwards from a specified limit above the surface of the earth.

Controlled airspace. An airspace of defined dimensions within which air traffic control service is provided for controlled flights.

Control Zone. A controlled airspace extending upwards from the surface to a specified upper level.

Estimated time of arrival (ETA). The time at which the pilot estimates that the aircraft will be over a specified location.

Expected approach time (EAT). The time at which ATC expects that an arriving aircraft, following a delay will arrive at the holding point to complete its approach for a landing.

Flight plan. Specified information provided to air traffic services units, relative to an intended flight or path of a flight of an aircraft.

Heading. The direction in which the longitudinal axis of an aircraft is pointed, usually expressed in degrees North (true, magnetic, compass or grid).

Holding Point. A specified location, identified by visual or other means, in the vicinity of which the point of an aircraft in flight is maintained in accordance with air traffic control clearances.

Holding procedure. A predetermined manoeuvre which keeps an aircraft which a specified airspace whilst awaiting further clearance.

IFR flight. A flight conducted in accordance with instrument flight rules.

Instrument meteorological conditions. Meteorological conditions expressed in terms of visibility, distance, cloud and ceiling, less than the minima specified for visual meteorological conditions.

Level. A generic term relating to the vertical position of an aircraft in flight and meaning variously, height or flight level.

Manoeuvring area. That part of an aerodrome to be used for the take-off, landing and taxiing of an aircraft excluding aprons.

Missed approach procedure. The procedure to be followed if the approach cannot be continued.

Movement area. That part of the aerodrome to be used for the take-off, landing and taxiing of aircraft, on the manoeuvring area and the apron(s).

Radar approach. An approach, executed by an aircraft, under the direction of a radar controller.

Radar identification. The process of correlating a particular radar blip of radar position symbol with a specific aircraft.

Radar vectoring. Provision of navigational guidance to aircraft in the form of specific headings, based on the use of radar.

Reporting point. A specified geographical location in relation to which the position of the aircraft can be reported.

Runway visual range. The range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line.

Threshold. The beginning of that portion of the runway useable for landing.

Touchdown. The point where the nominal glide path intercepts the runway.

Track. The projection on the earth's surface of the path of an aircraft, the direction of which path at any point is visually expressed in degrees from North (true, magnetic or grid).

VFR flight. A flight conducted in accordance with visual flight rules.

Visual meteorological conditions. Meteorological conditions expressed in terms of visibility, distance form cloud and ceiling, equal to or better than specified minima.

1.5 ABBREVIATIONS

Here are some commonly used abbreviations which you will meet many times in your career. They must be learned for exams.

Note: - the abbreviations listed below are normally spoken using the constituent letters, rather than the spelling alphabet, except those indicated by an asterisk are normally spoken as complete words.

ACC	Area control centre or area control.
ADF	Automatic direction-finding equipment.
ADR	Advisory route.
AFIS*	Aerodrome flight information service.
AGL	Above ground level.
AIP	Aeronautical information publication.
AIRAC*	Aeronautical information regulation and control.
AIS	Aeronautical information services.
AMSL	Above mean sea level.
ATC	Air traffic control (in general).
ATD	Actual time of departure.
ATIS*	Automatic terminal information service.
ATS	Air traffic services.
ATZ	Aerodrome traffic zone.
CAVOK*	Visibility, cloud and present weather better than prescribed values or conditions.
CTR	Control Zone.
DME	Distance measuring equipment.
EET	Estimated elapsed time.

ETA	Estimated time of arrival or estimating arrival.
ETD	Estimated time of departure or estimating departure.
FIC	Flight information centre.
FIR	Flight information region.
FIS	Flight information service.
GCA	Ground controlled approach system or ground controlled approach.
HF	High frequency (3 to 30 MHz).
H24	Continuous day and night service.
IFR	Instrument flight rules.
ILS	Instrument landing system.
IMC	Instrument meteorological conditions.
INFO*	Information.
INS	Inertial navigational system.
LORAN*	LORAN (long range air navigation system).
MET*	Meteorological or meteorology.
MLS	Microwave landing system.
MNPS	Minimum navigation performance specifications.
NDB	Non-directional radio beacon.
NIL*	None or I have nothing to send you.
NOTAM*	A notice containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.
PAPIs	Precision Approach Path Indicators
QFE	Atmospheric pressure at aerodrome elevation (or at runway threshold).

QNH	Altimeter sub-scale setting to obtain elevation when on the ground.
RCC	Rescue co-ordination centre.
RNAV*	Area navigation.
RVR	Runway visual range.
SELCAL*	A system which permits the selective calling of individual aircraft over radiotelephone channels linking a ground station with the aircraft.
SID*	Standard instrument departure.
SIGMET*	Information concerning en-route weather phenomena which may affect the safety of aircraft operations.
SNOWTAM*	A special series NOTAM notifying the presence or removal of hazardous conditions due to snow, ice, slush or standing water associated with snow, slush and ice on the movement area, by means of a specific format.
SPECIAL*	Special meteorological report (in abbreviated plain language).
SSR	Secondary surveillance radar.
SST	Supersonic transport.
STAR*	Standard (instrument) arrival.
TACAN*	UHF tactical air navigational aid.
TAF*	Aerodrome forecast.
TMA	Terminal control area.
UHF	Ultra high frequency (300 to 3000 MHz).
UIR	Upper flight information region.
UTA	Upper control area.
UTC	Co-ordinated universal time.
VASIS*	Visual approach slope indicator system.
VDF	Very high frequency direction-finding system.

VFR Visual flight rules.

VHF Very high frequency (30 to 300 MHz).

VIP Very important person.

VMC Visual meteorological conditions.

VOLMET* Meteorological information for aircraft in flight.

VOR VHF omnidirectional radio range.

VORTAC* VOR and TACAN combination.

1.6 CATEGORIES OF MESSAGES

By convention, messages are placed into categories so that if several need to be sent, the highest priority messages are sent first. This also applies to normal radio communications; for example, an aircraft emergency call takes priority over a request for landing. The messages have the following order of priority:

1) **Emergency Distress.** A condition of being threatened by serious and/or imminent danger and of requiring immediate assistance.

Urgency. A condition concerning the safety of an aircraft etc but does not require immediate assistance.

2) **Direction Finding** VDF using Q codes, Radar vectors.

3) **Flight Safety** Messages of immediate concern to an aircraft in flight.
Met advice of immediate concern.

4) **Met.** Reports, forecasts and warnings.

5) **Flight Regularity** Messages regarding
- operation or maintenance of facilities
- servicing
- changes in requirements for pax and crew
- non routine landings
- aircraft parts or materials
-changes in aircraft operating schedules

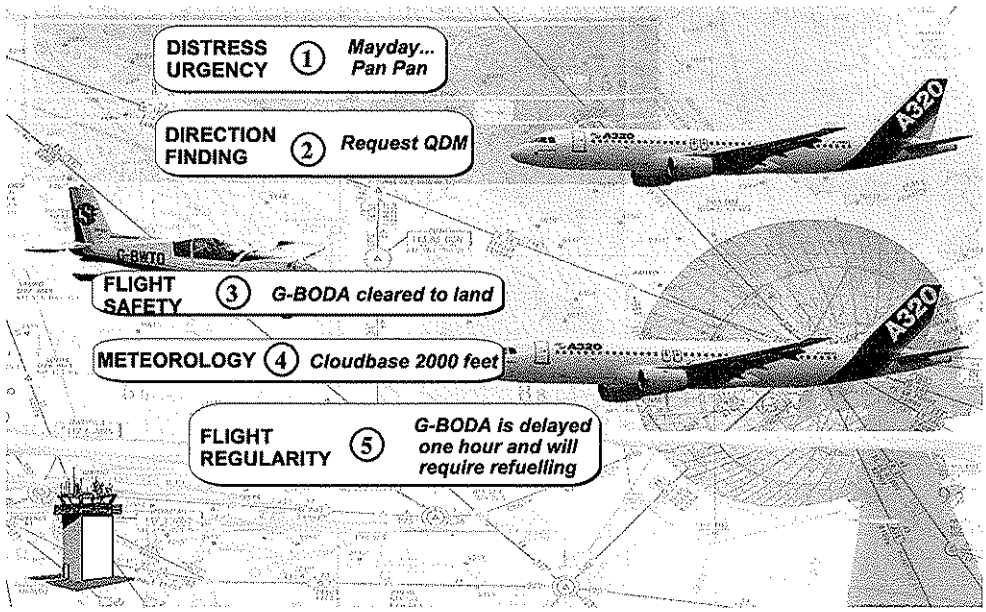


Figure 1.6.

1.7 VHF RANGE

Finally, you need to know a little about the range that you can get with your VHF radio. This is covered in the radio propagation theory in the Electrics book. The range of VHF radio in nm is about 1.25 times the square-root of the aircraft height in feet. Roughly this works out about 12 times the square-root of the flight level.

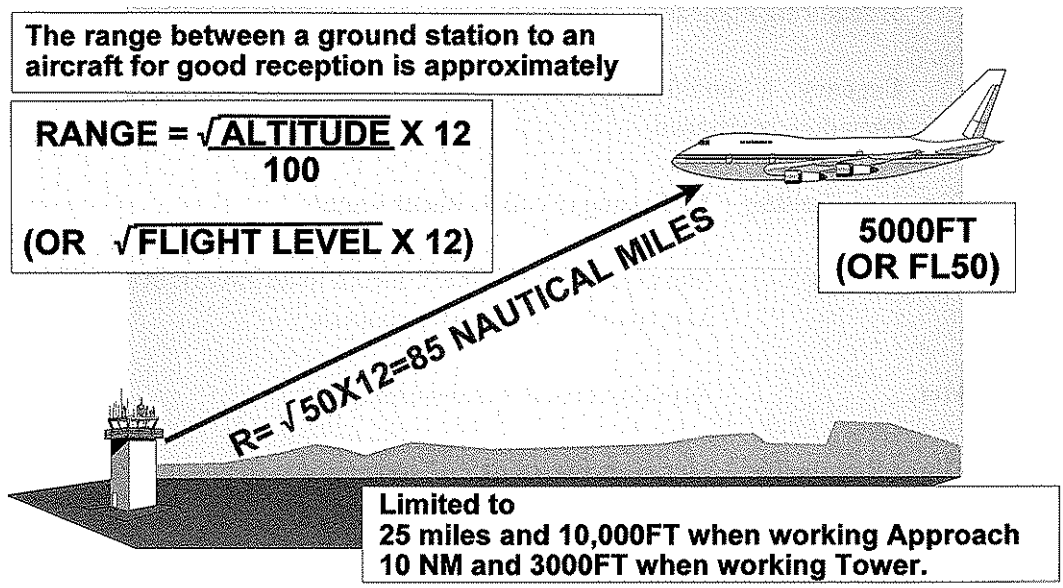


Figure 1.7. Vhf Range

1.8 APPENDIX 1A - ABBREVIATIONS USED IN AIS PUBLICATIONS

Abbreviations which differ from the ICAO abbreviations are shown in italics below.

† When radiotelephony is used, the abbreviations and terms are transmitted as spoken words.
‡ When radiotelephony is used, the abbreviations and terms are transmitted using the individual letters in non-phonetic form.

	A
A	Amber
AAA	(or AAB, AAC... etc, in sequence) Amended meteorological message (message type designator)
A/A	Air-to-air
AAL	Above Aerodrome Level
ABM	Abeam
ABN	Aerodrome Beacon
ABT	About
ABV	Above
AC	Altocumulus
ACARS	Aircraft Communications Addressing And Reporting System
ACAS†	Airborne Collision Avoidance Systems
ACC‡	Area Control Centre OR Area Control
ACCID	Notification of an Aircraft Accident
ACFT	Aircraft
ACH	Asymmetric Committed Height
ACK	Acknowledge
ACL	Altimeter Check Location
ACN	Aircraft Classification Number
ACP	Acceptance (message type designator)
ACPT	Accept OR Accepted
ACT	Active OR Activated OR Activity
AD	Aerodrome
ADA	Advisory Area
ADDN	Addition OR Additional
ADF‡	Automatic Direction-Finding Equipment
ADGE	Air Defence Ground Environment
ADIZ†	(to be pronounced 'AY-DIZ') Air Defence Identification Code
ADJ	Adjacent
ADR	Advisory Route
ADS	Automatic Dependent Surveillance
ADSU	Automatic Dependent Surveillance Unit
ADT	Approved Departure Time
ADVS	Advisory Service
ADZ	Advise
AES	Aircraft Earth Station
AFIL	Flight Plan Filed in the Air
AFIS	Aerodrome Flight information Service
AFM	Yes OR Affirm OR Affirmative OR That is Correct
AFS	Aeronautical Fixed Service
AFT	After... (time or place)
AFTN‡	Aeronautical Fixed Telecommunication Network
A/G	Air-to-Ground
AGA	Aerodromes, Air Routes and Ground Aids
AGL	Above Ground Level
AGN	Again
AGNIS	Azimuth Guidance for Nose-In Stand
AIAA	Area of Intense Air Activity
AIC	Aeronautical Information Circular
AIM	ATFM Information Message
AIP	Aeronautical Information Publication
AIRAC	Aeronautical Information Regulation and Control
AIREP†	Air-Report
AIS	Aeronautical Information Services
ALA	Alighting Area
ALERF	Alert Phase
A†	
ALR	Alerting (message type designator)
ALRS	Alerting Service
ALS	Approach Lighting System
ALT	Altitude
ALTN	Alternate OR Alternating (Light alternates in colour)
ALTN	Alternate (Aerodrome)
AMA	Area Minimum Altitude
AMD	Amend OR Amended (used to indicate amended meteorological message; message type designator)
AMDT	Amendment (AIP Amendment)
AMS	Aeronautical Mobile Service
AMSL	Above Mean Sea Level
AMSS	Aeronautical Mobile Satellite Service
ANM	ATFM Notification Message
ANS	Answer
AO	Aircraft Operators
AOC	Aerodrome Obstacle Chart
AOC	Air Operator Certificate
AOD	Above Ordnance Datum (Newlyn)
AOM	Aerodrome Operating Minima
AP	Airport

APAPI	Abbreviated Precision Approach Path Indicator
APCH	Approach
APHAZ	Aircraft Proximity Hazzard
APIS	Aircraft Positioning and Information System
APP	Approach Control Office OR Approach Control OR Approach Control Service
APR	April
APRX	Approximate OR Approximately
APSG	After Passing
APV	Approve OR Approved OR Approval
ARFOR	Area Forecast (In aeronautical Meteorological Code)
ARNG	Arrange
ARO	Air Traffic Services Reporting Office
ARP	Aerodrome Reference Point
ARP	Air-Report (message type designator)
ARQ	Automatic Error Correction
ARR	Arrive OR Arrival
ARR	Arrival (message type designator)
ARS	Special Air-Report (message type designator)
ARST	Arresting (Specify (part of) Aircraft Arresting Equipment)
AS	Altostratus
ASC	Ascent to OR Ascending to
ASDA	Accelerate-Stop Distance Available
ASPH	Asphalt
AT...	At (followed by time at which weather change is forecast to occur)
ATA‡	Actual Time of Arrival
ATC‡	Air Traffic Control (in general)
ATD‡	Actual Time of Departure
ATFM	Air Traffic Flow Management
ATIS†	Automatic Terminal Information Service
ATM	Air Traffic Management
ATN	Aeronautical Telecommunication Network
ATOTN	Air Traffic Operation Telephone Network
ATP	At...(time or place)
ATS	Air Traffic Service
ATSU	Air Traffic Service Unit
ATTN	Attention
ATZ	Aerodrome Traffic Zone
AUG	August
AUTH	Authorised OR Authorisation
AUW	All up Weight
AUX	Auxiliary
AVASIS	Abbreviated Visual Approach Slope Indicator System
AVBL	Available OR Availability
AVG	Average
AVGAS	Aviation Gasoline
†	

AVTUR	Aviation Turbine Fuel
AWTA	Advise at What Time Available
AWY	Airway
AZM	Azimuth
	B
B	Blue
BA	Braking Action
BAA	British Airports Authority plc
BASE†	Cloud Base
BCFG	Fog Patches
BCN	Beacon (Aeronautical ground light)
BCST	Broadcast
BDRY	Boundary
BECMG	Becoming
BFR	Before
BKN	Broken
BL...	Blowing (followed by DU = Dust, SA = Sand or SN = Snow)
BLDG	Building
BLO	Below Clouds
BLW	Below...
BOMB	Bombing
BR	Mist
BRF	Short (used to indicate the type of approach desired or required)
BRG	Bearing
BRKG	Braking
B-	Basic - (To be pronounced 'AR-NAV') Area
RNAV†	Navigation
BS	Commercial Broadcasting Station
BTL	Between Layers
BTN	Between
	C
C	Centre (runway identification)
CAA	Civil Aviation Authority
CANP	Civil Aircraft Notification Procedure
CAP	Civil Aviation Publication
CAS	Calibrated Airspeed
CAT	Category
CAT	Clear Air Turbulence
CATZ	Combined Aerodrome Traffic Zone
CAVOK	(To be pronounced 'KAV-OH-KAY')
†	Visibility, cloud and present weather better than prescribed values or conditions
CB‡	(To be pronounced 'CEE BEE') Cumulonimbus
CBR	Cloud Base Recorder (ceilometer)
CC	Counter Clockwise
CC	Cirrocumulus
CCA	(Or CCB, CCC...etc, in sequence) Corrected meteorological message (message type designator)
CD	Candela

CDN	Co-ordination (message type designator)
CDR	Conditional Rout
CEU	Central Executive Unit
CF	Change frequency to...
CFMU	Central Flow Management Unit (Europe)
CGL	Circling Guidance Light(s)
CHAPI	Compact Helicopter Approach Path Indicator
CH	Channel
CHG	Modification (message type designator)
CI	Cirrus
CIDIN†	Common ICAO Data Interchange Network
CIT	Near OR over large towns
CIV	Civil
CK	Check
CL	Centre-Line
CLA	Clear Type of Ice Formation
CLBR	Calibration
CLD	Cloud
CLG	Calling
CLR	Clear(s) OR Cleared to... OR Clearance
CLSD	Close OR Closed OR Closing
CM	Centimetre
CMB	Climb to OR Climbing to
CMN	Control Motion Noise
CMPL	Completion OR Completed OR Complete
CNL	Cancel OR Cancelled
CNL	Flight Plan Cancellation (message type designator)
CNS	Communications, Navigation and Surveillance
Coded	Centre-line lights of approach light system ae coded
COL	Column (in tables and text)
Colour coded	Runway centre-line lights are coloured red over the final 300 m and alternately red/white in the penultimate 600 m.
COM	Communications
CONC	Concrete
COND	Condition
CONS	Continuous
CONST	Construction OR Constructed
CONT	Continue(s) OR Continued
COOR	Co-ordinate OR Co-ordination
CO-ORD	Geographical Co-ordinates
COP	Change-Over Point
COR	Correct OR Correction OR Corrected (Used to indicate corrected meteorological message; message type designator)
COSPAS	Cosmos Rescue System (USSR)
COT	At the Coast
COV	Cover OR Covered OR Covering
CPL	Current Flight Plan (message type designator)
CRM	Collision Risk Model
CRZ	Cruise
CS	Cirrostratus
CTA	Control Area
CTAM	Climb to and Maintain
CTC	Contact
CTL	Control
CTMO	Central Traffic Management Organisation
CTN	Caution
CTOT	Calculated Take-off Time
CTR	Control Zone
CU	Cumulus
CUF	Cumuliform
CUST	Customs
CW	Continuous Wave
CWY	Clearway
	D
D...	DME Range (prefix used in graphics0
D	DME Frequency pairing (used in graphics as a suffix to a VOR/ILS frequency)
D...	Danger Area (Followed by Identification)
D	Downward (tendency in RVR during previous 10 minutes)
DA	Decision Altitude
DAAIS	Danger Area Activity Information Service
DACS	Danger Area Crossing Service
DBC	Comecon Data Bank
DBE	Eurocontrol Data Bank
DCD	Double Channel Duplex
DCKG	Docking
DCS	Double Channel Simplex
DCT	Direct (In relation to flight path clearances and type of approach)
DDM	Difference in Depth of Modulation
DEC	December
DECR	Decrease
DEG	Degrees
DENEB	Fog Dispersal Operations
DEP	Depart OR Departure
DEP	Departure (message type designator)
DER	Departure End of Runway
DES	Descend to OR Descending to
DEST	Destination
DETR	Department of the Environment, Transport and the Regions (UK)
DETRESFA†	Distress Phase
DEV	Deviation OR Deviating
DF	Direction Finding
DFR	Departure Flow Regulator
DFTI	Distance from touchdown Indicator

DH	Decision Height
DIF	Diffuse
DIST	Distance
DIV	Divert OR Diverting
DLA	Delay OR Delayed
DME‡	Distance Measuring Equipment
DNG	Danger OR Dangerous
DOC	Designated Operational Coverage
DOM	Domestic
DP	Dew Point Temperature
DPT	Depth
DR	Dead Reckoning
DR...	Low Drifting (followed by DU = Dust, SA = Sand or SN = Snow)
DRG	During
DS	Duststorm
DSB	Double Sideband
DTAM	Descend to and Maintain
DTG	Date-Time Group
DTRT	Deteriorate OR Deteriorating
DTW	Dual Tandem Wheels
DU	Dust
DUA	Dedicated User Area
DUC	Dense upper Cloud
DUR	Duration
DVOR	Doppler VOR
DW	Dual Wheels
DZ	Drizzle
	E
E	East OR Eastern Longitude
EAT	Expected Approach Time
EB	Eastbound
ECAC	European Civil Aviation Conference
ED	Emergency Distance (AD 1.1.1)
EDT	Estimated Departure Time
EET	Estimated Elapsed Time
EFC	Expected Further Clearance
EFIS	Electronic Flight Instrument System
EHF	Extremely High Frequency (30000 to 300000 MHz)
ELBA†	Emergency Location Beacon - Aircraft
ELEV	Elevation
ELR	Extra Long Range
ELT	Emergency Locator Transmitter (GEN 3.6.6)
EM	Emission
EMBD	Embedded in a Layer (To indicate cumulonimbus embedded in layers of other clouds)
EMERG	Emergency
END	Stop-end (related to RVR)
ENE	East North East
ENG	Engine
ENRT	En-Route
EOA	Engine Out Allowance
EOBT	Estimated Off-Block Time
EPIRB	Emergency Position Indicating Radio Beacon
EQPT	Equipment
ER	Here...OR Herewith
ESE	East South East
EST	Estimate OR Estimated OR Estimate (message type designator)
ETA‡	Estimated Time of Arrival OR Estimating Arrival
ETD‡	Estimated Time of Departure OR Estimating Departure
ETO	Estimated Time Over Significant Point
ETOPS	Extended Twin-jet Operations
EV	Every
EXC	Except
EXER	Exercises OR Exercising OR To Exercise
EXP	Expect OR Expected OR Expecting
EXTD	Extend OR Extending
	F
F	Fixed
FA	Area Forecast (ARFOR)
FAC	Facilities
FAF	Final Approach Fix
FAL	Facilitation of International Air Transport
FAP	Final Approach Point
FAT	Final Approach Track
FATO	Final Approach and Take-off Area
FAX	Facsimile Transmission
FBL	Light (Used to indicated the intensity of weather phenomena, interference or static reports, e.g. FBL RA = Light rain)
FBU	Flight Briefing Unit
FC	Funnel Cloud (tornado or water spout)
FCST	Forecast
FCT	Friction Coefficient
FEB	February
FG	Fog
FIC	Flight Information Centre
FIR‡	Flight Information Region
FIS	Flight Information Service
FISA	Automated Flight Information Service
FL	Flight Level
FLAS	Flight Level Allocation Scheme
FLD	Field
FLG	Flashing
FLR	Flares
FLT	Flight
FLTCK	Flight Check
FLUC	Fluctuating OR Fluctuation OR Fluctuated
FLW	Follow(s) OR Following
FLY	Fly OR Flying
FM	From

FM...	From (followed by time weather change is forecast to begin)
FMS	Flight Management System
FMU	Flow Management Unit
FMP	Flow Management Position
FNA	Final Approach
FOQNH	Forecast Regional QNH
FPL	Filed Flight Plan (message type designator)
FPM	Feet Per Minute
FPR	Flight Plan Route
FR	Fuel Remaining
FREQ	Frequency
FRI	Friday
FRNG	Firing
FRONT †	Front (Relating to Weather)
FRQ	Frequent
FSL	Full Stop Landing
FSS	Flight Service Station
FST	First
FT	Feet (Dimensional Unit)
FTT	Flight Technical Tolerance
FU	Smoke
FZ	Freezing
FZDZ	Freezing Drizzle
FZFG	Freezing Fog
FZRA	Freezing Rain
	G
G	Green
G/A	Ground-to-Air
G/A/G	Ground-to-Air and Air-to-Ground
GAT	General Air Traffic
Gauge	Indicates distance between two rows of runway lights
GCA‡	Ground Controlled Approach System OR Ground Controlled Approach
GEN	General
GEN	Generally
GEO	Geographic OR True
GES	Ground Earth Station
GLD	Glider
GND	Ground
GNDCK	Ground Check
GNSS	Global Navigation Satellite System
GP	Glide Path
GR	Hail
GRASS	Grass Landing Area
GRID	Processed Meteorological Data in the Form of Grid Point Values (In Aeronautical Meteorological Code)
GRVL	Gravel
GS	Ground Speed
GS	Small hail and/or snow pellets
GVS	Gas Venting Site
	H
H24	Continuous Day and Night Service
HAPI	Helicopter Approach Path Indicator
HBN	Hazard Beacon
HDF	High Frequency Direction-Finding Station
HDG	Heading
HEL	Helicopter
HF‡	High Frequency (3000 to 30000 kHz)
HGT	Height OR Height Above
HIAL	Highlands and Islands Airports Ltd
HI	High Intensity directional lights
HIRTA	High Intensity Radio Transmission Area
HJ	Sunrise to sunset
HL	Height Loss
HLDG	Holding
HN	Sunset to Sunrise
HO	Service available to meet operational requirements
HOL	Holiday
HOPA	Helicopter Operational Area
HORIZ	Horizontal
HOSP	Hospital Aircraft
HPA	Hectopascal
HR	Hours
HS	Service Available During Hours of Scheduled Operations
HT	High Tension (power)
HTA	Helicopter Training Area
HURCN	Hurricane
HVDF	High and Very High Frequency Direction Finding Stations (At the Same Location)
HVY	Heavy
HVY	Heavy (used to indicate the intensity of weather phenomena, e.g. HVY RA = Heavy rain)
HX	No Specific Working Hours
HYR	Higher
HZ	Dust Haze
Hz	Hertz (Cycle Per Second)
	I
IAC	Instrument Approach Chart
IAF	Initial Approach Fix
IAO	In and Out of Clouds
IAP	Instrument Approach Procedure
IAR	Intersection of Air Routes
IAS	Indicated Air Speed
IBN	Identification Beacon
IC	Diamond Dust (very small ice crystals in suspension)
ICE	icing
ID	Identifier OR Identify
IDENT†	Identification

IF	Intermediate Approach Fix
IFF	Identification Friend/Foe
IFR‡	Instrument Flight Rules
IGA	International General Aviation
ILS‡	Instrument Landing System
IM	Inner Marker
IMC‡	Instrument Meteorological Condition
IMG	Immigration
IMPR	Improve OR Improving
IMT	Immediate OR Immediately
INA	Initial Approach
INBD	Inbound
INC	In Cloud
INCR	Increase
INCERFA†	Uncertainty Phase
INCL	Included OR Including OR Inclusive
INFO†	Information
INOP	Inoperative
INP	If Not Possible
INPR	In Progress
INS	Inertial Navigation System
INSTL	Install OR Installed OR Installation
INSTR	Instrument
INT	Intersection
INTL	International
INTRG	Interrogator
INTRP	Interrupt OR Interruption OR Interrupted
INTSF	Intensify or Intensifying
INTST	Intensity
IR	Ice on Runway
ISA	International Standard Atmosphere
ISB	Independent Sideband
ISOL	Isolated
	J
JAN	January
JTST	Jet Stream
JUL	July
JUN	June
	K
KG	Kilogrammes
kHz	Kilohertz
KM	Kilometres
KMH	Kilometres per Hour
KPA	Kilopascal
KT	Knots
KW	Kilowatts
	L
L	Left (Runway Identification)
L	Locator (NDB with published approach procedure, See LM, LO)
LAM	Logical Acknowledgement (message type designator)
LAN	Inland
LARS	Lower Airspace Radar Advisory Service
LAT	Latitude
LATCC	London Area and Terminal Control Centre
LDA	Landing Distance Available
LDAH	Landing Distance Available, Helicopter
LDG	Landing
LDI	Landing Direction Indicator
LEN	Length
LF	Low Frequency (30 to 300 kHz)
LFA	Low Flying Area
LFZ	Low Flying Zone
LGT	Light or Lighting
LGTD	Lighted
LHA	Lowest Holding Altitude
LHS	Left Hand Side
LI	Low Intensity omni-directional lights
LIH	Light Intensity High
LIL	Light Intensity Low
LIM	Light Intensity Medium
LITAS	Low Intensity Two Colour Approach Slope Indicators at .... and .... metres from threshold bracketing approach angle of degrees
LLIZ	Localizer
LM	Locator, Middle
LMT	Local Mean Time
LNG	Long (Used to Indicate the type of approach desired or required)
LO	Locator, outer
LOC	Local OR Locally OR Location OR Located
LONG	Longitude
LORAN†	LORAN (Long Range Air Navigation System)
LRG	Long Range
LSQ	Line Squall
LTD	Limited
LTT	Landline teletypewriter
LUT	Local User Terminal
LV	Light and Variable (Relating to Wind)
LVE	Leave OR Leaving
LVL	Level
LVP	Low Visibility Procedures
LYR	Layer OR Layered
	M
M	Mach Number (Followed by figures)
M	Metres (Preceded by figures)
MAA	Maximum Authorised Altitude
MAG	Magnetic
MAINT	Maintenance
MAP	Aeronautical maps and charts
MAPt	Missed Approach Point
MAR	At sea
MAR	March

MAS	Manual A1 Simplex
MATZ	Military Aerodrome Traffic Zone
MAX	Maximum
MAY	May
MB	Millibars
MCA	Minimum Crossing Altitude
MCW	Modulated Continuous Wave
MDA	Minimum Descent Altitude
MDF	Medium Frequency Direction Finding Station
MDH	Minimum Descent Height
MEA	Minimum En-route Altitude
MEDA	Military Emergency Diversion Aerodrome
MEHT	Minimum Eye Height over Threshold (For VASIS and PAPI)
MET†	Meteorological OR Meteorology
METAR†	Aviation routine weather report (in aeronautical meteorological code)
MF	Medium Frequency (300 to 3000 kHz)
MHDF	Medium and High Frequency Direction Finding Stations (At the same location)
MHVDF	Medium, High and Very High Frequency Direction Finding Stations (At the same location)
MHz	Megahertz
MID	Mid-point (related to RVR)
MIFG	Shallow fog
MIL	Military
MIN	Minutes
MKR	Marker radio beacon
MLWA	Maximum Landing Weight Authorised
MLS‡	Microwave Landing System
MM	Middle Marker
MNM	Minimum
MNPS	Minimum Navigation Performance Specifications
MNT	Monitor OR Monitoring OR Monitored
MNTN	Maintain
MOA	Military Operating Area
MOC	minimum Obstacle Clearance (required)
MOD	Moderate (Used to indicated the intensity of weather phenomena, interference or static reports, e.g. MOD RA = Moderate rain)
MOGAS	Motor Gasoline
MON	Above Mountains
MON	Monday
MOTNE	Meteorological Operational Telecommunications Network Europe
MOV	Move OR Moving OR Movement
MPH	Statute Miles Per Hour
MPS	Metres Per Second
MRA	Minimum Reception Altitude
MRG	Medium Range
MRP	ATS/MET Reporting Point
MS	Minus
MSA	Minimum Sector Altitude
MSD	Minimum Separation Distance (Mil)
MSG	Message
MSL	Mean Sea Level
MT	Mountain
MTOW	Maximum Take-off Weight
MTRA	Military Temporary Reserved Airspace
MTU	Metric Units
MTW	Mountain Waves
MTWA	Maximum Total Weight Authorised
MVDF	Medium and Very High Frequency Direction Finding Stations (At the same location)
MWARA	Major World Air Route Area
MWO	Meteorological Watch Office
MX	Mixed type of ice formation (white and clear)

N

N	North OR Northern latitude
N	no distinct tendency (in RVR during previous 10 minutes)
NAT	North Atlantic
NATFMS	National Air Traffic Flow Management System
NAV	Navigation
NB	Northbound
NBFR	Not Before
NC	No Change
NDB‡	Non-Directional Radio Beacon
NDS	Non-deviating Status
NE	North East
NEB	North Eastbound
NEG	No OR Negative OR Permission not granted OR That is not correct
NGT	Night
NIL*†	None OR I Have nothing to send you
NM	Nautical Miles
NML	Normal
NNE	North North East
NNW	North North West
NOF	International NOTAM Office
NOSIG†	No Significant Change (Used in trend-type landing forecasts)
NOTAM†	A notice containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations
NOV	November
NR	Number

NRH	No Reply Heard
NS	Nimbostratus
NSC	Nil Significant Cloud
NSW	Nil Significant Weather
NW	North West
NWB	North Westbound
NXT	Next
	O
OAC	Oceanic Area Control Centre
OAS	Obstacle Assessment Surface
OAT	Operational Air Traffic
Obs	Obstacle lights
OBS	Observe OR Observed OR Observation
OBSC	Obscure OR Obscured OR Obscuring
OBST	Obstacle
OCA	Obstacle Clearance Altitude
OCC	Occulting (light)
OCH	Obstacle Clearance Height
OCNL	Occasional OR Occasionally
OCS	Obstacle Clearance Surface
OCT	October
OHD	Overhead
OIS	Obstacle Identification Surface
OLR	Off-load Routes
OM	Outer Marker
OPA	Opaque, white type of ice formation
OPC	The control indicated is operational control
OPMET †	Operational Meteorological (information)
OPN	Open OR Opening OR Opened
OPR	Operator OR Operate OR Operative OR Operating OR Operational
OPS†	Operations
O/R	On Request
ORCAM	Originator Region Code and Mode
ORD	Indication of an order
OSV	Ocean Station Vessel
OTLK	Outlook (used in SIGMET messages for volcanic ash and tropical cyclones)
OTP	On Top
OTS	Organised Track System
OUBD	Outbound
OVC	Overcast
	P
P...	Prohibited area (Followed by identification)
PALS	Precision Approach Lighting System (Specify category)
PANS	Procedures for Air Navigation Services
PAPA	Parallax Aircraft Parking Aid
PAPI†	Precision Approach Path Indicator
PAR‡	Precision Approach Radar
PARL	Parallel
PAX	Passenger(s)
PCD	Proceed OR Proceeding
PCN	Pavement Classification Number
PDG	Procedure Design Gradient
PE	Ice pellets
PEC	Pressure Error Correction
PER	Performance
PERM	Permanent
PH	Public Holiday
PIB	Pre-flight Information Bulletin
PJE	Parachute Jumping Exercise
PLA	Practice Low Approach
PLN	Flight Plan
PLS	Passenger Load Supplement
PLVL	Present Level
PN	Prior Notice required
PndB	Perceived Noise Decibels
PNR	Point of No Return
PO	Dust Devils
POB	Persons on Board
POSS	Possible
PPI	Plan Position Indicator
PPR	Prior Permission Required
PPSN	Present Position
PRI	Primary
PRKG	Parking
PRM	Preferred Route Message
PROB†	Probability
PROC	Procedure
PROV	Provisional
PS	Plus
PSG	Passing
PSN	Position
PSP	Pierced Steel Plan
PTN	Procedure Turn
PTS	Polar Track Structure
PWR	Power
	Q
QBI	Compulsory IFR flight
QDM‡	Magnetic Heading (zero wind)
QDR	Magnetic Bearing
QFA	Meteorological Forecast
QFE‡	Atmospheric pressure at aerodrome elevation (OR at runway threshold)
QFU	Magnetic orientation of runway
QNH‡	Altimeter sub-scale setting to obtain elevation when on the ground
QTE	True bearing
QUAD	Quadrant
	R
R	Red
R...	Restricted Area (followed by identification)
R...	Radial (prefix for use in graphics)
R	Right (runway identification)

R	Rate of Turn
RA	Rain
RA	Resolution Advisory/Advisories (ACAS)
RAC	Rules of the Air and Air Traffic Services
RAD	Radar Approach Aid
RAD	Radius
RAF	Royal Air Force
RAFC	Regional Area Forecast Centre
RAG	Ragged
RAG	Runway Arresting Gear
RAI	Runway Alignment Indicator
RAL	Runway alignment beacon at distance from
Beacon	threshold indicated
RAS	Radar Advisory Service
RB	Rescue boat
RCA	Reach Cruising Altitude
RCC	Rescue Co-ordination Centre
RCF	Radio Communication Failure (message type designator)
RCH	Reach OR Reaching
RCL	Runway Centre Line
RCLL	Runway Centre Line Light(s)
RCLR	Recleared
RDH	Reference Datum Height (For ILS)
RDL	Radial
RDT	Requested Departure Time
RDO	Radio
RE...	Recent (Used o qualify weather phenomena, eg RERA = recent rain)
REC	Receive OR Receiver
REDL	Runway Edge Light(s)
REF	Reference to ...OR Refer to...
REG	Registration
RENL	Runway End Light(s)
REP	Report OR Reporting OR Reporting Point
REQ	Request OR Requested
RERTE	Re-route
RESA	Runway End Safety Area
RET	Rapid Exit Taxiway
RFF	Fire and Rescue Equipment
RG	Range (lights)
RHS	Right hand side
RIF	Reclearance in Flight
RIS	Radar Information Service
RITE	Right (Direction of Turn)
RIV	Rapid Intervention Vehicle
RL	Report Leaving
RLA	Relay to
RLCE	Request Level Change En-route
RLLS	Runway Lead-in Lighting System
RLNA	Requested Level Not Available
RMK	Remark
RN	Royal Navy

RNAV†	(To be pronounced 'AR-NAV') Area Navigation
RNG	Radio Range
RNP	Required Navigation Performance
ROBEX	Regional OPMET Bulletin Exchange
†	(Scheme)
ROC	Rate of Climb
ROD	Rate of Descent
ROFOR	Route Forecast (in aeronautical meteorological code)
RON	Receiving Only
RPL	Repetitive Flight Plan
RPLC	Replace OR Replaced
RPS	Radar Position Symbol
RQMNT	Requirements
S	
RQP	Request flight plan (message type designator)
RQS	Request supplementary flight plan (message type designator)
RR	Report Reaching
RRA	(OR RRB, RRC...etc, in sequence) Delayed meteorological message (message type designator)
RSC	Rescue Sub-Centre
RSCD	Runway Surface Condition
RSP	Responder beacon
RSR	En-Route Surveillance Radar
RSS	Route Sum Square
RTD	Delayed (used to indicate delayed meteorological message; massage type designator)
RTE	Route
RTF	Radiotelephone
RTG	Radiotelegraph
RTHL	Runway threshold light(s)
RTN	Return OR Returned OR Returning
RTOAA	Rejected Take-off Area Available
RTODA	Rejected Take-off Distance Available,
H	Helicopter
RTR	Radar Termination Range
RTS	Return to Service
RTT	Radioteletypewriter
RTZL	Runway Touchdown Zone Light(s)
RUT	Standard regional route transmitting frequencies
RV	Rescue Vessel
RVA	Radar Vectoring Area
RVR‡	Runway Visual Range
RVSM	Reduced Vertical Separation Minimum
RWY	Runway
	S
S	South OR Southern Latitude

SA	Sand
SALS	Simple Approach Lighting System
SAN	Sanitary
SAP	As soon as possible
SAR	Search and Rescue
SARPS	Standards and Recommended Practices (ICAO)
SARSAT	Search and Rescue Satellite Aided Tracking System
SAT	Saturday
SATCOM†	Satellite Communication
SB	Southbound
SC	Stratocumulus
SCN	Slot Cancellation Message
SCT	Scattered
SDBY	Stand by
SDF	Step Down Fix
SE	South East
SEB	South Eastbound
SEC	Seconds
SECT	Sector
SELCAL†	Selective calling system
SEP	September
SER	Service OR Servicing OR Served
SEV	Severe (Used eg to qualify icing and turbulence reports)
SFC	Surface
SFLOC	Synoptic report of the location of sources of atmospherics
SG	Snow Grains
SGL	Signal
SH...	Showers (followed by RA = Rain, SN = Sow, PL = Ice pellets, GR = Hail, GS = Small hail and/or snow pellets or combinations thereof, eg SHRASN = showers of rain and snow)
SHF	Super High Frequency (3000 to 30000 MHz)
SHING	Supplementary High Intensity Narrow Gauge
SID†	Standard instrument Departure
SIF	Selective Identification Feature
SIGMET†	Information concerning en-route weather phenomena which may affect the safety of aircraft operations
SIGWX	Significant weather
SIMUL	Simultaneous OR Simultaneously
SIWL	Single Isolate Wheel Load
SKC	Sky Clear
SKED	Schedule OR Scheduled
SLAP	Slot Allocation Procedure
SLP	Speed Limiting Point
SLT	Slot Allocation Message
SLW	Slow
SMB	Side Marker Boards
SMC	Surface Movement Control
SMR	Surface Movement Radar
SN	Snow
SNOWTAM†	A special series NOTAM notifying the presence or removal of hazardous conditions due to snow, ice, slush or standing water associated with snow, slush and ice on the movement area, by means of a specific format
SOC	Start of Climb
Sodium box	Sodium approach lights arranged in box formation
SPECI†	Aviation selected special weather report (In aeronautical meteorological code)
SPECIAL†	Special meteorological report (In abbreviated plain language
SPI	Special Position Indicator
SPL	Supplementary flight plan (message type designator)
SPOT†	Spot wind
SQ	Squall
SR	Sunrise
SRA	Surveillance Radar Approach
SRE	Surveillance Radar Element of precision approach radar system
SRG	Short range
SRP	Slot Reference Point
SRQ	Slot Request Message
SRR	Search and Rescue Region
SRY	Secondary
SS	Sandstorm
SS	Sunset
SSB	Single Sideband
SSE	South South East
SSR‡	Secondary Surveillance Radar
SST	Supersonic transport
SSW	South South West
ST	Stratus
STA	Straight in approach
STAR†	Standard instrument arrival
STD	Standard
STF	Stratiform
STN	Station
STNR	Stationary
STOL	Short Take-Off and Landing
STS	Status
STWL	Stopway light(s)
SUBJ	Subject to
SUN	Sunday
SUP	Supplement (AIP Supplement)

SUPPS	Regional supplementary procedures
SVC	Service message
SVCBL	Serviceable
SVCE	Service
SVFR	Special Visual Flight Rules
SW	South West
SWB	South Westbound
SWY	Stopway
	T
T	Temperature
TA	Transition Altitude
TACAN	UHF Tactical Air Navigation Aid
†	
TAF†	Aerodrome forecast
TAIL†	Tail wind
TAR	Terminal Area Surveillance Radar
TAS	True Airspeed
TAX	Taxiing OR Taxi
TBC	Tactical Booking Cell
TC	Tropical Cyclone
TCU	Towering Cumulus
TDA	Temporary Danger Area
TDO	Tornado
TDZ	Touch Down Zone
TECR	Technical Reason
TEL	Telephone
TEMPO	Temporary OR Temporarily
†	
TFC	Traffic
TGL	Touch-and-Go Landing
TGS	Taxiing Guidance System
THR	Threshold
THRU	Through
THU	Thursday
TIL†	Until
TIP	Until past... (place)
TKOF	Take-off
TL...	Till (followed by time by which weather change is forecast to end)
TLOF	Touchdown and Lift-off Area
TMA‡	Terminal Control Area
TNA	Turn Altitude
TNH	Turn Height
TO	To... (place)
TOC	Top of Climb
TODA	Take-off Distance Available
TODAH	Take-off Distance Available, Helicopter
TOP†	Cloud Top
TORA	Take-off Run Available
TOS	Traffic Orientation Scheme
TOSA	Take-off Space Available
TP	Turning Point
TR	Track
TRA	Temporary Reserved Airspace
TRA	Temporary Restricted Area
TRANS	Transmits OR Transmitter
TRL	Transition Level
TROP	Tropopause
TS	Thunderstorm (in aerodrome reports and forecasts TS used alone means thunder heard but no precipitation at the aerodrome)
TS...	Thunderstorm (followed by RA = Rain, SN = Snow, PL = Ice pellets, GR = Hail, GS = Small hail and/or snow pellets or combinations thereof, eg TSRASN = thunderstorm with rain and snow)
TT	Teletypewriter
TTA	Tactical Training Areas
TTT	Template Training Technique
TUE	Tuesday
TURB	Turbulence
TVOR	Terminal VOR
TWIL	Twilight (Civil)
TWR	Aerodrome control tower OR aerodrome control
TWY	Taxiway
TWYL	Taxiway-Link
TYP	Type of Aircraft
TYPH	Typhoon
	U
U	Upward (tendency in RVR during previous 10 minutes)
UA	Air Report (AIREP)
UAB	Until Advised By....
UAC	Upper Area Control Centre
UAR	upper Air Route
UDF	Ultra High Frequency Direction Finding Station
UFN	Until Further Notice
UHDT	Unable Higher Due Traffic
UHF‡	Ultra High Frequency (300 to 3000 MHz)
UIC	Upper Information Centre
UIR‡	Upper Flight Information Region
UKLFS	United Kingdom Low Flying System
ULR	Ultra Long Range
UNA	Unable
UNAP	Unable to Approve
UNL	Unlimited
UNREL	Unreliable
U/S	Unserviceable
UTA	Upper Control Area
UTC‡	Co-ordinated Universal Time
	V
VA	Volcanic Ash
VAC	Visual Approach Chart
VAL	In Valleys
VAN	Runway Control Van

VAR	Magnetic Variation
VAR	Visual-aural radio range
VASIS†	Visual Approach Slope Indicator System
VC	Vicinity of aerodrome (followed by FG = Fog, FC = Funnel cloud, SH = Showers, PO = Dust/sand whirls, BLDU = Blowing dust, BLSA = Blowing sand or BLSN = Blowing snow, eg VC FG = Vicinity fog)
VCY	Vicinity
VDF	Very High Frequency Direction Finding Station
VER	Vertical
VFR‡	Visual Flight Rules
VHF‡	Very High Frequency (30 to 300 MHz)
VIP‡	Very Important Person
VIS	Visibility
VLF	Very Low Frequency (3 to 30 KHz)
VLR	Very Long Range
VMC‡	Visual Meteorological Conditions
VM(C)	Visual Manoeuvring (Circling)
VOLMET†	Meteorological information for aircraft in flight
VOR‡	Very High Frequency Omnidirectional Radio Range
VORTAC†	VOR and TACAN combination
VOT	VOR airborne equipment test facility
VRB	Variable
VRP	Visual Reference Point
VSA	By visual reference to the ground
VSP	Vertical speed
VSTOL	Very Short Take-Off and Landing
VTOL	Vertical Take-Off and Landing
	W
W	West or Western longitude
W	White
WAC	World Aeronautical Chart - ICAO 1:1 000 000
WAFC	World Area Forecast Centre
WB	Westbound
WBAR	Wing bar lights
WDI	Wing Direction Indicator
WDSPR	Widespread
WED	Wednesday
WEF	With Effect From OR Effective From
WI	Within
WID	Width
WIE	With Immediate Effect OR Effective Immediately
WILCO†	Will comply
WINTEM	Forecast upper wind and temperature for aviation
WIP	Work in Progress
WKN	Weaken or Weakening
WNW	Wet North West
WO	Without
WPT	Way-point
WRDA	Weapon Range Danger Area
WRNG	Warning
WS	Windshear
WSW	West South West
WT	Weight
WTSPT	Waterspout
WX	Weather
	X
X	Cross
XBAR	Crossbar (of approach lighting system)
XNG	Crossing
XS	Atmospheres
	Y
Y	Yellow
YCZ	Yellow caution zone (runway lighting)
YR	Your
	Z
Z	Co-ordinated Universal Time (in meteorological messages)

CHAPTER TWO - GENERAL OPERATING PROCEDURES

Contents

2.1 INTRODUCTION

The use of correct and precise standard phraseology in communications between pilots and ground personnel is vitally important. Incidents and accidents have occurred in which a contributing factor has been the misunderstanding caused by the use of non-standard phraseology.

Therefore we need to ensure that we use the correct:

- technique
- phonetic sounds for letters and numbers
- format for time
- phraseology
- callsigns.

This chapter also covers procedures relating to radio test, transfer of communications, readback, the radar environment and conditional clearances.

2.2 TECHNIQUE

a. Listen

Before transmitting check that the receiver volume is set and listen to make sure you do not interrupt another transmission.

b. Microphone

Be familiar with your microphone. Do not turn your head or vary the distance from the microphone. Distortion will result from:

- talking too close to the microphone
- touching the mike with the lips
- holding the boom of the microphone

c. Voice

Use a normal conversational tone, speak clearly and enunciate each word. Maintain the speaking volume at a constant level.

Note: You should depress transit switch before speaking and do not release it until after you finish. A common fault is to release the button too soon.

d. Rate of Speech

The correct rate of speech is about 100 words per minute, but if it is known that the information needs to be written down, speak slower. ATC controllers can be very bad at this.

e. Hesitation ... and avoid hesitation sounds such as er and um!

f. Abbreviations

Some abbreviations, which by common and frequent use are understood, need not be spelled out e.g.ILS, VOR, NDB, TACAN, GPS, SELCAL, Q-CODES (QFE, QNH, QDR,)

g. Long Messages

If you have a long message pause occasionally. This allows time to check that the frequency is still clear and gives time for receiver to request repetition or clarification of parts not received.

2.3 TRANSMISSION OF TIME

All time references should be made in Co-ordinated Universal Time (UTC). This used to be called Greenwich Mean Time (GMT). This time zone is sometimes referred to as Zulu (Z). Time is always in the 24 hour clock. 2400 is midnight and 0001 begins the new day.

When transmitting time, only the minutes of the hour are normally required. However, the hour should be included if there is any possibility of confusion or if crossing the hour e.g. SAM 58 FL100 OXFORD 0805.

TIME	TRANSMITTED AS	PRONOUNCED AS
0803	ZERO THREE or ZERO EIGHT ZERO THREE	ZE-RO TREE or ZE-RO AIT ZE-RO TREE
1300	ONE THREE ZERO ZERO	WUN TREE ZE-RO ZE-RO
2057	FIVE SEVEN or TWO ZERO FIVE SEVEN	FIFE SEVen or TOO ZE-RO FIFE SEVen

Note: Co-ordinated universal time (UTC) shall be used.

Pilots may check the time with the appropriate ATS unit. Time checks shall be given to the nearest half minute.

2.4 STANDARD WORDS AND PHRASES

Whenever possible use standard words and phrases. Here is a list of commonly used words and phrases which should be used in radiotelephony communications as appropriate and shall have the meaning shown.

WORD/PHRASE	MEANING
Acknowledge	Let me know that you have received and understood this message.
Affirm	Yes.
Approved	Permission for proposed action granted.
Break	I hereby indicate the separation between portions of the message. (To be used where there is no clear distinction between the text and other portions of the message).
Break Break	I hereby indicate the separation between messages transmitted to different aircraft in a very busy environment.
Cancel	Annul the previously transmitted clearance.
Check	Examine a system or procedure. (No answer is normally expected).
Cleared	Authorised to proceed under the conditions specified.
Confirm	Have I correctly received the following...? or Did you correctly receive the message?
Correct	That is correct.
Contact	Establish radio contact with .....
Correction	An error has been made in this transmission (or message indicated). The correct version is....
Disregard	Consider that transmission as not sent.
Go ahead	Proceed with your message. *Note: The phrase "Go ahead" is not normally used in surface movement communications.*
How do you read	What is the readability of my transmission?
I say again	I repeat for clarity or emphasis.

Monitor	Listen out on (frequency).
Negative	No *or* Permission not granted *or* That is not correct.
Out	This exchange of transmissions is ended and no response is expected.
Over	My transmission is ended and I expect a response from you. *Note: The word "OVER" is not normally used in VHF communications.*
Read back	Repeat all, or the specified part, of this message back to me exactly as received.
Recleared	A change has been made to your last clearance and this new clearance supersedes your previous clearance or part thereof.
Report	Pass me the following information.
Request	I should like to know... or I wish to obtain.
Roger	I have received all of your last transmission. *Note; Under no circumstances to be used in reply to a question requiring "READ BACK" or a direct answer in the affirmative (AFFIRM) or negative (NEGATIVE).*
Say again	Repeat all, or the following part, of your last transmission.
Speak slower	Reduce your rate of speech.
Standby	Wait and I will call you.
Verify	Check and confirm with originator.
Wilco	(Abbreviation for "will comply"). I understand your message and will comply with it.
Words twice	a) As a request: Communication is difficult. Please send every word or groups of words twice. b) As information: Since communication is difficult, every word or group of words in this message will be sent twice.

2.5 CALL SIGNS

a. Aeronautical Station For aeronautical stations there are of two parts:

i) Location name
ii) Suffix denoting unit or type of service

For example: Brize Radar or Oxford Tower

The suffix indicates the type of unit or service provided as shown in the list below.

UNIT OR SERVICE	CALL SIGN SUFFIX
Area control centre	CONTROL
Radar (in general)	RADAR
Approach control	APPROACH
Approach control radar arrivals	ARRIVAL *
Approach control radar departures	DEPARTURES
Aerodrome Control	TOWER
Surface movement control	GROUND
Clearance delivery	DELIVERY
Precision approach radar	PRECISION
Direction finding station	HOMER
Flight information service	INFORMATION
Apron control/management service	APRON
Company dispatch	DISPATCH
Aeronautical station	RADIO

* In the UK the term 'DIRECTOR' is used instead of 'ARRIVAL'.

When satisfactory communication has been established , and provided that it will not be confusing, the name of **the location or the call sign suffix may be omitted**.

b. Initial Contact

On initial contact use the full call sign of the station you are speaking to, followed by your full call sign.

c. Aircraft full call sign

An aircraft callsign shall be one of the following type:

i)	Type A	- aircraft registration marking e.g. G-BTRY (Note: this my be prefixed by the name of the aircraft manufacturer or aircraft model e.g. Piper G-BTRY or Seneca G-BTRY)
ii)	Type B	- operating agency designator plus last 4 characters of the registration e.g. SPEEDBIRD ABCD
iii)	Type C	- operating agency designator plus flight number e.g. SCANDINAVIAN 937

d. Aircraft Abbreviated Call Sign

Only air traffic control may initiate abbreviation of aircraft call signs. Thereafter the pilots may use abbreviations but must use full call signs if changing to another station. The call signs would be abbreviated as follows:

i)	Type A	The first character plus at least two last characters i.e. "G-BTRY" becomes "G-RY" or "G-TRY". (Note: either the name of the aircraft manufacturer or the aircraft model may be used in place of the first character i.e "Piper G-BTRY" becomes "Piper RY" or "Piper TRY".)
ii)	Type B	The operating agency designator followed by at least two last characters i.e"SPEEDBIRD ABCD" becomes "SPEEDBIRD CD" or "SPEEDBIRD BCD".
iii)	Type C	No abbreviation.

e. Examples of Full and Abbreviated Call signs

Call Sign	Type A			Type B	Type C
Full	N57826	CESSNA FABCD	CITATION FABCD	VARIG PVMA	SCANDINAVIAN 937
Abbreviated	N26 or N826	CESSNA CD CESSNA BCD	CITATION CD CITATION BCD	VARIG MA or VARIG VMA	(No abbreviated form)

f. Oxford Call Signs

Here at Oxford, all instructors have their own identifying numbers e.g.

"Oxford 20" (3rd type - no abbreviation)

but solo students must use the aircraft registration e.g.

"G - BODA" or abbreviate "G -DA".

This enables controllers at Oxford to identify those aircraft that may need more careful handling!

2.6 DIRECTION FINDING (DF)

a. Q Codes

Q-codes were used extensively when much of the communication work (especially HF-long range) was done in morse code. QNH was quicker to "key in" than A.L.T.I.M.E.T.E.R. S.E.T.T.I.N.G. S.E.A. L.E.V.E.L. P.R.E.S.S.U.R.E.! Today some Q-codes are still widely used because they are useful abbreviations. They are spoken in plain English not phonetically. Commonly used Q codes are listed below.

Q CODE	MEANING
QFE	Atmospheric pressure at aerodrome elevation
QNH	Altimeter sub-scale setting to obtain altitude above mean sea level
QDM	**Magnetic** direction **towards** facility
QDR	**Magnetic** bearing (radial) **from** a facility
QTE	**True** bearing **from** a facility
QUJ	**True** bearing **to** a facility

b. VHF DF (VDF)

Most air traffic control units (usually on Approach Frequency) are able to give pilots bearing or direction information based upon the pilot's transmission. The direction finding equipment can give a "steer"(QDM) towards the aerodrome or the pilot's true (or magnetic) bearing from the airfield (QTE or QDR).

The pilot in this case could also request a steer e.g.

"QDM QDM QDM Oxford Approach G-BODA request QDM G-BODA"

(the transmission ends with the aircraft call sign).

NOTE: The heading takes no account of wind effects (drift).

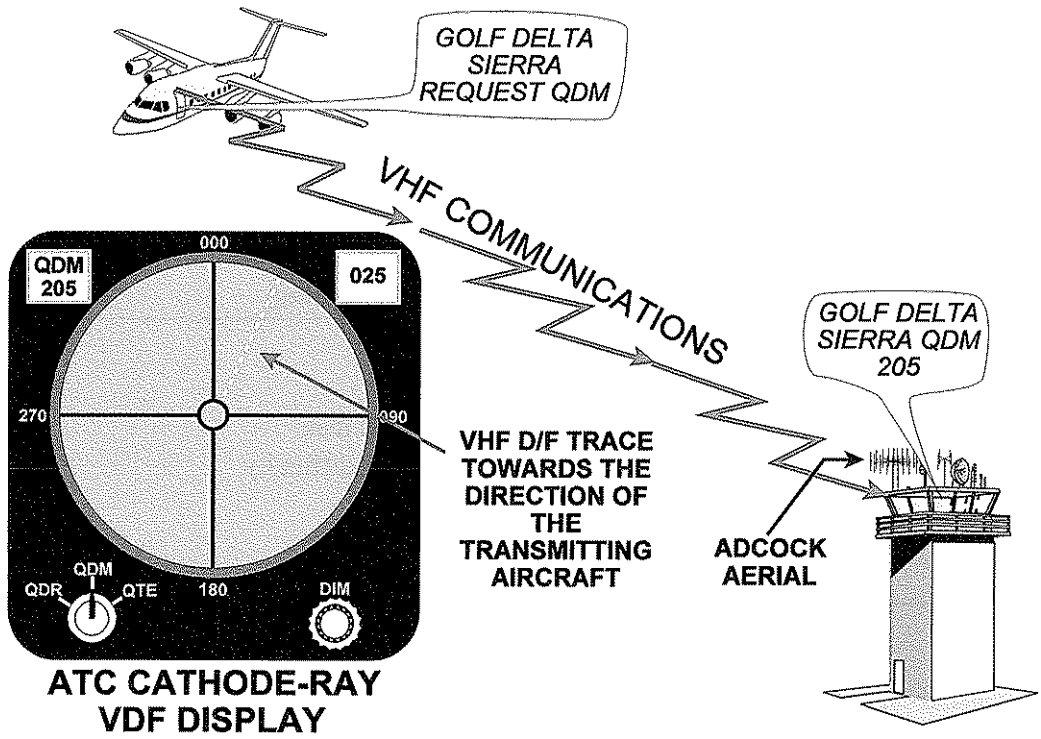


Figure 2.1. Ground Equipment for VHF Direction Finding.

c. Class of Bearing

The class of bearing refers to the accuracy of the bearing information as follows:

Class A	within ± 2°
Class B	within ± 5°
Class C	within ± 10°
Class D	less accurate than Class C

Normally class B is the best you can expect!

2.7 RADIO TEST PROCEDURES

Before flight, it is wise to ensure that your radios will transmit and receive properly. In order to do this a standard procedure is followed for each radio requiring a test. The meaning of this scale is as follows:

Readability Scale	Meaning
1	Unreadable
2	Readable now and then
3	Readable but with difficulty
4	Readable
5	Perfectly readable

2.8 TRANSFER OF COMMUNICATIONS

An aircraft will normally be advised by the appropriate aeronautical station to change from one frequency to another.

"Fastair 345 contact Wrayton control 129.1"

"Wrayton control 129.1 Fastair 345"

Pilot's Choice. If the pilot wishes to change frequency he should notify the change as appropriate.

"Oxford Approach, G-BODA changing to Brize Radar 134.3"

The ICAO Annex10 also has the following advice. "When establishing initial contact, or when leaving, a VHF frequency, an aircraft station shall transmit such information as may be prescribed by the appropriate authority".

This is a "catch all" phrase that allows individual authorities e.g. CAA to request whatever they wish, for example position reports on changing frequency.

2.9 READBACK

a. Readback of Clearances

A clearance may vary from a detailed description of a route and levels to be flown or it could be the name of a standard route such as a Standard Instrument Departure (known as "SID"). Clearances should be passed slowly to enable pilots to write down the information. If possible a clearance is passed before start up and certainly not when a pilot is engaged in manoeuvring his aircraft; of course, multi-crew aircraft do not have a problem here.

b. Messages to Readback

The ATC messages listed here must be read back in full by the pilot.

Level Instructions
Heading Instructions
Speed Instructions
ATC Route Clearances
Runway in use
Clearance to Enter, Land on, Take-off, Back-track, Cross, Hold Short of active runway
SSR operating Instructions
VDF information
Frequency changes
Type of radar service
Altimeter settings

If the controller does not receive a readback, he will instruct the pilot to do so. If the pilot does not understand the message he is expected to request that messages are repeated or clarified.

A route clearance is <u>not</u> a clearance to enter an active runway or to take off. The words "TAKE OFF" are only used when an aircraft is cleared to take-off. See CAP 413 or Doc 9432.

ATC route clearances shall always be read back unless otherwise authorised by the appropriate ATS authority. Clearances and Readbacks always include the aircraft call sign. In a readback the last thing you say is your callsign..

c. The JAR FCL makes <u>particular mention</u> of the need to read back the following clearances:

ATC route clearances
Clearances related to runway in use
Other clearances such as conditional clearances.
Data such as runway, altimeter settings, SSR codes etc.

2.10 RADAR PROCEDURES

a. Radar Identification and Vectoring

Before an aircraft can be given a radar service, the controller must positively identify which 'blip' on his screen is the aircraft requiring service. Usually this is done by giving the aircraft an SSR code to squawk, however if SSR is not available the controller will tell his 'target' to turn.

Note: Identification is not a service, until the pilot is told e.g. "Radar Advisory", he then acknowledges receipt of the service.

b. Radar Vectoring

Radar vectoring means that an aircraft may be told to fly specific headings by the radar controller. Pilots may be told the reason for this, but not always. Pilots may also request radar vectors in situations such as radar vectors to the ILS (final approach), avoiding severe weather ahead or to the next position / airfield.

c. Headings

The controller may wish to keep an aircraft on its present heading for a short while or change heading. Often the controller will ascertain the aircraft heading first.

"Oxford 30 turn left 300"

The clearance must be readback....

"Left 300 Oxford 30"

d. Vectoring Complete

When vectoring is no longer required by the controller, pilots will be instructed to resume own navigation, and if necessary they will be given position and appropriate instructions as necessary.

"Oxford 30, resume own navigation for Gloucester, position is 10 miles north of Brize Norton"

"Wilco, Oxford 30"

e. SSR instructions

All SSR instructions must be followed and readback, for example:

"Oxford 34, squawk 6411 ident" "6411 ident, Oxford 34"

SSR phrases and their meanings are listed below:

Squawk (code)	Set mode A code as instructed
Confirm squawk	Confirm the mode A code set on the transponder
Recycle (code)	Reselect assigned mode A code
Squawk Ident	Operate the special identification feature ie press the ident button
Squawk Standby	Switch to standby
Squawk Mayday	Select emergency code (7700)

f. Orbit

Occasionally it is necessary to gain separation on an aircraft ahead by making a complete turn through 360°. This is known as an orbit.

"G-CD, FOR SEPARATION, ONE ORBIT LEFT"

"ONE ORBIT LEFT, G-CD".

Having completed the "orbit" the aircraft then resumes its original heading.

An instruction that simply says " G-CD ORBIT RIGHT " means that the aircraft is to continue orbitting right until advised.

g. Traffic Information and Avoidance

Whenever traffic appears to be conflicting with the "target" aircraft, the controller should pass information in the form:

Relative Bearing	using the clock code
Range	in miles (nm)
Direction of flight	closing, converging, diverging, parallel, same direction, opposite direction, overtaking, crossing left to right or right to left
Relative speed	if known

A typical "traffic information" report to a pilot would be:

"Oxford 94, unknown traffic 10 o'clock 6 miles, crossing left to right, height unknown fast moving. If not sighted turn left heading 270"

"Left heading 270, Oxford 94".

h. Avoiding Action

Avoiding action to be taken by the pilot will be given whenever the controller considers that there would be a collision risk if no action was taken.

"Oxford 94, avoiding action turn left immediately heading 270, traffic right 2 o'clock same level converging".

"Left heading 270, Oxford 94"

When the risk has passed

"Oxford 94, resume own navigation"

"Wilco, Oxford 94".

2.11 CONDITIONAL CLEARANCES

Conditional clearances are given by ATC in the following format:

1. CALLSIGN
2. Condition
3. IDENTIFICATION OF THE SUBJECT OF THE CONDITION
4. The instruction

Examples of conditional clearances:

"GBODA After the landing LEARJET Line-up"

"FASTAIR 345 After departure climb straight ahead until 2500 feet BEFORE TURNING RIGHT. Cleared to take-off"

The readback of a conditional clearance must follow the same pattern with the aircraft callsign at the end.

CHAPTER THREE - PHRASEOLOGY

Contents

3.1 INTRODUCTION

The standard words and phrases and their meanings are given in this chapter. They cover general phraseology, co-ordination between units and various procedures as well as the whole range of services available on area, approach, ground and radar control.

In order to get some idea of the use of correct phraseology let us consider a VFR (visual flight rules) flight from Oxford to Gloucester with some radar assistance from Brize Norton along the way. Remember, we are only talking about VFR communications here.

EVENT	PILOT	ATC
Prior to engine start, select and listen to ATIS broadcast		Broadcast message: Oxford Departure information Bravo at 0830 Zulu. Surface wind 210 degrees 10 knots. QNH 1019 QFE 1009. Brize Norton outside air temp 15 dewpoint 14. Call 121.95 for taxi and report QNH and information Bravo
After engine start, on ground freq (121.95) request for taxi	Oxford Ground. GBODA Radio check and request taxi for (solo VFR to Gloucester). Information Bravo received QNH 1019 Holding point runway 20. GDA	 GDA Readability 4 Taxi to the holding point runway 20
After pre-take-off checks, taxi to holding point	GDA to tower. Out.	
On tower freq (118.87)	Oxford Tower GBODA Ready for departure Clear take-off GDA	 GDA wind 220 10 knots Clear take-off
After take-off	GDA Airborne. To approach	GDA Roger
On Approach freq (125.32)	Oxford Approach GBODA Departing VFR to Gloucester	 GDA Roger Report passing 2500 feet

On passing 2500'	GDA passing 2500 feet Brize Radar 134.3 GDA	GDA Roger Contact Brize Radar 134.3
ON Brize freq	Brize Radar GBODA Request Radar Information Service GBODA is a PA28 from Oxford 5 miles NW of Oxford Heading 270 at 3000 feet QNH 1019 Routing to Gloucester Squawk 4311 GDA	GBODA Pass your message GDA Roger Squawk 4311
Brize RIS	Traffic not sighted Request avoiding action Right 360 degrees GDA	GDA identified 8 miles north of Oxford Traffic 12 o'clock 5 miles closing rapidly GDA turn right 360 degrees
Radar vectors	GDA request vectors for Gloucester Left 250 degrees GDA	GDA Roger Turn left 250 degrees
En route	Squawk 7000 Gloucester 125.65 GDA	GDA 20 miles NE Gloucester Squawk 7000 Contact Gloucester Approach 125.65
VDF Bearing info	QDM QDM Gloucester Approach GBODA Request QDM GBODA QDM 240 degrees Class Bravo GBODA	GBODA Gloucester Approach QDM 240 degrees Class Bravo

Joining	Gloucester Approach GBODA GBODA is a PA28 from Oxford 10 miles NE at 3000 feet Inbound to you Request joining instructions Join downwind runway 27 right hand circuit QNH 1010 Wilco GDA	GBODA Pass your message GDA Join downwind runway 27 right hand circuit wind 240 degrees 10 knots QNH 1010 Report airfield in sight
Field in sight	GDA Airfield in sight Tower 122.9 GDA	GDA Contact Tower 122.9
On tower freq	Gloucester Tower GBODA request right base join for runway 27 Wilco GDA	GDA right base join approved Report final
Final approach	GDA Final to land Continue GDA Clear to land GDA	GDA Continue GDA Clear to land Wind 260 degrees 20 knots
On runway	Wilco GDA	GDA Expedite vacating runway
Off runway	Runway vacated GDA	GDA Roger

3.2 GENERAL PHRASEOLOGY

Circumstances	*Phraseologies*
Description of levels (subsequently referred to as *"(level")*)	a) FLIGHT LEVEL (number); *or* b) *(number)* METRES; *or* c) *(number)* FEET.
Level changes, reports and rates.	a) CLIMB (*or* DESCEND) *followed as necessary by:* i) TO *(level);* ii) TO REACH *(level)* AT (*or* BY) *(time or significant point)* iii) REPORT LEAVING (or REACHING, *or* PASSING) *(level).* iv) REPORT PASSING ODD (*or* EVEN) LEVELS; v) AT (*number*) METRES PER SECOND (or FEET PER MINUTE) [MINIMUM (or MAXIMUM)]. vi) REPORT STARTING ACCELERATION (or DECELERATION) b) STEP CLIMB *(aircraft identification)* ABOVE (*or* BENEATH) YOU; c) REQUEST LEVEL CHANGE FROM (*name of unit*) AT (*time or significant point*). d) STOP CLIMB (*or* DESCENT) TO (*level)*; e) CONTINUE CLIMB (*or* DESCENT) TO *(level)*;

	f)	EXPEDITE CLIMB (*or* DESCENT) [UNTIL PASSING (*level*)];
	g)	WHEN READY CLIMB (*or* DESCEND) TO (*level)*];
	h)	EXPECT DESCENT AT (*time*)
	*i)	REQUEST DESCENT AT (*time);*
.. . to require action at a specific time or place	j)	IMMEDIATELY
	k)	AFTER PASSING (*significant point*)
	l)	AT (*time or significant point)*
...to require action when convenient	m)	WHEN READY *(instruction*)
...to require an aircraft to climb or descend maintaining own separation and VMC	n)	MAINTAIN OWN SEPARATION AND VMC [FROM *level)*] *or* [to (*level*)];
	o)	MAINTAIN OWN SEPARATION AND VMC ABOVE (*or* BELOW, *or* TO) (*level*)
.. when there is doubt that an aircraft can comply with clearance or instruction.	p)	IF NOT POSSIBLE (*alternative instructions*) AND ADVISE;
.....when a pilot is unable to comply with an ACAS resolution advisory (Pilot and controller interchange)	*q)	UNABLE TO COMPLY
... after modifying vertical speed to comply with an ACAS resolution advisory (Pilot and controller interchange).	*r)	TCAS CLIMB (*or* DESCENT);
	s)	(*acknowledgement*);
	*t)	RETURNING TO (*assigned clearance*)
... after ACAS "Clear of Conflict" is annunciated (Pilot and controller interchange)	u)	(*acknowledgement) (or alternative instructions);*
.. after the response to an ACAS	*v)	TCAS CLIMB (*or* DESCENT), RETURNING resolution advisory is completed

(Pilot and controller interchange)
TO (*assigned clearance*);

w) *(acknowledgement) (or alternative instructions);*

... after returning to clearance after responding to an ACAS resolution advisory (Pilot and controller interchange)

*x) TCAS CLIMB (*or* DESCENT,) COMPLETED (assigned clearance);

y) *(acknowledgement) (or alternative instructions);*

... when unable to comply with a clearance because of an ACAS resolution advisory (Pilot and controller interchange)

*z) UNABLE TO COMPLY, TCAS RESOLUTION ADVISORY

aa) *(acknowledgement)*

* Denotes pilot transmission

Transfer of control and/ or frequency change

Note:- An aircraft may be requested to "Stand By" on a frequency when it is intended that the ATS unit will initiate communications and to "MONITOR" frequency when information is being broadcast thereon.

a) CONTACT *(unit call sign) (frequency)*;

b) At (*or* OVER) (*time or place*) CONTACT *(unit call sign) (frequency);*

c) IF NO CONTACT *(instructions)*;

d) STAND BY *(frequency)* FOR (*unit call sign);*

e) REQUEST CHANGE TO *(frequency)*

f) FREQUENCY CHANGE APPROVED;

g) MONITOR *(frequency)*;

*h) MONITORING *(frequency)*;

i) WHEN READY CONTACT *(unit call sign) (frequency);*

j) REMAIN THIS FREQUENCY.

* Denotes pilot transmission

Change of call sign	a)	CHANGE YOUR CALL SIGN TO (*new call sign*) [UNTIL FURTHER ADVISED];
.. To instruct an aircraft to change its type of call sign	b)	REVERT TO FLIGHT PLAN CALL SIGN (*call sign*) [AT (*significant point)*]
Traffic information	a)	TRAFFIC (information)
... to pass traffic information	b)	NO REPORTED TRAFFIC
... to acknowledge traffic information	*c)	LOOKING OUT;
	*d)	TRAFFIC IN SIGHT;
	*d)	TRAFFIC IN SIGHT;
	*e)	NEGATIVE CONTACT [*reasons*];
	f)	[ADDITIONAL] TRAFFIC *(direction)* BOUND (*type of aircraft*) (*level*) ESTIMATED (*or* OVER *(place)* AT (*time*) REPORTED *(level(s))* [*or* LEVEL UNKNOWN] MOVING *(direction) (other pertinent information, if any);*
		* Denotes pilot transmission
Meteorological conditions	a)	WIND (*number)* DEGREES *(number) (units);*
	b)	WIND AT (*height/altitude/flight level*) *(number)* DEGREES *(number) (units);*
		Note:- Wind is always expressed by giving the mean direction and speed and any significant variations thereof;
	c)	VISIBILITY *(distance) [direction*];
	d)	RUNWAY VISUAL RANGE (*or* RVR) [RUNWAY *(number)*] *(distance*);
... for multiple RVR observations	e)	RVR [RUNWAY (*number)*] (first position) (distance), (second position)(distance), (third position) (*distance*);

Note;- Multiple RVR observations are always representative of the touchdown zone, midpoint zone and the roll-out /stop end zone respectively.

.. In the event that RVR information on any one position this information will be included in the appropriate sequence

f) RVR [RUNWAY (*number*)] (first position) (distance), (second position) MISSING, (*third position) (distance)*

g) PRESENT WEATHER; (*details*)

h) CLOUD (*amount), [type] and height of base) (or* SKY CLEAR);

i) CAVOK;

Note:- CAVOK *pronounced* CAV-O-KAY

j) TEMPERATURE [MINUS] *(number) (and/or dew-point* [MINUS] *(number*)

k) QNH (*or* QFE) *(number) [units];*

l) MODERATE (*or* SEVERE) ICING (*or* TURBULENCE) [IN CLOUD] (*area);*

m) REPORT FLIGHT CONDITIONS

Position reporting

a) NEXT REPORT AT (*significant point)*

.. to omit position reports until a specified position

b) OMIT POSITION REPORTS [UNTIL (*specify*)];

c) RESUME POSITION REPORTING.

Additional reports

a) REPORT PASSING (*significant point*)

... to request a report at a specified place or distance

b) REPORT (*distance*) FROM (*name of DME station*) DME;

REPORT PASSING (*three digits*) radial (*name of VOR*) VOR

... to request a report of present position (*significant point)*

c) REPORT DISTANCE FROM

d) REPORT DISTANCE FROM (name of DME station) DME;

Aerodrome information

a) RUNWAY *(number) (condition)*;

b) LANDING SURFACE *(condition)*

c) CAUTION CONSTRUCTION WORK *(location)*;

d) CAUTION (*specify reasons*) RIGHT (*or* LEFT), (*or* BOTH SIDES) OF RUNWAY *[number];*

e) CAUTION WORK IN PROGRESS (*or* OBSTRUCTION) (*position and necessary advice)*

f) RUNWAY REPORT AT *(observation time)* RUNWAY (*number) (type of precipitant)* UP TO (*depth of deposit*) MILLIMETRES. BRAKING ACTION GOOD (*or* MEDIUM TO GOOD, *or* MEDIUM, *or* MEDIUM TO POOR, *or* POOR, *or* UNRELIABLE) [(*and/or* BRAKING COEFFICIENT (*equipment and number)];*

g) BRAKING ACTION REPORTED BY *(aircraft type)* AT (*time*) GOOD (*or* MEDIUM , *or* POOR);

h) RUNWAY (*or* TAXIWAY) WET [*or* DAMP, WATER PATCHES, FLOODED *(depth), or* SNOW REMOVED *(length and width as applicable), or* TREATED, *or* COMPACTED SNOW, *or* SLUSH, *or* FROZEN SLUSH, *or* ICE, *or* ICE UNDERNEATH, *or* ICE AND SNOW, *or* SNOWDRIFTS, *or* FROZEN RUTS AND RIDGES)].

Operational status of visual and non-visual aids

a) *(specify visual or non-visual aid)* RUNWAY *(number) (description of deficiency);*

b) *(type)* LIGHTING (*unserviceability*);

c) MLS/ILS CATEGORY *(category) (serviceability state)*

d) TAXIWAY LIGHTING (*description of deficiency);*

e) (*type of visual approach slope indicator*) RUNWAY (*number) (description of deficiency);*

f) SECONDARY POWER SUPPLY NOT AVAILABLE.

3.3 AREA CONTROL SERVICES

Issuance of a clearance

a) (*name of unit*) CLEARS (*aircraft identification)*

b) (*aircraft*) CLEARED TO

c) RECLEARED (*amended route portion*) TO (*significant point of original route);*

d) ENTER CONTROL AREA (*or* ZONE) [*via* (SIGNIFICANT POINT)] at (*level)* {AT (*time)*};

e) LEAVE CONTROL AREA (*or* ZONE) AT *(level) (or* CLIMBING, *or* DESCENDING);

f) JOIN (*specify)* AT (*significant point*) AT (*level*) [AT *(time)*].

Indication of route and clearance limit

a) FROM (*place*) TO (*place*);

b) TO (*place)*;

Followed as necessary by:

i) DIRECT

ii) VIA (*route and/or reporting points*);

iii) VIA FLIGHT PLANNED ROUTE

Note:- Conditions associated with the use of this phrase are in Part III, 12.2.

iv VIA (*distance*) ARC (*direction*) OF (*name of* DME *Station*) DME

c) (*level or route*) NOT AVAILABLE DUE (*reason*) ALTERNATIVE[S] IS/ARE (*levels or routes*) ADVISE.

Maintenance of specified levels

a) MAINTAIN (*level*) [TO (*significant point*)];

b) MAINTAIN (*level)* UNTIL PASSING (*significant point*);

c) MAINTAIN (*level*) UNTIL (*time*);

d) MAINTAIN (*level*) UNTIL ADVISED BY (*name of unit*);

e) MAINTAIN *(level)* UNTIL FURTHER ADVISED;

f) MAINTAINED (*level*) WHILE IN CONTROLLED AIRSPACE

g) MAINTAIN AT LEAST (*number*) METRES (*or* FEET) ABOVE (*or* BELOW) (*aircraft identification*)

Note:- the term "MAINTAIN" is not used in lieu of "DESCEND" or "CLIMB" when instructing an aircraft to change level.

Specification of cruising levels

a) CROSS (*significant point*) AT (*or* ABOVE, *or* BELOW) (*level*);

b) CROSS (*significant point*) AT (*time*) OR LATER (*or* BEFORE) AT (*level)* [MAINTAINING OWN SEPARATION AND VMC];

c) CRUISE CLIMB BETWEEN (levels) (or ABOVE (level));

d) CROSS *(distance)* (*name of DME station*) DME AT (*or* ABOVE, *or* BELOW) (*level);*

Emergency descent

*a) EMERGENCY DESCENT (*intentions*);

b) EMERGENCY DESCENT AT (*significant point or location*) ALL AIRCRAFT BELOW (*level)* WITHIN (*distance*) OF (*significant point or navigation aid*) LEAVE IMMEDIATELY (*followed as necessary by specific instructions as to direction, heading or track etc.)*

* Denotes pilot transmission

If clearance cannot be issued immediately upon request	EXPECT CLEARANCE AT (*time*);
En-route absorption of terminal delay	AT (*time or position*) DESCEND TO (*level*) FOR EN-ROUTE DELAY OF (*number*) minutes.
Separation instructions	a) CROSS (*significant point*) AT (*time*) b) ADVISE IF ABLE TO CROSS (*significant point*) AT (*time*); c) MAINTAIN MACH (*number*)

3.4 APPROACH CONTROL SERVICES

Departure instructions

a) AFTER DEPARTURE TURN RIGHT (*or* LEFT) HEADING *(three digits)*

b) TURN RIGHT (*or* LEFT) HEADING *(three digits)*;

c) TRACK (*three digits*) DEGREES [MAGNETIC (*or* TRUE] TO (*or* FROM) (*significant point*) UNTIL (*time, or* REACHING (*fix or significant point or level)*) {BEFORE SETTING HEADING];

d) SET HEADING AT (*or* BEFORE, *or* LATER THAN) *(time)*;

e) SET HEADING TO (*or* DIRECT) (*significant point*) AT (*or* BEFORE, *or* LATER THAN) *(time);*

f) AFTER REACHING (*or* PASSING) (*level or significant point)* SET HEADING [DIRECT] (*significant point*);

g) CLEARED VIA *(designation)*.

Note :- Conditions associated with the use of this phrase are in Part III, 12.2.

Approach instructions

a) CLEARED VIA (*designation*);

b) CLEARED TO (*clearance limit*) VIA (designation);

c) CLEARED VIA (*details of route to be followed);*

d) CLEARED (*type of approach*) APPROACH [RUNWAY (*number*)];

e) CLEARED APPROACH [RUNWAY *(number)]*;

f) COMMENCE APPROACH [RUNWAY *(number)*];

*g) REQUEST STRAIGHT-IN APPROACH [RUNWAY (*number*)];

h) COMMENCE APPROACH AT (*time*);

i) REPORT VISUAL;

j) REPORT RUNWAY [LIGHTS] IN SIGHT;

*k) REQUEST VISUAL APPROACH;

l) CLEARED VISUAL APPROACH (number)

m) REPORT (*significant point*); [OUTBOUND, or INBOUND];

*n) REQUEST VMC DESCENT;

o) MAINTAIN OWN SEPARATION;

p) MAINTAIN VMC;

q) ARE YOU FAMILIAR WITH (*name*) APPROACH PROCEDURE;

r) REPORT MLS CAPABILITY;

*s) REQUEST (*Type of approach*) APPROACH [RUNWAY (*number)*]

*t) REQUEST (*MLS/RNAV plain language designator);*

u) REQUEST (*MLS/RNAV plain language designator).*

** Denotes pilot transmission*

Holding instructions

.....visual

a) HOLD VISUAL [OVER] (*position*), (*or* BETWEEN (*two prominent landmarks*));

... published holding procedure over a facility or fix	b)	HOLD AT (significant point, name facility or fix) (level) EXPECT APPROACH (*or* FURTHER CLEARANCE) AT (*time*);
... when a pilot requires an oral description of holding procedure based on a facility (VOR or NDB)	*c)	REQUEST HOLDING INSTRUCTIONS;
	d)	HOLD AT (*name of facility*) (*call sign and frequency, if necessary) (level)* INBOUND TRACK (*three digits*) DEGREES RIGHT (*or* LEFT) HAND PATTERN OUTBOUND TIME (*number*) MINUTES (*additional instructions, if necessary);*
	e)	HOLD ON THE (*three digits*) RADIAL OF THE (*name)* VOR (*call sign and frequency, if necessary*) At (*distance*) DME (*or* BETWEEN (*distance)* AND (*distance)* DME (*level*) INBOUND TRACK (*three digits*) RIGHT (*or* LEFT) HAND PATTERN (*additional instructions, if necessary).*
		** Denotes pilot transmission*
Expected approach time	a)	NO DELAY EXPECTED;
	b)	EXPECTED APPROACH TIME (*time)*;
	c)	REVISED EXPECTED APPROACH (*time*);
	d)	DELAY NOT DETERMINED (*reasons*).
Identification of aircraft		SHOW LANDING LIGHT
Acknowledgement by visual means	a)	ACKNOWLEDGE BY MOVING AILERONS (or RUDDER);
	b)	ACKNOWLEDGE BY ROCKING WINGS;
	c)	ACKNOWLEDGE BY FLASHING LANDING LIGHTS

3.5 STARTING PROCEDURES

... to request permission to start engines

*a) [*aircraft location*] REQUEST START UP;

*b) [*aircraft location*] REQUEST START UP, INFORMATION (*ATIS identification*);

.. ATC replies

c) START UP APPROVED;

d) START UP AT (*time*);

e) EXPECT START UP AT (*time*);

f) START UP AT OWN DISCRETION;

g) EXPECT DEPARTURE (*time*) START UP AT OWN DISCRETION.

** Denotes pilot transmission.*

Starting procedures (ground crew/cockpit)

a) [ARE YOU READY TO START UP?];

*b) STARTING NUMBER (*engine number(s)*);

Note 1:- The ground crew should follow this exchange by either a reply on the intercom or a distinct visual signal to indicate that all is clear and that the start-up as indicated may proceed.

Note 2:- Unambiguous identification of the parties concerned is essential in any communications between ground crew and pilots.

* Denotes pilot transmission.

Push-back procedures

Note:- When local procedures so prescribe, authorisation for pushback should be obtained from the control tower.

..... aircraft /ATC

a) [*aircraft location*] REQUEST PUSHBACK;

b) PUSHBACK APPROVED

c) STAND BY;

d) PUSHBACK AT OWN DISCRETION;

e) EXPECT *(number) minutes delay due (reason);*

(Ground crew/cockpit)

f) ARE YOU READY FOR PUSHBACK?

*g) READY

g) CONFIRM BRAKES RELEASED;

*h) BRAKES RELEASED;

i) COMMENCING PUSHBACK;

j) PUSHBACK COMPLETED;

*k) STOP PUSHBACK;

l) CONFIRM BRAKES SET;

*m) BRAKES SET;

*n) DISCONNECT

*denotes pilot transmission.

Towing procedures

**a) REQUEST TOW [*company name*] (*aircraft type*) FROM (*location*) TO (*location*);

ATC response

b) ATC response

c) HOLD POSITION;

d) STAND BY;

** denotes transmission from aircraft/tow vehicle combination.

To request time check and/or aerodrome data for departure *a) REQUEST TIME CHECK;

b) TIME (*minutes*);

.....when no ATIS broadcast is available

*c) REQUEST DEPARTURE INFORMATION;

	d)	RUNWAY (*number*), WIND (*direction and speed)*, QNH (*detail)*, TEMPERATURE (*detail*), [VISIBILITY FOR TAKE-OFF (*detail*) (*or* RVR (*detail*)].
		* denotes pilot transmission
Taxi procedures		
.. for departure	*a)	[*aircraft type*] [*wake turbulence category if "heavy"*] [*aircraft location*] REQUEST TAXI [*intentions*];
	*b)	[*aircraft type*] [*wake turbulence category if "heavy"*] [*aircraft location*] *(flight rules)* TO (*aerodrome of destination*) REQUEST TAXI [*intentions*];
	c)	TAXI TO HOLDING POINT *[number*] [RUNWAY (*number*)] TAXI [*intentions*];
.... where detailed taxi instructions are required	*d)	[*aircraft type*] [*wake turbulence category if "heavy"*] REQUEST DETAILED TAXI INSTRUCTIONS;
	e)	TAXI VIA (*specific routing to be followed*) TO HOLDING POINT [*number*] [RUNWAY (*number*)] [TIME (*minutes*)];
.. where aerodrome information is not available from an alternative source such as ATIS	f)	TAXI TO HOLDING POINT *[number*] *(followed by aerodrome information applicable)* [TIME (*minutes*)];
	g)	TAKE (*or* TURN) FIRST (*or* SECOND) LEFT (*or* RIGHT);
	h)	TAXI VIA (*identification of taxiway*);
	i)	TAXI VIA RUNWAY (*number*);
... for helicopter operations	*j)	REQUEST AIR-TAXIING FROM (*or* VIA) TO (*location or routing as appropriate*);

j) AIR-TAXI TO (*or* VIA) (*location or routing as appropriate*) [*CAUTION (dust, blowing snow, loose debris, taxiing light aircraft, personnel, etc.)]*;

k) AIR TAXI VIA (*direct as requested, or specified route*) TO (*location, heliport, operating or movement area, active or inactive runway*). AVOID (*aircraft or vehicles or personnel);*

.... after landing

*l) REQUEST BACKTRACK;

m) BACKTRACK APPROVES;

n) BACKTRACK RUNWAY (number);

... general

*o) [*aircraft location*] REQUEST TAXI TO (*destination on aerodrome*);

p) TAXI STRAIGHT AHEAD;

q) TAXI WITH CAUTION;

r) GIVE WAY TO (*description and position of other aircraft);*

*s) GIVING WAY TO (*traffic*);

*t) TRAFFIC (*or type of aircraft)* IN SIGHT;

u) FOLLOW (*description of other aircraft or vehicle);*

v) FOLLOW (*description of other aircraft or vehicle);*

w) VACATE RUNWAY;

*x) RUNWAY VACATED;

y) EXPEDITE TAXI [*reason*];

*z) EXPEDITING;

aa) [CAUTION] TAXI SLOWER [*reason*];

bb) *SLOWING DOWN

*Denotes pilot transmission

Holding

#a) HOLD (*direction*) OF (*position, runway number, etc.);*

#b) HOLD POSITION;

#c) HOLD (*distance*) FROM (*position*);

#d) HOLD SHORT OF (*position*);

*e) HOLDING

*f) HOLDING SHORT.

Requires specific acknowledgement from the pilot.
* Denotes pilot transmission. The procedure words ROGER and WILCO are insufficient acknowledgement of the instructions. HOLD, HOLD POSITION and HOLD SHORT OF (position). In each case the acknowledgement shall be by the phraseology HOLDING or HOLDING SHORT, as appropriate.

To cross a runway

Note 1 :- Unless otherwise specified by ATC, a taxi instruction which contains a taxi limit beyond a runway includes permission to cross that runway.

Note 2;- The pilot shall, when requested, report "RUNWAY VACATED" when the aircraft is well clear of the runway.

*a) REQUEST CROSS RUNWAY (*number);*

Note - If the control tower is unable to see the crossing aircraft (e.g. night, low visibility, etc.), the instruction should always be accompanied by a request to report when the aircraft has vacated and is clear of the runway.

b) CROSS RUNWAY (*number*) [REPORT VACATED];

c) EXPEDITE CROSSING RUNWAY (*number*) TRAFFIC (*aircraft type*) (*distance*) KILOMETRES (*or* MILES) FINAL;

* Denotes pilot transmission

Preparation for take-off

a) UNABLE TO ISSUE (*designator*) DEPARTURE (*reasons)*;

b) REPORT WHEN READY [FOR DEPARTURE];

c) ARE YOU READY [FOR DEPARTURE];

d) ARE YOU READY FOR IMMEDIATE DEPARTURE?;

e) *READY;

.. If unable to issue take-off clearance

f) WAIT [*reason*];

g) LINE UP;

..clearance to enter runway and await take-off clearance

Note: May be followed by phraseology

#h) LINE UP RUNWAY (*number*)

i) LINE UP. BE READY FOR IMMEDIATE DEPARTURE;

.. conditional clearances

**j) (*condition*) LINE UP;

..acknowledgement of a conditional clearance

*k) (*condition*) LINING UP;

..confirmation of a conditional clearance

.. Confirmation or otherwise of the readback of conditional clearance

l) [THAT IS] CORRECT (*or* I SAY AGAIN ... (*as appropriate*).

* Denotes pilot transmission
# When there is the possibility of confusion during multiple runway operations
** Provisions concerning the use of conditional clearances are contained in 2.4.

Take off Clearance

a) CLEARED FOR TAKE-OFF [REPORT AIRBORNE)

When there is a possibility of confusion

b) CLEARED FOR TAKE-OFF RUNWAY (*number)*;

	c)	TAKE-OFF IMMEDIATELY OR VACATE RUNWAY;
When take-off clearance has not been complied with	d)	TAKE-OFF IMMEDIATELY OR HOLD SHORT OF RUNWAY;
	e)	HOLD POSITION, CANCEL, I SAY AGAIN CANCEL TAKE-OFF (*reasons*);
... to cancel a take-off clearance	*f)	HOLDING;
	g)	STOP IMMEDIATELY (*repeat aircraft call sign*) STOP IMMEDIATELY;
.. To stop a take-off in emergency conditions	*h)	STOPPING;
	i)	CLEARED FOR TAKE-OFF FROM *(present position, taxiway, final approach and take-off area, runway and number);*
... for helicopter operations from other than the manoeuvring area	*j)	REQUEST DEPARTURE TURN RIGHT (*or* LEFT, *or* CLIMB) *(instructions as appropriate).*
	k)	AFTER DEPARTURE TURN RIGHT (*or* LEFT, *or* CLIMB, (*instructions as appropriate).*
	* denotes pilot transmission. HOLDING and STOPPING are the procedural responses to e) and g) respectively.	
After take-off	*a)	REQUEST RIGHT (*or* LEFT) TURN [WHEN AIRBORNE];
	b)	RIGHT (*or* LEFT) TURN APPROVED;
	c)	WILL ADVISE LATER FOR RIGHT (*or* LEFT) TURN;
	d)	AIRBORNE (*time*);
	e)	AFTER PASSING *(level) (instructions*);

..... heading to be followed

.. when a specific track

is to be followed

f) CONTINUE ON (*magnetic direction of runway) (instructions);*

g) TRACK (*magnetic direction of runway (instructions);*

h) CLIMB STRAIGHT AHEAD (*instructions).*

* denotes pilot transmission

Entering an aerodrome traffic circuit

*a) [*aircraft type*] *(position) (level)* FOR LANDING;

b) JOIN (*position in circuit) (runway number*) [SURFACE] WIND (*direction and speed*) [TEMPERATURE (*degrees celsius*)] QNH (*or* QFE) (*detail)* [HECTOPASCALS] [TRAFFIC (*detail)*];

c) MAKE STRAIGHT-IN APPROACH, RUNWAY (*number)* [SURFACE] WIND (*direction and speed*) [TEMPERATURE (*degrees celsius*)] QNH (*or* QFE) (*detail*) [HECTOPASCALS] [TRAFFIC (*detail*)];

when right hand traffic circuit in use

d) JOIN RIGHT HAND (*position in circuit*) (*runway number*) [SURFACE] WIND (*direction and speed*) [TEMPERATURE (*degrees celsius*)] QNH (*or* QFE) (*detail*) [HECTOPASCALS] [TRAFFIC (*detail)*];

.. when ATIS information is available

*e) (*aircraft type) (position) (level*) information (*ATIS identification*) FOR LANDING;

f) JOIN (*position in circuit*) RUNWAY (*number*) QND (*or* QFE) (*detail)* [HECTOPASCALS] (TRAFFIC) (*detail)*].

* denotes pilot transmission.

In the circuit	*a)	(*position in circuit, e.g.* DOWNWIND/FINAL);
	b)	NUMBER ... FOLLOW (*aircraft type and position) [additional instructions if required].*
	* denotes pilot transmission.	
Approach instructions	a)	MAKE SHORT APPROACH
Note : - The report "LONG FINAL" is made when aircraft turn on to final approach at a distance greater than 7 km (4 NM) from touchdown or when an aircraft on a straight-in approach is 15 kn (8 NM) from touchdown. In both cases a report "FINAL" is required at 7 km (4NM) from touchdown.	b)	MAKE LONG APPROACH (*or* EXTEND DOWNWIND);
	c)	REPORT BASE (or FINAL, or LONG FINAL);
	d)	CONTINUE APPROACH.
Landing	a)	CLEARED TO LAND.
..multiple runway operations	b)	CLEARED TO LAND RUNWAY (*number*);
... special operations	c)	CLEARED TO TOUCH AND GO;
	d)	MAKE FULL STOP;
To make an approach along, or parallel to a runway, descending to an agreed minimum level	*e)	REQUEST LOW APPROACH (Reasons);
	f)	CLEARED LOW APPROACH [RUNWAY(*number)*] [*(Altitude restriction if required) (go around restrictions*)]
to fly past the control tower or other observation point for the purpose of visual inspection by persons on the ground.	*g)	REQUEST LOW PASS (*reasons)*;
	h)	CLEARED LOW PASS [*as in f*)].
	i*)	REQUEST STRAIGHT-IN (*or* CIRCLING APPROACH, LEFT (*or* RIGHT) TURN TO (*location*));

j) MAKE STRAIGHT-IN (*or* CIRCLING APPROACH, LEFT (*or* RIGHT) TURN TO (*location, runway, taxiway, final approach and take off area*) [ARRIVAL (*or* ARRIVAL ROUTE) (*number, name, or code*)] [HOLD SHORT OF (*active runway, extended runway centre line, other helicopter or aircraft*)]. [CAUTION (*power lines, unlighted obstructions, wake turbulence, etc.*)]. CLEARED TO LAND.

* denotes pilot transmission

Delaying aircraft

a) CIRCLE THE AERODROME;

b) ORBIT (RIGHT, *or* LEFT) [FROM PRESENT POSITION];

c) MAKE ANOTHER CIRCUIT.

Missed approach

a) LANDING GEAR APPEARS DOWN;

b) RIGHT *or* LEFT, or NOSE) WHEEL APPEARS UP (*or* DOWN);

c) WHEELS APPEAR UP;

d) RIGHT (*or* LEFT, *or* NOSE) WHEEL DOES NOT APPEAR UP (*or* DOWN);

...wake turbulence.

e) CAUTION WAKE TURBULENCE;

.. Jet blast on apron or taxiway

f) CAUTION JET BLAST;

.. Propeller-driven aircraft slipstream

g) CAUTION SLIP STREAM;

After landing

a) CONTACT GROUND (*frequency*);

b) WHEN VACATED CONTACT GROUND (*frequency*);

c) EXPEDITE VACATING;

d) YOUR STAND (*or* GATE) (*designation*);

e) TAKE (*or* TURN) FIRST (*or* SECOND, *or* CONVENIENT) LEFT (*or* RIGHT) AND CONTACT GROUND (*frequency*);

... for helicopter operations

f) AIR- TAXI TO HELICOPTER STAND (*or*) HELICOPTER PARKING POSITION (*area*);

g) AIR-TAXI TO (or VIA) (*location or routing as appropriate*) [CAUTION (*dust, blowing snow, loose debris, taxiing light aircraft, personnel, etc.*)];

h) AIR-TAXI VIA (*direct, as requested, or specified route*) TO (*location heliport, operating or movement area, active or inactive runway*). AVOID (*aircraft or vehicles or personnel).*

3.6 CO-ORDINATION BETWEEN ATS UNITS

Estimates and revisions

a) ESTIMATE [*direction of flight*] (*aircraft call sign*) [SQUAWKING (*SSR code*)] (*type*) ESTIMATING (*significant point*) (*time*) (*level*) (*or* DESCENDING FROM (*level*) TO (*level*) [SPEED (*filed TAS*)] (*route*) [REMARKS];

... transmitting station

b) ESTIMATE (*significant point*) ON (*aircraft call sign);*

.. Receiving reply (if flight plan details are available)

(*Aircraft type*) (*destination*);

[SQUAWKING (*SSR Code*) [ESTIMATING] (*significant point*) (*time*) AT (*level*);

Note;- in the event that flight plan details are not available the receiving station shall reply to b) NO DETAILS and transmitting station shall pass full estimate as in a).

c) ESTIMATE UNMANNED FREE BALLOON(S) (*identification and classification*) ESTIMATED OVER (*place*) AT (*time*)REPORTED FLIGHT LEVEL(S) (*figure or figures*) [*or* FLIGHT LEVEL UNKNOWN] MOVING (*direction*) ESTIMATED GROUND SPEED (*figure*) (*other pertinent information, if any);*

d) REVISION (*aircraft call sign*) (*details as necessary).*

Transfer of control

a) REQUEST RELEASE OF (*aircraft call sign);*

b) (*aircraft call sign*) RELEASED [AT (*time*)] [*conditions/restrictions*],

c) IS (*aircraft call sign*) RELEASED [FOR CLIMB *or* DESCENT)]?;

d) (*aircraft call sign*) NOT RELEASED [UNTIL (*time or significant point*)];

	e)	UNABLE RELEASE (*aircraft call sign*) [TRAFFIC IS (*details*)].
Change of clearance	a)	MAY WE CHANGE CLEARANCE *OF (aircraft call sign)* TO (*details of alteration proposed*)?
	b)	AGREED TO (*alteration of clearance*) OF (*aircraft call sign*);
	c)	UNABLE TO APPROVE CHANGE TO CLEARANCE OF (*aircraft call sign*);
	d)	UNABLE TO APPROVE (*desired route, level etc.*) [OF *aircraft call sign*);DUE *(reason)*] *(alternative clearance proposed).*
Approval request	a)	APPROVAL REQUEST (*aircraft call sign*) ESTIMATED DEPARTURE FROM (*significant point*) AT (*time*);
	b)	(*aircraft call sign*) REQUEST APPROVED [(*restriction if any*)];
	c)	(*aircraft call sign*) UNABLE APPROVE (*alternative instructions*);
Inbound release	a)	INBOUND RELEASE (*aircraft call sign*) [SQUAWKING (*SSR Code*) FROM (*departure point*) RELEASED AT (*significant point, or time, or level*) CLEARED TO AND ESTIMATING (*clearance limit) (time*) AT (*level*) [EXPECTED APPROACH TIME *or* DELAY EXPECTED] CONTACT AT (*time*).
Radar handover	a)	RADAR HANDOVER (*aircraft call sign*) [SQUAWKING (*SSR Code*)] POSITION (*aircraft position or significant point) (level)*
Expedition of clearance	a)	EXPEDITE CLEARANCE (*aircraft call sign*) EXPECTED DEPARTURE FROM (*place*) AT (*time*);

b) EXPEDITE CLEARANCE (*aircraft call sign*) [*estimated*] OVER (*place*) At (*time*) REQUESTS (*level or route etc.*).

Note :- The following comprise phraseologies specifically applicable when radar is used in the provision of air traffic services. The phraseologies detailed in the sections above for use in the provision of air traffic services are also applicable, as appropriate, when radar is used.

3.7 GENERAL RADAR PHRASEOLOGIES

Identification of aircraft

a) REPORT HEADING [AND FLIGHT LEVEL (*or* ALTITUDE)];

b) FOR IDENTIFICATION TURN LEFT (*or* RIGHT) HEADING (*three digits*);

c) TRANSMIT FOR IDENTIFICATION AND REPORT HEADING;

d) TRANSMIT FOR IDENTIFICATION AND REPORT HEADING;

e) IDENTIFIED [*position*];

f) NOT IDENTIFIED [*reason*], [RESUME (*or* CONTINUE) OWN NAVIGATION].

Position information

POSITION (*distance) (direction*) OF (*significant point*) (*or* OVER *or* ABEAM (*significant point*).

Vectoring instructions

a) LEAVE (*significant point*) HEADING (*three digits*) [INBOUND] AT (*time);*

b) CONTINUE HEADING (*three digits*) AT (*time*);

c) CONTINUE PRESENT HEADING;

d) FLY HEADING (*three digits*);

e) TURN LEFT (*or* RIGHT) (*number*) DEGREES (*or* HEADING (*three digits)* [*reason*];

f) STOP TURN HEADING (*three digits);*

g) FLY HEADING (*three digits*), WHEN ABLE PROCEED DIRECT (*name) (navaid or way-point);*

h) HEADING IS GOOD

Termination of radar vectoring

a) RESUME OWN NAVIGATION *(position of aircraft) (specific instructions).*

b) PRESUME OWN NAVIGATION [DIRECT] (*significant point*) [MAGNETIC TRACK (*three digits*) DISTANCE (*number*) KILOMETRES (*or* MILES)]

Manoeuvres

a) MAKE A THREE SIXTY TURN LEFT (*or* RIGHT) [*reason*]

... (in case of unreliable directional instruments on board aircraft)

b) ORBIT LEFT (or RIGHT) [*reason*];

c) MAKE ALL TURNS RATE ONE (*or* RATE HALF, *or (number)* DEGREES PER SECOND) EXECUTE INSTRUCTIONS IMMEDIATELY UPON RECEIPT;

Note:- when it is necessary to specify a reason for radar vectoring or for the above manoeuvres, the following phraseologies should be used:

a) DUE TRAFFIC
b) FOR SPACING
c) FOR DELAY
d) FOR DOWNWIND (or BASE,
e) or FINAL).

b) TURN LEFT (*or* RIGHT) NOW;

c) STOP TURN NOW.

Speed control

*a) SPEED (*number*) KILOMETRES PER HOUR (*or* KNOTS);

b) REPORT SPEED;

c) MAINTAIN (*number*) KILOMETRES PER HOUR (KNOTS);

d) MAINTAIN PRESENT SPEED;

e) INCREASE (*or* REDUCE) SPEED TO (*number*) KILOMETRES PER HOUR (*or* KNOTS);

f) INCREASE (*or* REDUCE) SPEED BY (*number*) KILOMETRES PER HOUR (*or* KNOTS);

g) RESUME NORMAL SPEED;

h) REDUCE TO MINIMUM APPROACH SPEED;

i) REDUCE TO MINIMUM CLEAN SPEED;

j) NO [ATC] SPEED RESTRICTIONS

* denotes pilot transmission

Position reporting

.. To omit position reports when under radar control

a) OMIT POSITION REPORTS [UNTIL (*specify*)]

b) NEXT REPORT AT (*significant point*);

c) REPORTS REQUIRED ONLY AT (*location(s)*);

d) RESUME POSITION REPORTING.

Traffic information and avoiding action

a) TRAFFIC (*number*) O'CLOCK (*distance*) (*direction of flight*) *[any other pertinent information]*;

1) avoiding action

2) SLOW MOVING;

3) FAST MOVING;

4) CLOSING;

5)

6) OPPOSITE (*or* SAME) DIRECTION;

7) OVERTAKING;

8) CROSSING LEFT TO RIGHT (*or* RIGHT TO LEFT);

.....if known

8) TYPE;

9) LEVEL;

... to request avoiding action

10) CLIMBING (*or* DESCENDING);

*b) REQUEST VECTORS;

when passing unknown traffic

c) DO YOU WANT VECTORS?;

d) CLEAR OF TRAFFIC [*appropriate instructions];*

... for avoiding action

e) TURN LEFT (*or* RIGHT) IMMEDIATELY](*number*) DEGREES] *or* HEADING (*three digits*)] TO AVOID [UNIDENTIFIED] TRAFFIC *(bearing by clock -reference and distance).*

* denotes pilot transmission

Communications and loss of communications

a) [IF] RADIO CONTACT LOST (*instructions*);

b) IF NO TRANSMISSIONS RECEIVED FOR (*number*) MINUTES (*or* SECONDS) (*instructions*);

c) REPLY NOT RECEIVED (*instructions*);

d) IF YOU READ (*manoeuvre instructions or* SQUAWK (*code or IDENT*)];

e) *manouevre or* SQUAWK) OBSERVED. POSITION *(Position of aircraft).* WILL CONTINUE TO PASS INSTRUCTIONS.

Termination of radar service

a) RADAR CONTROL TERMINATED [DUE (*reason*)];

b) RADAR SERVICE TERMINATED (*instructions*);

c) WILL SHORTLY LOSE IDENTIFICATION (*appropriate instructions or information*);

d) IDENTIFICATION LOST [*reasons*](*instructions*);

3.8 RADAR IN APPROACH CONTROL SERVICE

Vectoring for approach

a) VECTORING FOR (*type of pilot-interpreted aid*) APPROACH RUNWAY (*number*);

b) VECTORING FOR VISUAL APPROACH RUNWAY (*number)* REPORT FIELD (*or* RUNWAY) IN SIGHT;

c) VECTORING FOR (*positioning on the circuit*);

d) VECTORING FOR SURVEILLANCE RADAR APPROACH RUNWAY (*number*);

e) VECTORING FOR PRECISION APPROACH RUNWAY (*number)*;

f) (*type)* APPROACH NOT AVAILABLE DUE (*reason) (alternative instructions).*

Vectoring for ILS and other pilot-interpreted aids

a) POSITION (*number*) KILOMETRES (*or* MILES) from (*fix*). TURN LEFT (*or* RIGHT) HEADING (*three digits*);

b) YOU WILL INTERCEPT (*radio aid or track (distance*) FROM (*significant point or* TOUCHDOWN);

... when a pilot wishes to be positioned a specific distance from touchdown

c) REQUEST (*distance*) FINAL;

d) CLEARED FOR (*type*) APPROACH RUNWAY (*number*);

instructions and information

e) REPORT ESTABLISHED [ON MLS APPROACH RACK] *or* [ON ILS (LOCALIZER) *or* (GLIDE PATH)];

f) CLOSING FROM LEFT (*or* RIGHT) [REPORT ESTABLISHED];

g) TURN LEFT (*or* RIGHT) HEADING (*three digits*) [TO INTERCEPT] *or* [REPORT ESTABLISHED];

h) TURN LEFT (*or* RIGHT) HEADING (*three digits*) [TO INTERCEPT] *or* [REPORT ESTABLISHED];

i) THIS TURN WILL TAKE YOU THROUGH (*aid) (reason*);

j) TAKING YOU THROUGH (*aid) (reason);*

k) MAINTAIN (*altitude*) UNTIL GLIDE PATH INTERCEPTION;

l) REPORT ESTABLISHED ON GLIDE PATH;

m) INTERCEPT (*radio aid*) [REPORT ESTABLISHED].

* denotes pilot transmission.

Manoeuvre during independent and dependent parallel approaches

a) CLEARED FOR ILS (*or* MLS) APPROACH RUNWAY (*number*) LEFT (*or* RIGHT);

b) YOU HAVE CROSSED THE LOCALIZER (*or* MLS FINAL APPROACH TRACK). TURN LEFT (*or* RIGHT) IMMEDIATELY AND RETURN TO THE LOCALIZER (*or* MLS FINAL APPROACH TRACK);

... for avoidance action when an aircraft is observed penetrating the NTZ.

c) ILS (*or* MLS) RUNWAY (*number*) LEFT (*or* RIGHT) LOCALIZER (*or* MLS) FREQUENCY IS (*frequency*).

d) TURN LEFT (*or* RIGHT) (*number*) DEGREES (*or* HEADING) (*three digits*) IMMEDIATELY TO AVOID TRAFFIC [DEVIATING FROM ADJACENT APPROACH], CLIMB

3.9 SURVEILLANCE RADAR APPROACH

Provision of service	a)	THIS WILL BE A SURVEILLANCE RADAR APPROACH RUNWAY (*number*) TERMINATING AT (*distance*) FROM TOUCHDOWN, OBSTACLE CLEARANCE ALTITUDE (*or* HEIGHT) (*number*) METRES (*or* FEET) CHECK YOUR MINIMA [IN CASE OF GO AROUND (*instructions*)];
	b)	APPROACH INSTRUCTIONS WILL BE TERMINATED AT (*distance*) FROM TOUCHDOWN.
Elevation	a)	COMMENCE DESCENT NOW [TO MAINTAIN A (*number*) DEGREE FLIGHT PATH;
	b)	(*distance*) FROM TOUCHDOWN ALTITUDE (*or* HEIGHT) SHOULD BE (*numbers and units*).
Position		(*distance*) FROM TOUCHDOWN
Checks	a)	CHECK GEAR DOWN
	b)	REPORT RUNWAY [LIGHTS] IN SIGHT;
	c)	APPROACH COMPLETED [CONTACT (*unit*)].

3.10 PAR APPROACH

Provision of service	a)	THIS WILL BE A PRECISION RADAR APPROACH RUNWAY (*number*);
	b)	PRECISION APPROACH NOT AVAILABLE DUE (*reason) (alternative instructions);*
	c)	IN CASE OF GO AROUND (*instructions*).
Communications	a)	DO NOT ACKNOWLEDGE FURTHER TRANSMISSIONS;

	b)	REPLY NOT RECEIVED. WILL CONTINUE INSTRUCTIONS.
Azimuth	a)	CLOSING [SLOWLY (*or* QUICKLY)] [FROM THE LEFT (*or* FROM THE RIGHT)].
	b)	HEADING IS GOOD.
Completion of approach	a)	REPORT VISUAL;
	b)	REPORT RUNWAY [LIGHTS] IN SIGHT;
	c)	APPROACH COMPLETED [CONTACT (*unit*)].
Missed approach	a)	CONTINUE VISUALLY OR GO AROUND [*missed approach instructions*];
	b)	GO AROUND IMMEDIATELY [*missed approach instructions*] *(reason);*
	c)	ARE YOU GOING AROUND?;
	d)	IF GOING AROUND (*appropriate instructions*);
	*e)	GOING AROUND.
	* denotes pilot transmission	
Track	a)	ON TRACK
	b)	SLIGHTLY (*or* WELL, *or* GOING) LEFT, (*or* RIGHT) OF TRACK;
	c)	(*number*) METRES LEFT (*or* RIGHT) OF TRACK.
Elevation	a)	APPROACHING GLIDE PATH
	b)	COMMENCE DESCENT NOW [AT (*number*) FEET PER MINUTE (or ESTABLISH A (*number*) DEGREE GLIDE PATH)];

	c)	RATE OF DESCENT IS GOOD;
	d)	ON GLIDE PATH;
	e)	SLIGHTLY (*or* WELL, *or* GOING) ABOVE (*or* BELOW) GLIDE PATH;
	f)	[STILL] (*number*) METRES (*or* FEET) TOO HIGH (*or* TOO LOW);
	g)	ADJUST RATE OF DESCENT;
	h)	COMING BACK [SLOWLY (*or* QUICKLY)] TO THE GLIDE PATH;
	i)	RESUME NORMAL RATE OF DESCENT;
	j)	E L E V A T I O N E L E M E N T UNSERVICEABLE (*to be followed by appropriate instructions);*
	k)	(*distance*) FROM TOUCHDOWN. ALTITUDE *or* HEIGHT) SHOULD BE (*numbers and units*).
Position	a)	(*distance*) FROM TOUCHDOWN;
	b)	OVER APPROACH LIGHTS;
	c)	OVER THRESHOLD.
Checks	a)	CHECK GEAR DOWN AND LOCKED;
	b)	CHECK DECISION ALTITUDE (or HEIGHT).

Note:- Other phraseologies for use in the area control radar service are given in the section containing approach control radar service phraseologies.

3.11 SSR PHRASEOLOGY

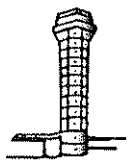
To request the pilot to confirm the Mode A Code selected on the aircraft's transponder	a) CONFIRM SQUAWK (*code)*; *b) SQUAWKING (*code*). * denotes pilot transmission
To request the operation on the IDENT feature	a) SQUAWK IDENT; b) SQUAWK LOW; c) SQUAWK NORMAL.
To request temporary suspension of transponder operation	SQUAWK STANDBY
To request emergency code	SQUAWK MAYDAY
To request termination of transponder operation	STOP SQUAWK
To request transmission of pressure altitude	SQUAWK CHARLIE
To request pressure setting check and confirmation of level	CHECK ALTIMETER SETTING AND CONFIRM LEVEL
To request termination of pressure altitude transmission because of faulty operation	STOP SQUAWK CHARLIE WRONG INDICATION
To request altitude check	VERIFY (*level*).
To request the capability of the SSR equipment	a) ADVISE THE TYPE OF TRANSPONDER *b) TRANSPONDER (*as shown in flight plan*); *c) NEGATIVE TRANSPONDER. * Denotes pilot transmission.

To instruct setting of transponder	a) FOR DEPARTURE SQUAWK (*code*); b) SQUAWK (*code*);
To request the pilot to reselect the assigned mode and code	a) RECYCLE (*mode) (code*); *b) RECYCLING (*mode) (code*). * Denotes pilot transmission.
To request reselection of aircraft identification	RESET MODE S IDENTIFICATION

The following phrases together with their meanings are listed again in the following table and illustrations.

PHRASE	MEANING
SQUAWK (code)	Set the mode A as instructed.
CONFIRM SQUAWK	Confirm code A code set on the transponder.
SQUAWK IDENT.	Operate the "IDENT" feature.
SQUAWK MAYDAY	Select emergency code.
SQUAWK STANDBY	Select the standby feature.
SQUAWK CHARLIE	Select pressure altitude transmission feature.
CHECK ALTIMETER SETTING AND CONFIRM LEVEL	Check pressure setting and confirm present level.
STOP SQUAWK CHARLIE WRONG INDICATION	Deselect pressure altitude transmission feature because of faulty operation.
*VERIFY LEVEL	Check and confirm your level.
CHECK ID SQUAWK	For a mode S equipped aircraft, check the setting of the aircraft identification feature.
* Used to verify the accuracy of the Mode C derived level information displayed to the controller.	

The pilot reply to SSR instructions is usually an acknowledgement or readback.



FASTAIR 345 ADVISE TYPE OF TRANSPONDER

FASTAIR 345 TRANSPONDER CHARLIE

FASTAIR 345 SQUAWK 6411

6411 FASTAIR 345

FASTAIR 345 CONFIRM SQUAWK

FASTAIR 345 SQUAWKING 6411

FASTAIR 345 RECYCLE 6411

FASTAIR 345 RECYCLING 6411

FASTAIR 345 CHECK ALTIMETER SETTING AND CONFIRM LEVEL

FASTAIR 345 ALTIMETER 1013 FLIGHT LEVEL80

FASTAIR 345 CONFIRM TRANSPONDER OPERATING

FASTAIR 345 NEGATIVE, TRANSPONDER UNSERVICEABLE

3.12 INITIAL MESSAGE

When flying under VFR an aircraft may change frequency to establish communications with an aeronautical station to obtain:

- some form of service (FIS, RIS) from an ATSU or
- clearance to penetrate a MATZ or
- clearance to enter controlled airspace under special VFR

The initial call should include the callsign and a request for the type of service required.

On receipt of the message ' GO AHEAD ' (or 'Pass your message' in the UK) from the ground station the initial message would be sent by the aircraft. The exact information and the order in which it must be passed will vary with each unit and this is tabulated below.

Information	ATSU	MATZ	SVFR
Callsign	✓	✓	✓
Type	✓	✓	✓
Position	✓	✓	
Heading	✓	✓	
Level	✓	✓	
Intention	✓	✓	✓
Type of service	(✓) *		
ETA entry point			✓

* if not transmitted with initial call.

CHAPTER FOUR - WEATHER INFORMATION

Contents

4.1 INTRODUCTION

Knowledge of weather conditions likely to be encountered during flight is essential to the safe operation of aircraft. However, weather conditions change and therefore a convenient system to supply the latest information is required. To be effective these sources and the terms used must be globally understood.

4.2 SOURCES OF WEATHER INFORMATION

a. Sources

A pilot in flight can gain weather information from several sources; the main sources are:

ATC
ATIS
VOLMET

In all of these, standard met terms should be used and the information is transmitted slowly and enunciated clearly so that the data can be written down by the flight crew.

b. Request from ATC

For example, when returning to Oxford from Cardiff, you might be receiving a radar service from Brize Radar. In order to decide how you will approach Oxford you could request the weather from Brize.

"Brize Radar, Oxford 94 request Oxford weather"

"Oxford 94, the Oxford 0950 weather, surface wind 360 degrees 5 knots, visibility 10 kms, Nil weather, scattered 2500 feet. Runway 02 in use, QNH 1010"

c. ATIS

In order to reduce the workload on controllers, a recorded message is transmitted continuously on a discrete VHF frequency or on a VOR frequency. Pilots are expected to listen to the report before contacting the appropriate aerodrome controller. Every time the data is changed a new code letter is allocated.

Oxford has its own ATIS on 121.95, a typical example sounds like this:
"Oxford Departure information Bravo at 0830 Zulu. Surface wind 210 degrees 10 knots. QNH 1019 QFE 1009. Brize Norton outside air temp 15 dewpoint 14. Call 121.95 for taxi and report QNH and information Bravo"

Information Code. On initial contact the pilot should state the information code that he has received so that the controller can update the information if necessary. e.g.:

"Oxford Ground, GBODA with Information Bravo QNH 1019 request taxi"

d. VOLMET

Frequencies for Volmet information can be found in the Aeronautical Information Publication (AIP) or en-route booklets such as Aerad.
Each Volmet transmits a met information for a group of aerodromes at set times past the hour.

e. Contents of Volmet

Volmet broadcasts (and other Met transmissions) should follow a standard format. You should study the information on Met Reports in UK AIP MET so that you are familiar with terms and the units of measurement. A Volmet broadcast would include the following items and units of measurement:

Aerodrome identification			
Surface wind	Degrees and knots e.g. 250 degrees 10 knots		
Visibility	Metres (below 5 km) or kilometres		
Runway Visual range (RVR)	Metres (only reported 50 - 1500m)		
Weather	No units e.g. rain		
Cloud	Few	1-2 octas	(octa = 1/8)
	Scattered	3-4 octas	
	Broken	5-7 octas	
	Overcast	sky covered	
Temperature	Degrees Celsius		
Dew point	Degrees Celsius		
QNH	Hectopascals or millibars		
Trend	No units		

Cavok. This is pronounced "CAV-O-KAY" and means a combination of conditions where the visibility, cloud and present weather are better than prescribed valves, namely:

- Visibility is 10 km or more
- No cloud below 1500m (5,000 ft) or below MSA (minimum sector altitude) whichever is greater and no cumulonimbus (CB)
- No significant weather i.e no precipitation, thunderstorm, shallow fog or low drifting snow

Note: Surface wind is not included.

4.3 SUPPLEMENTARY INFORMATION

a) Some other information may also be included in reports, particularly with regard to runway conditions:

- Standing water, e.g. damp, wet, water patches or flooded. Snow, slush, ice.

- Braking action - given for Touchdown Zone, Mid-Point, Stop End. (see table below)

- Other runway surface conditions (e.g. threshold displaced 1000ft due to work in progress).

- Obstructions.

- Wind Shear warnings etc.

For example: "Oxford 94, braking action medium due to heavy rain"

"Oxford 94".

b) Braking Action Code

From data collected from operations on compacted snow and ice, an assessment table has been produced to relate to a measured braking co-efficient to an estimated braking action and hence to a simple code for braking action. It must be borne in mind that the description "good" is a comparative value and is intended to mean that aeroplanes should not experience directional control or braking difficulties when landing, but conditions would not be as good as on a clean, dry, runway.

The measured co-efficient may be reported as a 2 digit code without the decimal.

Measured Co-efficient	Estimated Braking Action	Code
0.40 and above	Good	5
0.39 - 0.36	Medium to good	4
0.35 - 0.30	Medium	3
0.29 - 0.26	Medium to poor	2
0.25 and below	Poor	1

CHAPTER FIVE - FAILURES AND EMERGENCIES

Contents

5.1 INTRODUCTION

As with any field of human endeavour flight operations do not always go according to plan. In the worst case we may have to apply procedures designed to gain assistance in difficult situations. In this chapter we will consider communications failure and emergency procedures.

5.2 COMMUNICATIONS FAILURE

a. Breakdown of communications

Occasionally (rarely) communication between aircraft and ground stations can break down. It could be that either party has a partial failure (receiver failed, transmitter okay or vice versa) or even a total failure of equipment. The breakdown may be caused by interference or by wrong selection.

b. Actions

The most common reason for lack of comms. is usually "finger trouble". Therefore you should check:

i) Correct frequency selected
ii) Volume control not turned too low or squelch level too high
iii) Microphone / headset plugs fully home
iv) The aeronautical station is open for watch e.g. Military Training bases after 1700 hrs.
v) You are within radio range

c. Radio Failure

It could be that your (or the other station) equipment is malfunctioning. It is possible that your receiver has failed but you are still transmitting satisfactorily.

In VMC and operating under VFR (visual flight rules) some aircraft still operate with no radio fitted, therefore unless you need an ATC service there is no cause for concern! However, if you do need a service (for example to join a traffic pattern to land) then you should follow the GENERAL PROCEDURE outlined here:

i) Attempt communication on another frequency.
ii) If these attempts fail, continue to transmit your message twice on the designated frequency.
iii) If you know that your receiver has failed, transmit reports (or positions) at the scheduled times on the frequency in use.

Note: ICAO requirement states that "An aircraft which is receiving Air Traffic Control or Advisory Service shall also transmit information regarding the intention of the pilot-in-command with respect to the continuation of the flight."

d. **Question.** How else could you inform ATC of your radio failure?

Answer. SSR Code - squawk 7600 This code appearing on a radar screen informs the controller that the aircraft concerned has radio problems.

e. **Rules of the Air**

The Rules of the Air (Annex 2 to the ICAO convention) says that in Visual Met Conditions (VMC) the aircraft with communications failure shall:

i) Continue to fly in VMC (keep clear of cloud).
ii) Land at nearest suitable aerodrome.
iii) Report arrival by the most expeditious means to the appropriate ATC unit (i.e. telephone ATC).

Note 1: "In addition, the aircraft when forming part of the traffic pattern (i.e. in the circuit to land) at a controlled aerodrome shall keep a watch for instructions as may be issued by visual signals"

Note 2: " Controlled VFR" is common in other countries and requires 2-way communications.

5.3 EMERGENCIES

a. States of Emergency

The states of emergency are classified as follows:

DISTRESS - a condition of being threatened by serious and/or imminent danger and of requiring immediate assistance.

URGENCY - a condition concerning the safety of an aircraft or other vehicle or of some person on board or within sight, but does not require immediate assistance.

b. Emergency communications

Distress and urgency traffic shall normally be maintained on the frequency on which such traffic was initiated until it is considered that better assistance can be provided by transferring that traffic to another frequency.

Note: 121.5 MHz or alternative available VHF or HF frequencies may be used as appropriate.

In cases of distress and urgency communications, in general, the transmissions by radiotelephony shall be made slowly and distinctly, each word being clearly pronounced to facilitate transcription.

5.4 DISTRESS PROCEDURES

a. Distress Message.

In addition to being preceded by the radiotelephony distress signal MAYDAY, preferably spoken three times, the distress message to be sent by an aircraft in distress shall:

i) be on the air-ground frequency in use at the time;

ii)* consist of as many as possible of the following elements spoken distinctly and, if possible, in the following order:

1) name of the station addressed (time and circumstances permitting);

2) the identification of the aircraft;

3) the nature of the distress condition;

4) intention of the person in command;

5) present position, level (i.e. flight level, altitude, etc., as appropriate) and heading.

b. Supplemental Measures.

The foregoing provisions may be supplemented by the following measures:

i) the distress message of an aircraft in distress being made on the emergency frequency 121.5 MHz or another aeronautical mobile frequency, if considered necessary or desirable. Not all aeronautical stations maintain a continuous guard on the emergency frequency;

ii) the distress message of aircraft in distress being broadcast, if time and circumstances make this course preferable;

iii) the aircraft transmitting on the maritime mobile service radiotelephony calling frequencies;

iv) the aircraft using any means at its disposal to attract attention and make known its conditions including the activation of the appropriate SSR mode and code (mode A 7700);

v) any station taking any means at its disposal to assist an aircraft in distress;

vi) any variation on the elements listed in ii)* above when the transmitting station is not itself in distress, provided that such circumstance is clearly stated in the distress message.

Note: The station addressed will normally be that station communicating with the aircraft or in whose areas of responsibility the aircraft is operating.

c. Action by the station addressed or the first station acknowledging the distress message.

The station addressed by the aircraft in distress, or first station acknowledging the distress message, shall;

i) immediately acknowledge the distress message;

ii) take control to the communications or specifically and clearly transfer that responsibility, advising the aircraft if a transfer is made;

iii) take immediate action to ensure that all necessary information is made available, as soon as possible, to;

- the ATS unit concerned;

- the aircraft operating agency concerned, or its representative, in accordance with pre-established arrangements;

Note: The requirement to inform the aircraft operating agency concerned does not have priority over any other action which involves the safety of the flight in distress, or of any other flight in the area, or which might affect the progress of expected flights in the area.

iv) warn other stations, as appropriate, in order to prevent the transfer of traffic to the frequency of the distress communication.

d. Imposition of Silence.

The station in distress, or the station in control of distress traffic, shall be permitted to impose silence, either on all stations of the mobile service in the area or on any station which interferes with the distress traffic. It shall address these instructions "to all stations", or to one station only, according to circumstances. In either case, it shall use:

'STOP TRANSMITTING'

The radio distress signal 'MAYDAY'.

The use of the signals specified above shall be reserved for the aircraft in distress and for the station controlling the distress traffic.

e. Action by all other stations.

The distress communications have absolute priority over all other communications, and a station aware of them shall not transmit on the frequency concerned, unless:

i) the distress is cancelled or the distress traffic is terminated;

ii) all distress traffic has been transferred to other frequencies;

iii) the station controlling communications gives permission;

iv) it has itself to render assistance.

Any station which has knowledge of distress traffic, and which cannot itself assist the aircraft in distress, shall nevertheless continue listening to such traffic until it is evident that assistance is being provided.

f. Termination of Distress Communications and of Silence.

When an aircraft is no longer in distress, it shall transmit a message cancelling the distress condition.

When the station which has controlled the distress communication traffic becomes aware that the distress condition is ended, it shall take immediate action to ensure that this information is made available, as soon as possible, to:

i) the ATS unit concerned;

ii) the aircraft operating agency concerned, or its representative, in accordance with pre-established arrangements. The distress communication and silence conditions shall be terminated by transmitting a message, including the words:

"DISTRESS TRAFFIC ENDED"

on the frequency or frequencies being used for the distress traffic. This message shall be originated only by the station controlling the communications when, after the reception of the message cancelling the distress condition, it is authorised to do so by the appropriate authority.

5.5 URGENCY PROCEDURES

a. Action by the aircraft reporting the condition (other than by an aircraft used for medical transports).

In addition to being preceded by the radiotelephony urgency signal PAN PAN preferably spoken three times, the urgency message to be sent by an aircraft reporting an urgency condition shall:

i) be on the air-ground frequency in use at the time;

ii) consist of as many as required of the following elements spoken distinctly and, if possible, in the following order;

1) the name of the station addressed;

2) the identification of the aircraft;

3) the nature of the urgency condition;

4) the intention of the person in command;

5) present position, level (i.e. flight level, altitude, etc., as appropriate) and heading;

6) any other useful information.

Note 1: The foregoing provisions are not intended to prevent an aircraft broadcasting an urgency message, if time and circumstances make this course preferable.

Note 2: The station addressed will normally be that station communicating with the aircraft or in whose area of responsibility the aircraft is operating.

b. Action by the station addressed or the first station acknowledging the urgency message.

The station addressed by an aircraft reporting an urgency condition, or first station acknowledging the urgency message, shall:

i) acknowledge the urgency message;

ii) take immediate action to ensure that all necessary information is made available, as soon as possible, to;

1) the ATS unit concerned;

2) the aircraft operating agency concerned, or its representative, in accordance with pre-established arrangements;

Note: The requirement to inform the aircraft operating agency concerned does not have priority over any other action which involves the safety of the flight in distress, or of any other flight in the area, or which might affect the progress of expected flights in the area.

iii) if necessary, exercise control of communications.

c. Action by all other stations.

The urgency communications have priority over all other communications, except distress, and all stations shall take care not to interfere with the transmission of urgency traffic.

5.6 MEDICAL TRANSPORTS

a. Action by an aircraft used for medical transports.

The use of the signal PAN PAN MEDICAL shall indicate that the message which follows concerns a protected medical transport pursuant to the 1949 Geneva Conventions and Additional Protocols.

For the purpose of announcing and identifying aircraft used for medical transports, a transmission of the radiotelephony urgency signal PAN PAN, preferably spoken three times, shall be followed by the radiotelephony signal for medical transports MAY-DEE-CAL, pronounced as in the French "mèdical". The use of the signals described above indicates that the message which follows concerns a protected medical transport. The message shall convey the following data:

i) the call sign or other recognised means of identification of the medical transports;

ii) position of the medical transports;

iii) number and type of medical transports;

iv) intended route;

v) estimated time en route and of departure and arrival, as appropriate; and

vi) any other information such as flight altitude, radio frequencies guarded, languages used, and secondary surveillance radar modes and codes.

b. Action by the station addressed or by other stations receiving a medical transports message.

The provisions of the above shall apply as appropriate to stations receiving a medical transports message.

5.7 COMMUNICATIONS RELATED TO ACTS OF UNLAWFUL INTERFERENCE

The station addressed by an aircraft being subjected to an act of unlawful interference, or first station acknowledging a call from such an aircraft, shall render all possible assistance, including notification of appropriate ATS units as well as any other station, agency or person in a position to facilitate the flight.

CHAPTER SIX - IFR

Contents

6.1 INTRODUCTION

The procedures for IFR and VFR are mostly identical but some words and procedures are generally only used by large commercial aircraft; hence they appear in this section.

In this chapter we will discuss the remaining elements of communications which apply to IFR flight rather than to both VFR and IFR.

6.2 CALLSIGNS

a. 'Heavy'

Aircraft which are in the heavy wake turbulence category (mostly decided by aircraft weight) must use the word 'HEAVY' in the initial call to an ATSU (Air Traffic Service Unit).

E.g. "Brize Radar, Speedbird 213 Heavy, request radar advisory"

b. Change Call Sign

In the interests of safety an aeronautical station (ATC) may tell an aircraft to change call sign temporarily. The aircraft station cannot do this! For example there may be two aircraft on the same frequency with a similar sounding call sign: Speedbird 123 and Birdseed 123

"Speedbird 123 change call sign to BA 123"

When this is no longer required (one aircraft has left frequency or the subject aircraft is handed over to another agency for example) the aircraft is told to revert to his original call sign.

"BA123 revert to flight plan call sign"

6.3 LEVEL REPORTING

a. Vertical Position

The reporting of vertical position aircraft depends upon the altimeter pressure setting in use.

(i) Standard Pressure Setting (SPS)

Its reading is based on sea level pressure in the standard atmosphere i.e.1013.2 hpa. The altimeter reads FLIGHT LEVEL.

Note: SPS does not read height above sea level but merely above a standard datum.

(ii) **QNH.**

With this pressure setting the altimeter reads ALTITUDE above mean sea level for the actual atmospheric conditions.

(iii) **QFE**

With this pressure setting the altimeter reads HEIGHT usually above the runway threshold. (Commercial operations rarely use this pressure setting now.)

Therefore in R/T, the use of the words FLIGHT LEVEL, ALTITUDE, HEIGHT should indicate which altimeter setting should be used by the pilot.

E.g. "G-DA descend to FL 50" the controller assumes that the pilot has the SPS (1013) set on the altimeter. For most IFR work you will use QNH and SPS.

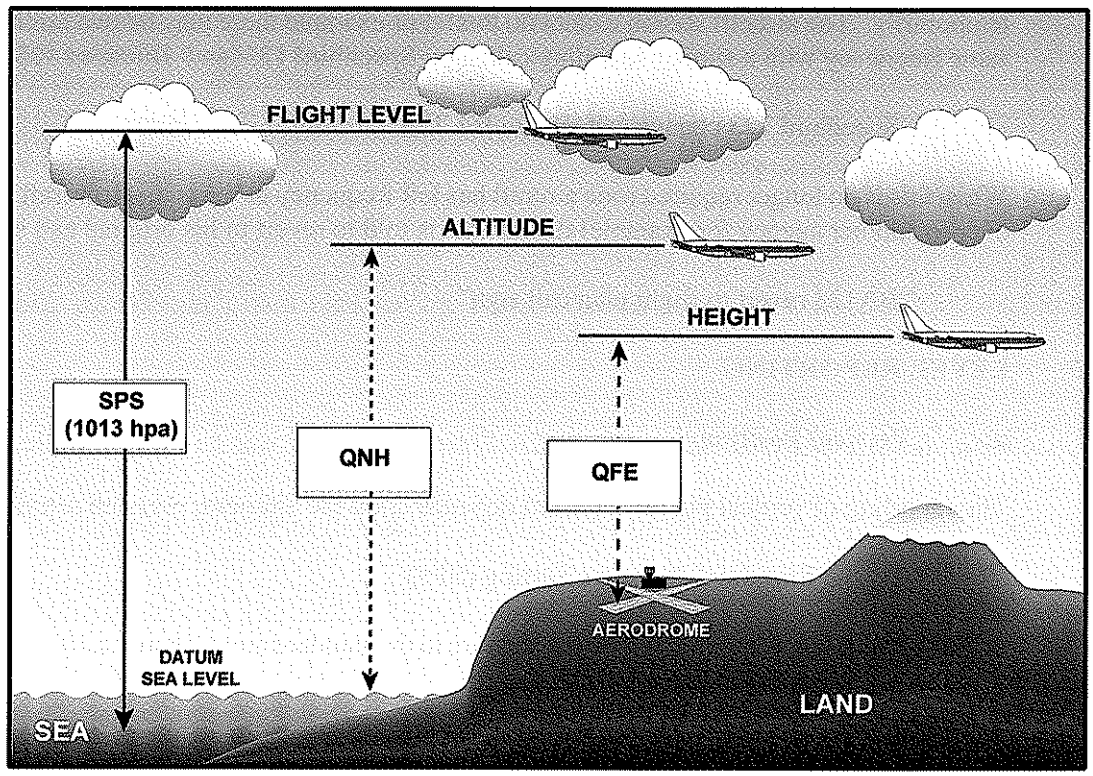


Figure 6.1. Pressure Settings

b. ICAO and CAP413

In the ICAO documents (esp. 9432) and CAP413 there are some notable differences. In doc 9432 the altitudes/heights are assumed to be with QNH set. The phraseology is a little unsatisfactory because it does not clearly specify or check that the pilot has the correct pressure setting. This is potentially dangerous especially when traffic separation of ground clearance is critical.

CAP 413 seems to eliminate these chances of confusion. However, for the exam the ICAO version (Doc 9432) only is required. Hopefully the ICAO will adopt the changes made in the UK, but in the meantime.....

If the aircraft cannot comply with the instructions given he must say so.

c. Examples

In the following examples 'climb' or 'descend' are interchangeable.

Event	Pilot	ATC
Flight Level change	Descend to FL 120 Fastair 243	Fastair 243 Descend to FL 120
Flight Level change	Re-cleared FL 60 Fastair 243	Fastair 243 Re-cleared FL 60
Altitude	QNH 1003 Descend to 3,000 ft Fastair 243	Fastair 243 Set QNH 1003 Descend to 3,000 ft
Inability to climb	Fastair 243 Unable to comply due to weight	Fastair 243 Expedite climb to FL 200

6.4 POSITION REPORTING

a. Compulsory position reports

Compulsory position reports may be required on some routes that may or may not have designated significant points. These reports shall contain the following elements of information, except that elements iv), v) and vi) may be omitted under certain conditions:

i) callsign
ii) position
iii) time
iv) level
v) next position and time
vi) ensuing significant point.

Note: i), ii) and iii) may not be omitted.

b. Exemptions

Where adequate flight progress data is available from other sources, such as surveillance radar, flights may exempted from compulsory position reports. Examples of messages relating to such exemption include:

" FASTAIR 345 NEXT REPORT COLINTON "

" FASTAIR 345 OMIT POSITION REPORTS UNTIL FIR BOUNDARY, NEXT REPORT COLINTON "

" FASTAIR 345 RESUME POSITION REPORTING "

The reply to such a message would be " FASTAIR 345 WILCO "

6.5 MET REPORTS

a. Requirement

Occasionally aircraft meteorological observations are required. (In practice these are rarely required in the UK, but in some areas where observations are difficult [e.g. Atlantic] aircraft reports are valuable). The reports required are:

- routine aircraft observations during en-route and climb-out phases.
- special reports during any phase of flight.

The following flights are exempt from sending met reports:

- aircraft not equipped with RNAV (area navigation)
- flight is less than 2 hours
- aircraft is less than 1 hour from next landing
- altitude of flight is less than 1500m (5,000 ft)

b. Content of Routine Met Reports

The content of a routine report is combined with a routine position report as shown below:

SECTION 1 (POSITION)

Callsign, Position, Time, Level, Next Position & ETA

SECTION 2 (OPERATIONAL INFO)

ETA (at destination), Endurance

SECTION 3 (MET INFO)

Air Temp, Wind (direction and speed), Turbulence, Icing, Humidity

c. Special Met Reports

The content of a special met report includes:

SECTION 1 Callsign, Position, Time Level

SECTION 2 Special met condition

Special reports are reported in SPECIAL weather conditions such as Severe Turbulence, Volcanic Ash, Pre-volcanic Eruption, Severe Icing, Heavy Dust / Sand Storm, Thunderstorm, severe Mountain Wave.

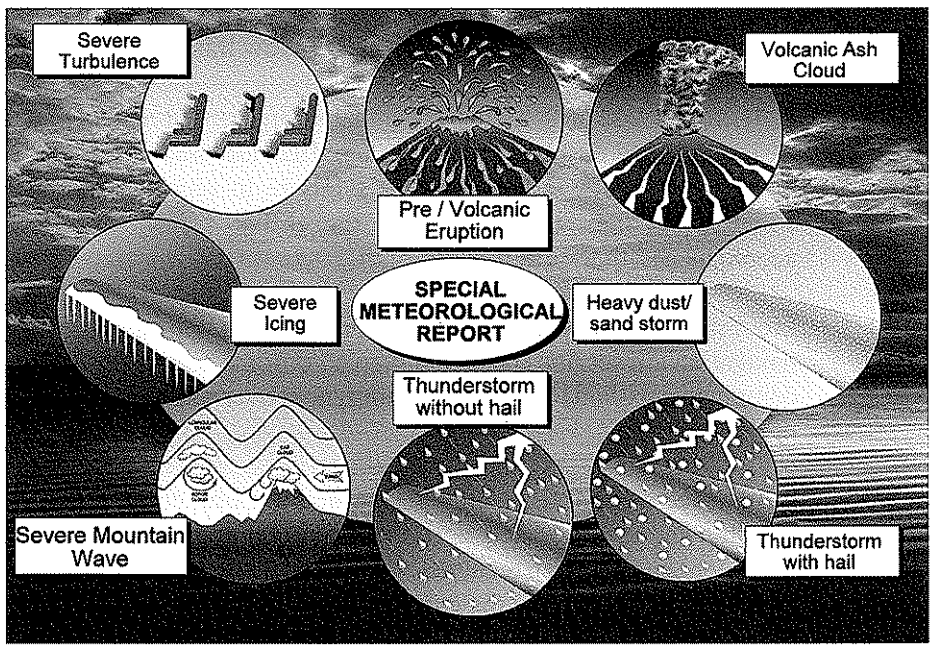


Figure 6.2. Special Weather Conditions

6.6 COMMUNICATION FAILURE UNDER IFR

a. IFR in VMC or IMC

In the event of a failure to establish or maintain communications, the initial actions are the same as for VFR, in other words check equipment, transmit blind etc. The ICAO reference really only considers "controlled flights" under VFR and IFR [In the UK controlled VFR is uncommon except under special circumstances in Control Zones e.g. crossing Brize Norton's control zone].

The subsequent actions in the event of communication failure depend upon whether the aircraft can maintain visual meteorological conditions (VMC) i.e. keep clear of cloud during descent and landing or whether the aircraft cannot avoid flying in cloud i.e. in instrument meteorological conditions (IMC).

b. IFR in VMC

The action for comm failure on IFR flight in VMC is the same as the VFR procedure. If an aircraft can maintain VMC then the pilot must follow this procedure:

i) Continue to fly in VMC
ii) Land at the nearest suitable aerodrome; and
iii) Report arrival by most expeditious means to the appropriate ATSU.

c. IFR in IMC

There is a slight variation in this procedure depending on the stage of flight i.e en route or departure.

En Route

If an aircraft cannot maintain VMC then it must follow this procedure:

i) Unless otherwise prescribed by regional navigation agreement maintain the **last assigned speed and level** (or minimum flight altitude if higher) for a period of **20 minutes** following the aircraft's failure to report their position over a compulsory reporting point, and **thereafter** adjust level and speed in accordance with the **filed flight plan**.

ii) Proceed according to the flight plan route to the appropriate designated navigation aid serving the destination aerodrome and when required to ensure compliance with iii) below [i.e. timing] hold over this aid until commencement of descent.

iii) Commence descent from the navigation aid specified in ii) at, or as close as possible to, the expected approach time last received; or if no expected approach time has been received at, or as close as possible to, the estimated time of arrival resulting from the current flight plan;

iv) Complete a normal instrument approach procedure as specified for the designated navigation aid; and

v) land, if possible within 30 minutes after the estimated time of arrival specified in iii) above, or the last acknowledged expected approach time, whichever is later.

Departure.

A departing IFR flight in IMC should **maintain the level** to which it was cleared for a period of **three minutes** and **then** continue its flight in accordance with the **current flight plan.**

6.7 SELCAL

SELCAL stands for selective calling, a system in which the voice calling is replaced by the transmission of coded tones to the aircraft over the radiotelephony channels. This means that the **flight crew do not have to monitor the channel continuously** - a very useful feature particularly on long oceanic flights using HF communications.

A single selective call consists of a combination of four pre-selected audio tones whose transmission requires about 2 seconds. Receipt of the assigned tone code (SELCAL code) activates a cockpit call system in the form of light and/or chime signals.

The procedure for the use of SELCAL by a flight crew is as follows:

a) include the SELCAL code in the flight plan and

b) **establish HF communications temporarily while still within VHF coverage** to ensure that the HF aeronautical station has the correct SELCAL code information.

The aircraft station should also carry out a pre-flight SELCAL check and ,if necessary give its SELCAL code.

6.8 IFR FLIGHT PROFILE

In order to put into practice some of the standard words and phrases from the list profiled in Doc 4444 (or summarised in 9432) we will follow a typical IFR flight profile.

Some of the profile is imaginary in that there is no standard departure from Cardiff nor is there an ILS at Oxford! However, the object is to fly IFR from Cardiff to Oxford with an ILS approach.

The list of phrases used is not exhaustive and therefore some private study of all phrases possible is essential.

EVENT	PILOT	ATC / *Groundcrew*
Departure ATIS		This is Cardiff Departure Information Delta. Time 1115 Runway 30 Surface wind 290 degrees 15 knots Visibility 10 km Sky clear Temperature 15 Dew point 10 QNH 1009 For start-up and taxi instructions contact Ground on 124.0
Start-up on 124.0 (this is requested to avoid unnecessary fuel wastage by delays on the ground. In case of a delay an expected start-up time is given)	Cardiff Ground Birdseed 123 Stand 24 Information Delta Request Start-up	Birdseed 123 Start-up at 35 QNH 1009 *or* Birdseed 123 Start-up approved QNH 1009
Push-back	Ground Birdseed 123 Request push-back	Birdseed 123 push-back approved
On groundcrew intercomm	*Ready for push-back* *Brakes released* *Brakes set. Disconnect* *Roger*	*Confirm brakes released* *Commencing push-back* *Push-back complete confirm brakes set* *Disconnecting. standby for visual signal at your left*
On Ground 124.0	Ground Birdseed 123 Request taxy Taxy to holding point D runway 30 Wilco Birdseed123	Birdseed 123 Taxy to holding point D runway 30 Give way to Boeing 747 on taxyway at C

Clearances are passed by ground controllers when they have received them from Approach or Airways controller	Ready to copy (or go ahead) Birdseed 123 Birdseed 123 is cleared for the Brecon 30 departure climbing to FL 80 Onward clearance with Cardiff Approach 125.85 Squawk 3312 Birdseed 123 Tower 125.9 Birdseed 123	Birdseed 123 I have your clearance Birdseed 123 is cleared for the Brecon 30 departure climbing to FL 80 Onward clearance with Cardiff Approach 125.85 Squawk 3312 Readback correct Contact tower 125.9
On tower freq 125.9 Conditional clearance Take-off (when runway vacated by B747)	Cardiff tower Birdseed 123 ready for departure After landing 747 line-up Birdseed 123 Cleared for take-off Birdseed 123	 Birdseed 123 After landing 747 line-up Birdseed 123 cleared for take-off
Departure Then	Cardiff tower Birdseed 123 passing FL 50 for FL 80 Brecon 30 departure Climb FL150 Birdseed 123 Expedite climb until passing FL120 Birdseed 123	 Birdseed 123 Roger continue climb FL 150 Birdseed 123 Expedite climb until passing FL120

Joining Controlled Airspace	London Control Birdseed 123 maintaining FL150 Birdseed123 is cleared to enter controlled airspace at Brecon FL 150 route to Oxford via Golf 1 Leave controlled airspace at Malby Wilco Birdseed123 Squawk 2156 Contact London control 123.12 Birdseed123	Birdseed123 is cleared to enter controlled airspace at Brecon FL 150 route to Oxford via Golf 1 Leave controlled airspace at Malby Birdseed123 readback correct Report at Alvin Birdseed123 Squawk 2156 Contact London Control 123.12 for airways clearance
Position Reports: Callsign Position, time FL Next posn, time	Birdseed123 Alvin 25 FL150 Wotan 30	Birdseed123 Roger
Descent	Birdseed123 Request leave controlled airspace by descent Descend FL 120 Expect further descent when clear of controlled airspace Birdseed123	Negative Birdseed123 Descend now to FL 120 Expect further descent when clear of controlled airspace
IFR Arrival	Oxford Approach Birdseed123 FL 80 Estimate Chalo 45 Information Delta QNH 1001 Descending 2,500 ft Birdseed123 Right 020 degrees Birdseed123 Wilco Birdseed123	Birdseed123 QNH 1001 Descend to 2,500 ft Birdseed123 turn right 020 degrees for separation Birdseed123 self position for ILS runway 20 Report at Hey

ILS Approach (on Oxford Approach)	Birdseed123 Hey 2,500 ft Right 180 Wilco Birdseed123	Birdseed123 turn right 180 closing localiser from the right Report established
Clearances	Birdseed123 Localiser established Cleared ILS runway 20 Wilco Birdseed123 Birdseed123 Outer marker Tower 118.87 Birdseed123	Birdseed123 Roger Cleared ILS approach runway 20 Report outer marker Birdseed123 contact tower 118.87
On tower 118.87	Oxford tower Birdseed123 outer marker Cleared to land Birdseed123	Birdseed123 Oxford tower Cleared to land runway 20

6.9 NDB APPROACH PROFILES

EVENT	PILOT	ATC
NDB Approach	Oxford Approach GBODA Chalo 45 FL 80 Estimate OX at 50 Hold at OX FL 45 GBODA GBODA OX FL 45 Entering the hold Roger GBODA	GBODA Oxford Approach hold OX at FL 45 Expect NDB approach runway 20 GBODA expected approach time 55
Clearance	Cleared for NDB approach runway 20 Wilco GBODA	GBODA Cleared for the NDB approach to runway 20 Report beacon outbound
Beacon Outbound	GBODA beacon outbound Wilco GBODA	GBODA report base turn complete
Base Turn	GBODA base turn complete Tower 118.87 GBODA	GBODA contact tower 118.87
Final Approach	Oxford Tower GBODA long final runway 20 Cleared to land GBODA	GBODA Oxford tower Cleared to land

CHAPTER 7 - VHF PROPAGATION

Contents

7.1 INTRODUCTION

a) Radio Waves.

If an alternating current of suitably high frequency is fed to a transmitting aerial, the energy is not confined to the metal of the aerial but radiates out into space in the form of electro-magnetic waves (radio waves). This radiation of energy through space comprises alternating electrical and magnetic fields at right angles to each other. The amplitude of each field varies (oscillates) between zero and a maximum value, at the same frequency as the alternating current in the aerial.

b) Polarization.

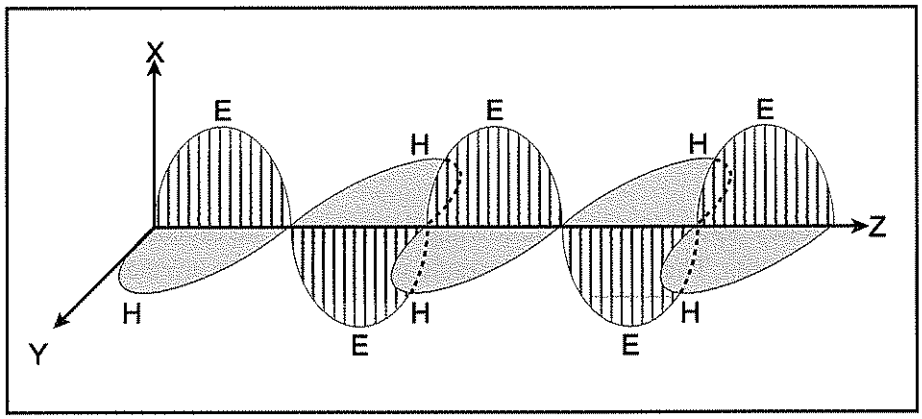


Figure 7.1. Vertical Polarization.

The term polarization is used to describe the direction or plane of oscillation of the electrical field of an electro-magnetic wave. For instance a vertical transmitting aerial produces (mainly) a vertically polarized radio wave, with the electrical field (E) oscillations occurring in the vertical plane and the magnetic field (H) oscillations in the horizontal plane. For **efficient** reception, the receiving aerial should also be vertical. If the transmitting aerial is horizontal, the receiving aerial should also be horizontal.

The electric and magnetic fields oscillate at right angles to each other and both are at right angles to the direction of propagation (or travel) of the radio wave. Figure 7.1. shows the peak values E and H of the electric and magnetic fields of a vertically polarized wave.

c) Speed of Propagation.

Radio waves travel at the speed of light. The speed is virtually constant and is:-

300 000 000 metres per second, or

162 000 nautical miles per second

d) Wavelength.

The wavelength of a radio wave can be defined as the distance travelled by the radio signal during the transmission of one cycle. Wavelength is normally expressed in metres unless it is less than one metre, when centimetres or millimetres are used.

e) Frequency Units.

Frequencies are expressed in Hertz (Hz). One Hertz equals one cycle per second. Radio frequencies are high and for convenience the following units may be used:-

Kilo-Hertz	(kHz)	= 1,000 Hz	= 10^3 Hz
Mega-Hertz	(MHz)	= 1,000,000 Hz	= 10^6 Hz
Giga-Hertz	(Ghz)		= 10^9 Hz
Tera-Hertz	(THz)		= 10^{12} Hz

7.2 RADIO FREQUENCY BANDS

Frequency Spectrum. The following table shows the division of radio frequencies into the various bands. The bands used for radio communications are the VHF and the HF bands.

Frequencies	Frequency Band	Wavelength	Facilities
3-30 kHz	VLF (Very Low Frequency)	100 km - 10 km	Very long range navigation
30-300 kHz	LF (Low Frequency)	10 km - 1km	NDB, Decca, Loran -C
300-3,000 kHz	MF (Medium Frequency)	1 km - 100 metres	NDB
3 - 30 MHz	HF (High Frequency)	100 metres-10 metres	HF R/T
30 - 300 MHz	VHF (Very High Frequency)	10 metres -1 metre	VHF R/T, VDF, VOR, ILS. marker beacons,
300 - 3,000 MHz	UHF (Ultra High Frequency)	1 metre -10 cm	ILS Glidepath, DME, some Surveillance Radar.
3 - 30 Ghz	SHF (Super High Frequency)	10 cm -1 cm	PAR, some Surveillance Radar, Doppler Radar, Radio Altimeter .AWR
30 - 300 GHz	EHF (Extremely High Frequency)	1 cm -1 mm	Airfield Surface Movement Radar

7.3 VHF FREQUENCY SPREAD

The frequencies in the part of the VHF band that may be of concern to the pilot are as follows:

88 to 107.95 MHz	Broadcasting (FM)
108 to 117.95 MHz	Radio Navigation (AM and FM)
118 to 136.975 MHz	Radio Communication (AM) This is the band that used for Aeronautical Mobile Service voice communications

(AM stands for amplitude modulation and FM for frequency modulation)

7.4 VHF FREQUENCY SEPARATION

a) Sidebands and Bandwidth.

The spread of side frequencies above and below the carrier frequency are known respectively as the upper and lower sidebands. The total spread of frequencies in the modulated emission is known as the Bandwidth of the signal. A voice (or music) transmission consists of many different audio frequencies, up to at least 5 kHz, impressed on the carrier wave. Consequently many side frequencies exist in the modulated signal, which may have a bandwidth of at least 10 kHz. Such a signal is classified as an A3E emission; an example is VHF R/T.

b) VHF Bandwidth

The bandwidth allocated to VHF frequencies is at present for the most part 25 kHz or 0.025 MHz i.e. the spacing between one channel and another. However, this is being reduced to 8.33 kHz (one-third of 25 kHz) and is already mandatory for aircraft using the upper airspace over Europe under Eurocontrol.

7.5 VHF PROPAGATION CHARACTERISTICS

a) Propagation Paths.

The path of a radio wave from a transmitter to a receiver many miles away is not necessarily direct. The following paragraphs describe the various paths a radio signal can follow. In many cases, the signal may be reaching the receiver by more than one path at the same time, and because of the different path lengths there will be phase differences between the signals. Such phase differences affect the resultant signal strength. For instance, if two waves from the same transmitter travel by different paths and arrive 180° out of phase, they will cancel each other if their amplitudes are the same. The resultant signal strength will be zero, so no signal will be received. Changes in phase difference will cause changes in signal strength so producing the effect known as '**fading**'.

b) Direct and Ground-reflected Waves.

A signal which travels in a straight line between transmitter and receiver is called the **direct wave**. In addition to this, there is normally a signal arriving at the receiver after reflection at the earth's surface. This is the **ground-reflected wave**. These two waves are jointly known as the **Space Wave** and are depicted in Figure 7.2. (In this and other diagrams, the abbreviation Tx is used for transmitter and Rx for Receiver.)

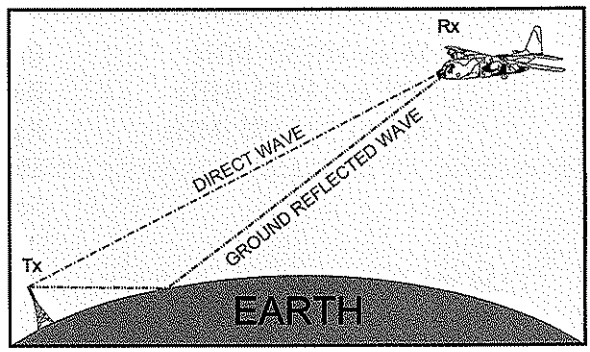


Figure 7.2. Space Wave.

Since the direct and reflected waves follow different paths they may arrive at the receiver with large phase differences. The situation is further complicated by a change in phase which occurs at the point of reflection of the ground-reflected wave. The net result is that, for instance, an aircraft flying towards a ground station may suffer fading or temporary loss of VHF communications with that station. The range at which this occurs depends on ground aerial height above the surface, aircraft altitude, and frequency. For instance, with VHF R/T, except in freak conditions, the curvature of the earth gives protection from mutual interference between stations using a common frequency provided they are well-separated geographically.

7.6 FACTORS AFFECTING VHF PROPAGATION

a) Attenuation.

The term **attenuation** means the loss in strength of a radio signal as range from the transmitter increases. The signal strength received is inversely proportional to the distance from the transmitter. A wave becomes attenuated as range increases because:-

i) The radio energy available is spread over a greater area.

ii) Radio energy is lost to the earth, the atmosphere, and sometimes to the ionised layers above the earth.

One factor on which the operational range of a radio emission depends is the transmitter power. The range obtainable is proportional to the square root of the power; in other words if the range is to be doubled, the transmitter power must be quadrupled.

b) Refraction.

As a general rule, radio signals travel in straight lines, that is, they follow great circle paths over the surface of the earth. Under certain circumstances, however, the path of a signal may change direction. This change of direction is known as **refraction**. The amount of refraction varies considerably, depending on conditions and on frequency. In the VHF range of frequencies there is negligible refraction.

7.7 EFFECTIVE RANGE OF VHF

Line of Sight Range

The curvature of the earth limits the use of the direct wave. It can be seen from Figure 7.3. that the aircraft 'below the horizon' cannot use the direct wave for communications.

The lowest direct wave is just tangential to the surface and is known as the 'horizon ray'. It will be appreciated that direct wave communications for the aircraft in Figure 7.3. could be restored by either raising the height of the ground aerial or increasing the aircraft's altitude.

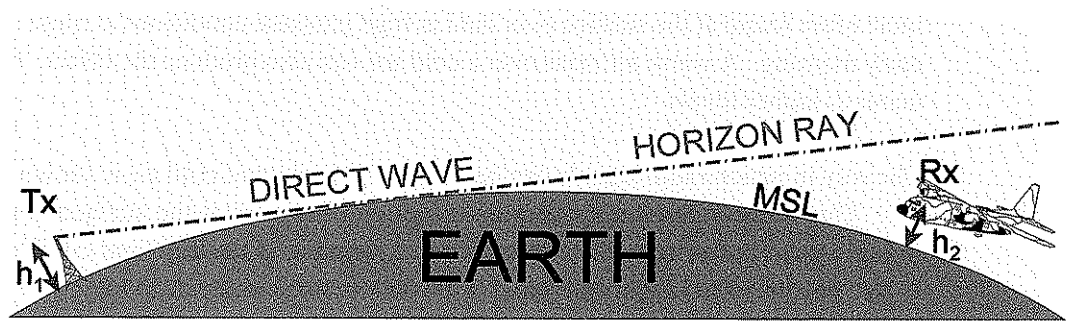


Figure 7.3. Line of Sight.

A formula used for calculating the maximum range of direct wave reception is:-

$$\text{Range (nm)} = 1.23\ (\sqrt{h_1} + \sqrt{h_2})$$

where h_1 = height of ground aerial (feet AMSL)

h_2 = aircraft altitude (feet AMSL)

This formula allows for a small amount of refraction in the lower layers of the atmosphere, which gives a slightly better range than would be obtained if the direct wave followed a perfectly straight path without any downward refraction. Under normal conditions, the space wave provides the only propagation path for frequencies **above** about 30 MHz.

Therefore, except on fairly rare occasions, communications in the VHF and higher bands suffer from **line of sight** transmission with range limited by the curvature of the earth and any high ground which interrupts the line of sight. Note that the range limitation imposed by Line of sight transmission is useful when there is a shortage of available frequencies.

7.8 FREAK PROPAGATION

It has been stated that for frequencies above about 30 MHz, transmission is normally 'line of sight' so that propagation is by means of the space wave. Under certain conditions of freak or 'anomalous' propagation, however, ranges much greater than line of sight ranges can be achieved by means of **duct propagation** and **scatter propagation**.

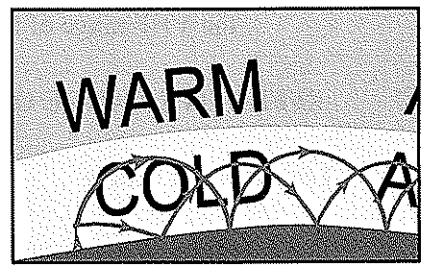


Figure 7.4 Duct Propagation.

a) Duct Propagation.

This effect, also called '**super-refraction**, is associated with a **temperature inversion** and a **rapid decrease in humidity with height**. Such meteorological conditions are most often found at the surface over land in high pressure conditions at night and in the early morning. A warm air mass over a cold sea can also produce the effect. It can also occur at higher levels.

The way in which radio signals can be 'trapped' in a duct of cold air is shown in Figure 7.4. This process sometimes permits reception of signals at the surface hundreds of miles beyond the horizon. The effect is most common in the SHF and UHF bands, but is also encountered in the VHF band if the duct is sufficiently deep (say, 500 ft). Duct propagation can cause annoying interference between control towers using the same R/T frequency, and false range indications on ground radar screens.

b) Scatter Propagation.

The E-layer sometimes contains areas of very high ionisation density which can produce weak sky waves (known as 'Sporadic-E' reflections) in the VHF band. The effect is unpredictable and the sky waves are scattered at random in the forward direction from the transmitter. With specially designed aerials, scatter propagation can sometimes be used to provide intermittent extended range VHF R/T but it is not a reliable means of communication. Scatter propagation can cause mutual interference between VHF radio aids sharing a frequency and normally protected from interference by line of sight transmission. Television programmes also suffer from interference due to this effect.

CHAPTER 08 - VFR QUESTION PAPERS

VFR PAPER 1

1. An altitude of 1500 feet is transmitted as:

   a) Fifteen hundred feet
   b) Wun tousand fife hundred feet
   c) Wun fife hundred feet
   d) Wun fife zero zero feet

2. Using the readability scale, readability 4 means:

   a) Readable
   b) Readable with difficulty
   c) Readable with background noise
   d) Unreadable

3. 'ORBIT RIGHT' means:

   a) Turn right to avoid other traffic
   b) Continue to make right hand turn until advised
   c) Make a 360° turn to the right
   d) Right hand circuits in use

4. The frequency used for the first transmission of a 'MAYDAY' call should be:

   a) The distress frequency 121.5 MHz
   b) The frequency currently in use
   c) Any international distress frequency
   d) Approach frequency of the nearest airfield

5. 'STANDBY' means:

   a) Wait and I will call you again
   b) Selected STANDBY on the SSR Transponder
   c) Hold your present position
   d) Continue on present heading and listen out

6. The correct abbreviation of the full callsign AIRLINK GBBRA is:

   a) GOLF ROMEO ALPHA
   b) AIRLINK GOLF ROMEO ALPHA
   c) AIRLINK ROMEO ALPHA
   d) AIRLINK GOLF BRAVO ALPHA

7. 'SQUAWK 1234' means:

a) Count up to 4 for test purposes
b) Make a test transmission on 123.4 MHz
c) Select this code on the SSR transponder
d) Transmit for a VDF bearing

8. The phrase 'take-off' is used by a pilot:

a) Only to acknowledge take-off clearance
b) Never. It is used only by a ground station
c) Only to request immediate clearance
d) After the aircraft is airborne

9. The Q code for the measurement of altitude is:

a) QFE
b) QFF
c) QNE
d) QNH

10. 'VACATE RIGHT' means:

a) Continue right to the end of the runway
b) Clear the runway immediately
c) Take the next runway exit on the right
d) Turn right after take-off

11. A Blind Transmission is:

a) A transmission of information relating to the safety of air navigation that is not addressed to a specific station or stations
b) A transmission from an aircraft to obtain VDF guidance to descend from the initial approach altitude to a position from which an approach can be completed visually
c) A transmission from an aeronautical station to all aircraft on its frequency
d) A transmission made in circumstances where two-way communications cannot be established but it is believed that the called station is able to receive the transmission

12. 'VERIFY' means:

a) Repeat your last transmission
b) Check and confirm your last message
c) Read back VDF bearing
d) Confirm your last message

13. If a pilot receives an instruction from ATC that he cannot carry out he should use the phrase:

a) UNABLE TO COMPLY
b) NEGATIVE INSTRUCTION
c) NO CAN DO
d) CANCEL INSTRUCTION

14. A class 'B' VDF bearing is accurate to within:

a) ± 2°
b) ± 3°
c) ± 5°
d) ± 1°

15. 'GO AROUND' means:

a) Overtake the aircraft ahead
b) Make a 360° turn
c) Taxi past the aircraft on the holding point
d) Carry out a missed approach

16. On hearing a Distress message a pilot must:

a) Acknowledge the message immediately and standby to relay further messages if required
b) Maintain radio silence and monitor the frequency to ensure assistance is provided
c) Change frequency because radio silence will be imposed on the frequency in use
d) Take control of the situation and co-ordinate the efforts of all agencies in the rescue operation

17. A pilot may abbreviate his aircraft callsign only:

a) After having established communication with an aeronautical ground station on the frequency in use
b) When he considers no confusion with another similar callsign is likely to occur on the frequency in use
c) When communicating with the departure and destination airfields
d) If it has first been abbreviated by the aeronautical ground station on the frequency in use

18. A pilot is required to read back:

a) SSR operating instructions, take-off clearances, altimeter settings, VDF information, frequency changes
b) Altimeter settings, taxi information, terminal weather, runway clearances, approach aid serviceability
c) Route clearances, speed instructions, weather reports, taxi clearances, runway state information
d) ATC route clearances, runway clearances, conditional clearances, actual weather reports

19. The term 'aeronautical station' means:

a) An airborne station forming part of the AFTN
b) Any station established to exchange radiotelephony communications
c) a station in the aeronautical telecommunication service located on land or on board an aircraft to exchange radiotelephony communications
d) A station in the aeronautical mobile service located on land or, in certain circumstances, on board a ship or on a platform at sea

20. A DISTRESS message is preceded by the call..... and would be sent by an aircraft that is in a condition .....

a)	Pan Pan Pan Pan Pan Pan	of being threatened by imminent danger and of requiring immediate assistance.
b)	Mayday Mayday Mayday	concerning the safety of an aircraft but does not require immediate assistance
c)	Pan Pan Pan	concerning the safety of an aircraft but does not require immediate assistance
d)	Mayday Mayday Mayday	of being threatened by imminent danger and of requiring immediate assistance

21. The correct pronunciation for the number 2500 when used to pass altitude, height, cloud height or visibility by radiotelephony is:

a) TWO FIFE ZERO ZERO
b) TOO TOUSAND FIFE HUNDRED
c) TWO THOUSAND FIVE HUNDRED
d) TWENTY FIVE HUNDRED

22. Pilots requiring a MATZ penetration should pass the following information:

a) Callsign; A/C Type; Position; Heading; Altitude/FL; Intentions
b) Callsign; Position; Altitude; ETA MATZ; Next position
c) Callsign; A/C type; Position; ETA; Altitude; Destination
d) Callsign; A/C Type; Position; Altitude/FL; Flight conditions

23. What are the two classified states of Emergency Message?

a) Emergency and PAN PAN
b) Distress and Urgency
c) MAYDAY and PAN PAN
d) Emergency and Security

24. On a VFR navigation exercise you request a flight information service from an ATSU providing a LARS. After your initial call, you are invited to "pass your message" which should consist of:

a) Position; Heading; Altitude; Destination; Intention
b) Aircraft identification and type; Estimated position; Heading; Level; Intention; Type of service required
c) Aircraft identification; Type; Level; Intention; Type of service required
d) Aircraft identification and type; Estimated position; Level; Flight conditions; Type of service required

25. A Radar Information Service (RIS) is an ATC service:

a) in which the controller will provide radar separation from all other traffic
b) which may only be used by aircraft flying in accordance with the instrument flight rules
c) in which the controller will inform the pilot of the bearing, distance and, if known, the altitude of conflicting traffic
d) in which the controller will direct the aircraft to avoid the other traffic

VFR PAPER 2

1. The word ROGER means:

   a) that is correct
   b) message received and understood
   c) pass your message
   d) I have received all your last transmission

2. For callsign CALAIR GABCD the correct abbreviation is:

   a) CALAIR Charlie Delta
   b) Golf Charlie Delta
   c) CALAIR Golf Charlie Delta
   d) CALAIR Golf Alpha Delta

3. Using the readability scale, readability 5 means:

   a) readable now and then
   b) unreadable
   c) readable with difficulty
   d) perfectly readable

4. An Aeronautical Station is defined as:

   a) a radio communication service between aircraft stations and ground stations or between aircraft stations
   b) a land station in the aeronautical mobile service. In certain instances, an aeronautical station may be placed on board a ship or an earth satellite
   c) a mobile station in the aeronautical mobile service on board an aircraft
   d) a radio station broadcasting aeronautical information

5. A time of 1020 hours is transmitted as:

   a) ten twenty hours
   b) 'one zero two zero' or 'two zero'
   c) one zero two zero
   d) ten two zero

6. An altitude of 2400 feet is transmitted as:

   a) twenty four hundred feet
   b) two four hundred feet
   c) two four zero zero feet
   d) two thousand four hundred feet

7. The correct pronunciation of the frequency 122.1 MHz when passed by radiotelephony is:

a) ONE TWO TWO POINT ONE
b) WUN TOO TOO DAYSEEMAL WUN
c) ONE TWO TWO DECIMAL ONE
d) ONE TWENTY TWO DAYSEEMAL ONE

8. When asked by ATC "Are you able to maintain FL 40" the correct reply contains the phrase:

a) ROGER
b) WILCO
c) NO SIR
d) AFFIRM or NEGATIVE

9. With the SSR transponder selected ON, the ATSU message "G-ABCD Verify your level" would be made to:

a) identify the aircraft position
b) check your altimeter setting
c) check and confirm the accuracy of the Mode C level information displayed to the controller
d) check with the pilot that mode C is selected ON

10. Which of the following is a conditional clearance ?

a) Fastair 345, Line-Up and hold
b) Redwing 42, Take-off at your discretion
c) G-ZZ, Report Final, two ahead
d) G-BOJR, after the Jersey European 146, taxi to holding point D runway 26

11. 'SQUAWK IDENT' means:

a) select the SSR transponder code to 7000
b) select the SSR transponder mode to "ALT"
c) say again your callsign
d) operate the SSR transponder "special position identification" feature

12. When requesting a special VFR clearance in flight, ATC must be given details of:

a) callsign, type, position, heading, intentions and ETA at entry point
b) callsign, altitude, heading and ETA at entry point
c) callsign, type, TAS, ETA at entry point and destination
d) callsign, type, intentions and ETA at entry point

13. On a long straight-in approach to land, the call "Long Final"would be made at a range of:

a) 2 nm
b) 3 nm
c) between 4 nm and 8 nm
d) 25 nm

14. The abbreviation ATIS stands for:

a) Air Traffic Information Service
b) Aircraft Technical Information Service
c) Aerodrome Traffic Information Service
d) Automatic Terminal Information Service

15. URGENCY is defined as a condition:

a) of being threatened by serious and or immediate danger and of requiring immediate assistance
b) concerning the safety of an aircraft or other vehicle or of some person on board or within sight and requiring immediate assistance
c) concerning the safety of an aircraft or other vehicle or of some person on board or within sight, but which does not require immediate assistance
d) requiring urgent assistance from ground stations

16. The callsign prefix 'Tyro' indicates that:

a) this is a practice emergency
b) the aircraft is not in immediate need of assistance
c) the pilot lacks experience
d) the pilot is lost

17. A Class B bearing is accurate to within:

a) ± 5°
b) ± 10°
c) ± 1°
d) ± 2°

18. The frequency 121.5 MHz may be used to practise emergency procedures:

a) including simulated distress or urgency situations
b) not including any simulated distress incident
c) at no time; only the FIS frequency should be used
d) only on dual crew flights

19. A pilot shall ask for a QFE as follows:

a) Request Quebec Foxtrot Echo
b) Request Queen Fox Easy
c) Request Quebec Fox Easy
d) Request Quebec Fox Echo

20. ATIS is to be found on:

a) the Approach frequency
b) the Tower frequency
c) a discrete VHF frequency
d) a discrete VHF or a VOR frequency.

21. The phrase "**Squawk Charlie**" means:

a) press the ident button on the transponder
b) select altitude (ALT) on the transponder
c) confirm the transponder is selected ON
d) select 7700 on the transponder

22. Which of the following messages has the highest priority?

a) CAUTION, WORK IN PROGRESS ON THE TAXIWAY
b) REPORT FINAL NUMBER 1
c) REQUEST QDM
d) TAXI TO THE REFUELLING PUMPS

23. A height of 1250 feet is transmitted as:

a) Wun too fife zero feet
b) Twelve fifty feet
c) One thousand two hundred and five zero feet
d) One thousand two hundred and fifty feet

24. A radar advisory service will:

a) Give you standard separation from all traffic
b) Advise you of possible conflict
c) Give you a radar approach
d) Give you an air traffic control service

25. DAAIS stands for:

a) Dangerous Activity and Interception Service
b) District Aerial Activity Information System
c) Danger Area Activity Information Service
d) Descent And Approach Information System

VFR PAPER 3

1. The three main categories of aeronautical communication service are:

   a) Air/ground, flight information, ATC
   b) Emergency, airways, VFR
   c) ATC, operations, meteorological
   d) Ground, lower airspace, upper airspace

2. In the event of a radio failure the SSR transponder should be set to:

   a) 7600
   b) 7700
   c) 7500
   d) 7000

3. The correct abbreviation of the callsign **Speedbird G-BGDC** is:

   a) Speedbird G-DC
   b) G-DC
   c) Speedbird DC
   d) Speedbird G-BC

4. Your radio check is reported as '**Readability 3**', your transmission is:

   a) unreadable
   b) perfectly readable
   c) reading only half the time
   d) readable but with difficulty

5. The correct order and content of a position report is:

   a) callsign, position, level, heading, ETA
   b) callsign, position, time, level, next position and ETA
   c) callsign, route, position, level, request
   d) callsign, position, level, intention and ETA at destination

6. A Pilot may file a flight plan with an ATSU during flight. The frequency that would normally be used for this purpose is:

   a) FIR
   b) RADAR
   c) APPROACH
   d) TOWER

7. The correct RTF call when you are ready to take off is:

a) Roger take-off
b) Request take-off
c) Request departure clearance
d) Ready for departure

8. What is the correct way of spelling out FRI-VOR in a radio message?

a) Foxtrot Romeo India - VOR
b) Foxtrot Romeo India - Victor Oscar Romeo
c) Friday - VOR
d) Fox Romeo India - VOR

9. You receive the message "G-ABCD Squawk Ident". You should:

a) select STAND-BY on the SSR transponder
b) select ALT - altitude reporting facility (Mode C) on the SSR transponder
c) operate the special position identification on the SSR transponder
d) reply giving your callsign

10. A time of 1300 UTC is transmitted as:

a) one thousand three hundred
b) one three zero zero
c) one three hundred UTC
d) thirteen hundred UTC

11. Pilots requiring a MATZ crossing service must establish two way RTF contact with the aerodrome controlling the zone by ..... nm, or ..... minutes from the boundary whichever is the sooner:

a) 5 nm or 10 min
b) 10 nm or 5 min
c) 15 nm or 10 min
d) 15 nm or 5 min

12. Which aeronautical communication service provides automated airfield and meteorological information for departing and arriving traffic?

a) LARS
b) AFIS
c) FIS
d) ATIS

13. When arriving at an airfield whose callsign ends with the Suffix "**Information**", the pilot's correct response to the call: "**G-ABCD land at your discretion, Surface wind 260/07**" should be:

a) Land at my discretion G-ABCD
b) Cleared to land G-ABCD
c) G-ABCD
d) Roger G-CD

14. A pilot who has already established communication with a civil or military ATSU should in the event of being confronted with an emergency:

a) make a distress call on the frequency in use and maintain the allocated SSR code
b) make a MAYDAY call on 121.5 MHz
c) select 7700 on the SSR and change to 121.5 MHz
d) squawk Ident

15. On the initial call to an ATSU a pilot should pass:

a) callsign, service requested
b) callsign, aircraft type, position, heading, ETA
c) callsign, position, heading, level, intention, type of service required
d) callsign, position, level, flight conditions and intention

16. A Special VFR (SVFR) flight is a:

a) royal flight that you must avoid
b) flight in VMC for which you must file a Flight Plan
c) flight made on a special occasion
d) flight which is unable to comply with the instrument flight rules and is cleared to enter a Control Zone under specified weather minima

17. Which of the following lists are all ATC messages that must read back in full:

a) level instructions, altimeter settings, surface wind, runway information
b) clearance to enter, land on, take-off on, backtrack, cross or hold short of an active runway; SSR instructions
c) VDF information, frequency changes, type of radar service
d) ATC route clearances, runway clearances, actual weather reports

18. You call an ATSU and receive the reply "G-XX Stand-By" you should:

a) acknowledge immediately: "Stand-By G-XX"
b) say nothing, assuming no onward clearance and wait until called
c) call the ATSU again after 5 mins to obtain a clearance
d) change frequency

19. When transmitting a message preceded by the phrase "Transmitting blind due to receiver failure" the aircraft station shall also:

a) Advise the time of its next intended transmission
b) Hold for 5 minutes at its present position
c) Proceed to the alternate airport
d) Enter the next en-route holding pattern

20. When joining overhead an airfield at 2000 ft, at what point in the circuit pattern should the aircraft commence descent to circuit height, and make the RTF Call: "G-ABCD ..... descending"?

a) CROSSWIND
b) DOWNWIND
c) BASE LEG
d) DEADSIDE

21. A pilot may abbreviate his aircraft callsign only:

a) When changing frequency
b) After establishing communication with a ground station
c) If it has first been abbreviated by the ground station on the frequency in use
d) When he considers that no confusion is likely to occur

22. When an airfield has a RADIO service the answer a pilot can expect upon stating that they are ready for departure is:

a) Wind and traffic information
b) "Take off at your discretion"
c) "Cleared for take off"
d) "Cleared to depart"

23. On an airfield with an INFORMATION service the controller:

a) Can give landing clearances only
b) Has control over all surface movements including helicopters hover taxiing
c) No control over airfield movements
d) Can give a take off clearance

24. The abbreviation for a control zone is:

a) MATZ
b) CTZ
c) CTR
d) CTA

25. A request to a direction finding station for a bearing should be in the following format:

a) Oxford homer, which way to Oxford? GBODA
b) Oxford Approach, this is Golf Bravo Oscar Delta Foxtrot. Request QDM, Golf Bravo Oscar Delta Foxtrot
c) True bearing, true bearing, true bearing, Oxford Approach this is GBODF. Request true bearing GBODF
d) Oxford homer this is Golf Bravo Oscar Delta Foxtrot, request steer

VFR PAPER 4

1. Radio test transmissions should take the following form:

   a) Station being called, aircraft identification, words "Readability check", frequency
   b) Station being called, aircraft identification, words "radio check", frequency being used
   c) Station being called, aircraft identification, words "How do your read?"
   d) Station being called, aircraft identification, frequency, words "Do you read?"

2. After making a call to an ATSU, you are asked to "pass your message". This should take the following form:

   a) Aircraft identification and type, departure point and estimated position, heading, level, intention, type of service required
   b) Aircraft identification, full route details, level and type of service required
   c) Aircraft identification and type, last turning point, level, intentions
   d) Callsign and type, position, level and intentions

3. A "downwind" call is made:

   a) Just before turning on to base leg
   b) As soon as the aircraft is on the downwind leg
   c) Abeam the upwind end of the runway
   d) Any position on downwind leg

4. Aerodrome traffic is:

   a) All traffic on the manoeuvring area of an aerodrome and all aircraft operating in the vicinity of an aerodrome
   b) All aircraft on an aerodrome
   c) All vehicles on an aerodrome
   d) All traffic on the movement area of an aerodrome

5. DACS is normally spoken as one word. It means:

   a) Direct Airfield Crossing Service
   b) Diversion Airfield Control System
   c) Danger Area Crossing Service
   d) Departing Aircraft Control Service

6. FL180 is transmitted as:

   a) Flight Level One Eighty
   b) Flight Level Wun Ate Zero
   c) Foxtrot Lima One Eight Zero
   d) Flight Level One hundred Eight Zero

7. Which of the following is correct?

a) Runway 18 is passed as "Runway Eighteen"
b) "With you" means that you are on frequency
c) The words "Over, Roger and Out" may be omitted if there is no possibility of confusion
d) The word "Wilco" means that you have received and understood the message

8. A pilot wishing to confirm his position may request a "Training Fix" on:

a) The frequency in use
b) 121.5 MHz
c) The approach control frequency of his nearest airfield
d) 243 MHz

9. When calling for a "Practice Pan", a pilot, before transmitting, should:

a) Listen out
b) Climb to as great a height as possible
c) Select 7700 on his transponder
d) Descend below 3000 feet

10. Frequency 121.725 MHz should be transmitted as:

a) One Two One Point Seven Two Five
b) Wun Too Wun Dayseemal Seven Too
c) Wun Too Wun Point Seven Too
d) One twenty one decimal seven twenty five

11 The priority of the message " Taxi to holding point Runway 05 " is:

a) less than " Clear land Runway 05 "
b) the same as " Caution construction and men adjacent to taxi-way "
c) same as " Line up and wait "
d) more than " Caution wind shear on final approach ".

12. Which statement is correct?

a) A D/F message has priority over a flight safety message
b) A meteorological message has no priority over a flight safety message
c) An urgency message is lower priority than a flight safety message
d) A "windshear" warning has a higher priority than "clear to take-off"

13. If your signal is too weak or distorted the controller may ask you to use the speechless code. Three short transmissions means:

a) Negative
b) Yes
c) Say again
d) My aircraft has developed another emergency

14. If a controller passes an instruction and you understand it and will comply, the standard reply is:

a) Verify
b) Roger
c) Confirm
d) Wilco

15. The opening words of an urgency message are:

a) Emergency
b) Mayday, Mayday, Mayday
c) Pan, Pan, Pan
d) Pan Pan, Pan Pan, Pan Pan

16. The callsign of an aeronautical station controlling surface vehicles in the manoeuvring area would be:

a) TOWER
b) GROUND
c) ARRIVALS
d) MOVEMENT.

17. If the pilot is unable to make contact with a station on a designated frequency, then he should:

a) make a blind transmission
b) transmit using words twice
c) transmit on 121.5 MHz
d) try transmitting on another related frequency.

18. A pilot who is unable to complete a landing from an approach should make the call:

a) GOING AROUND
b) OVERSHOOTING
c) CLIMBING OUT
d) MISSED APPROACH.

19. The correct readback of the message 'XY-CD Change to Stephenville Tower 118.7' is:

a) 118.7 XY-CD
b) Changing frequency to Stephenville Tower XY-CD
c) Wilco XY-CD
d) Roger XY-CD.

20. An aircraft will be in the best range for VHF communications if it is:

a) at high altitude and long range
b) at low altitude and close range
c) at low altitude and long range
d) at high altitude in the vicinity of the airfield.

21. In order to make your communications more effective, you should:

a) use words twice
b) modulate your voice
c) use a constant speaking volume
d) call break between sentences.

22. The VHF aeronautical communications frequency range lies between:

a) 108 and 118 MHz
b) 118 and 136.975 MHz
c) 3 and 30 MHz
d) 118 and 136.975 kHz.

23. The correct callsign of a station providing flight information service is the location followed by:

a) RADIO
b) CONTROL
c) INFORMATION
d) HOMER.

24. The abbreviation HJ means that the hours of service of an aerodrome are:

a) between sunrise and sunset
b) between sunset and sunrise
c) twenty four hours
d) not specified hours.

25. The maximum VHF communications range that can be expected by an aircraft at FL 100 is:

a) 100nm
b) 120nm
c) 150nm
d) 1200nm.

VFR ANSWERS

Question No	Paper 1	Paper 2	Paper 3	Paper 4
1	B	D	C	B
2	A	A	A	A
3	B	D	C	D
4	B	B	D	A
5	A	B	B	C
6	C	D	A	B
7	C	B	D	C
8	A	D	A	B
9	D	C	C	A
10	C	D	B	B
11	D	D	D	C
12	B	D	D	A
13	A	C	C	C
14	C	D	A	D
15	D	C	A	D
16	B	C	D	B
17	D	A	B	D
18	A	B	B	A
19	D	A	A	A
20	D	D	D	D
21	B	B	C	C
22	A	C	B	B
23	B	A	C	C
24	B	A	C	A
25	C	C	C	B

CHAPTER 09 - IFR QUESTION PAPERS

PAPER 1

1. Which of the following shows the correct elements of a position report in their correct order?

   a) Callsign, Position, Heading, Level, Next position and ETA
   b) Callsign, Position, Level, Met conditions, Intention and Destination
   c) Callsign, Position, Time, Level, Next position and ETA
   d) Callsign, Type, Position, ETA next position, Level

2. Pilots flying an Instrument Departure must pass the following information on first contact with approach control/departure radar:

   a) Callsign, SID designator when appropriate, current or passing altitude/FL, cleared altitude/FL
   b) Call sign, type, destination, passing level and cleared level
   c) Callsign, type, route details, passing level
   d) Callsign, SID designation, heading, level passing, flight conditions

3. Which elements in a position report cannot be omitted?

   a) Position, Time, Flight level
   b) Aircraft callsign, Position, Time
   c) Next position and ETA
   d) Ensuing significant point.

4. What would be the suffix of an aeronautical station that transmits the Route Clearance to an aircraft at an international airport?

   a) DELIVERY
   b) CLEARANCE
   c) TOWER
   d) DEPARTURE.

5. The callsign of a controlled airfield without radar would have the suffix:

   a) ARRIVALS
   b) TOWER
   c) INFORMATION
   d) APPROACH.

6. A reported braking action co-efficient of 30 means that the braking action is:

   a) poor
   b) poor to medium
   c) medium
   d) good.

7. If you wish to repeat a word or phrase for clarity then, before repeating, you should say:

a) WORDS TWICE
b) REPEAT
c) I SAY AGAIN
d) CORRECTION.

8. An aeronautical station that wishes to put out a general call to all aircraft in its area should address the call to:

a) ALL STATIONS
b) ALL TRAFFIC
c) ALL AIRCRAFT
d) ALL STATION TRAFFIC.

9. Routine MET reports should be transmitted with position reports except when:

a) the flight is less than 1 hour long
b) the flight remains below 10,000 ft
c) the aircraft is less than 1 hour from landing
d) the aircraft is not equipped with IRS.

10. Which of the following statements about SELCAL is correct?

a) It can only be used with VHF radio
b) It requires a four letter code to be entered into the flight plan
c) It requires constant monitoring by the flight crew
d) The pilot can select it after the aircraft is outside VHF range.

ANSWERS

Question No	Paper 1
1	C
2	A
3	B
4	A
5	D
6	C
7	C
8	A
9	C
10	B

Manual of Radiotelephony

Doc 9432-AN/925

SECOND EDITION — 1990

Foreword

The examples contained in this manual are intended to be representative of radiotelephony phraseology in common use. They are based on the procedures in Annex 10 — *Aeronautical Telecommunications,* Volume II (Communication Procedures including those with PANS status)* and the phraseology detailed in the *Procedures for Air Navigation Services — Rules of the Air and Air Traffic Services* (PANS-RAC), Doc 4444*. While the procedures and phraseology specifically reflect the situation in an environment where very high frequency (VHF) is in use, they are equally applicable in those areas where high frequency (HF) is used.

Constant attention to correct phraseology and procedures will result in their use becoming automatic, thus ensuring a high standard of aeronautical radiotelephony which will contribute to the safety of operations, both in the air and on the ground.

It is not practicable to give examples of phraseology to cover every conceivable situation which may arise. Users will find it necessary to make adaptations according to particular circumstances. However, care must be taken not to confuse or prejudice basic meanings. A basic knowledge of the language being used in radiotelephony is required so that communications, both for standard situations as well as those not covered by the examples can be exchanged satisfactorily. Be aware that the language being used in radiotelephony may not be the mother tongue of those receiving the transmission. Therefore, speak slowly and clearly and use standard words and phrases as much as possible. Furthermore, certain States may specify in their aeronautical information publication (AIP) particular requirements on first contact when entering their airspace or prior to leaving their airspace. Pilots should, therefore, ensure that they are aware of such procedures by referring to the relevant instructions (e.g. AIP and NOTAM) before undertaking flights to other countries. Examples of phraseology of this type are beyond the scope of this manual.

* ICAO documents available from the International Civil Aviation Organization (ICAO).

Table of Contents

Page

Chapter 1
Glossary

1.1 DEFINITIONS OF PRINCIPAL TERMS USED IN THIS MANUAL

Note.— Other definitions will be found in the appropriate ICAO documents.

Aerodrome control service. Air traffic control service for aerodrome traffic.

Aerodrome traffic. All traffic on the manoeuvring area of an aerodrome and all aircraft flying in the vicinity of an aerodrome.

Note.— An aircraft is in the vicinity of an aerodrome when it is in, entering or leaving an aerodrome traffic circuit.

Aerodrome traffic circuit. The specified path to be flown by aircraft operating in the vicinity of an aerodrome.

Aeronautical mobile service. A mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radiobeacon stations may also participate in this service on designated distress and emergency frequencies.

Aeronautical station. A land station in the aeronautical mobile service. In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea.

Air-ground communication. Two-way communication between aircraft and stations or locations on the surface of the earth.

Air traffic. All aircraft in flight or operating on the manoeuvring area of an aerodrome.

Air traffic control clearance. Authorization for an aircraft to proceed under conditions specified by an air traffic control unit.

Air traffic service. A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service, area control service, approach control service or aerodrome control service.

Air traffic services unit. A generic term meaning variously, air traffic control unit, flight information centre or air traffic services reporting office.

Airway. A control area or portion thereof established in the form of a corridor equipped with radio navigational aids.

Altitude. The vertical distance of a level, a point or an object considered as a point, measured from mean sea level.

Approach control service. Air traffic control service for arriving or departing controlled flights.

Apron. A defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, fuelling, parking or maintenance.

Area control centre. A unit established to provide air traffic control service to controlled flights in control areas under its jurisdiction.

Automatic terminal information service. The provision of current, routine information to arriving and departing aircraft by means of continuous and repetitive broadcasts throughout the day or a specified portion of the day.

Blind transmission. A transmission from one station to another station in circumstances where two-way communication cannot be established but where it is believed that the called station is able to receive the transmission.

Broadcast. A transmission of information relating to air navigation that is not addressed to a specific station or stations.

Clearance limit. The point to which an aircraft is granted an air traffic control clearance.

Controlled airspace. An airspace of defined dimensions within which air traffic control service is provided to controlled flights.

Control zone. A controlled airspace extending upwards from the surface of the earth to a specified upper limit.

Expected approach time. The time at which ATC expects that an arriving aircraft, following a delay, will leave the holding point to complete its approach for a landing.

Flight information centre. A unit established to provide flight information service and alerting service.

Flight plan. Specified information provided to air traffic services units, relative to an intended flight or portion of a flight of an aircraft.

Heading. The direction in which the longitudinal axis of an aircraft is pointed, usually expressed in degrees from North (true, magnetic, compass or grid).

Holding point. A specified location, identified by visual or other means, in the vicinity of which the position of an aircraft in flight is maintained in accordance with air traffic control clearances.

Holding procedure. A predetermined manoeuvre which keeps an aircraft within a specified airspace whilst awaiting further clearance.

IFR flight. A flight conducted in accordance with the instrument flight rules.

Instrument meteorological conditions. Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, less than the minima specified for visual meteorological conditions.

Level. A generic term relating to the vertical position of an aircraft in flight and meaning variously, height, altitude or flight level.

Manoeuvring area. That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons.

Missed approach procedure. The procedure to be followed if the approach cannot be continued.

Movement area. That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the apron(s).

Radar approach. An approach, executed by an aircraft, under the direction of a radar controller.

Radar identification. The process of correlating a particular radar blip or radar position symbol with a specific aircraft.

Radar vectoring. Provision of navigational guidance to aircraft in the form of specific headings, based on the use of radar.

Reporting point. A specified geographical location in relation to which the position of an aircraft can be reported.

Runway visual range. The range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line.

Touchdown. The point where the nominal glide path intercepts the runway.

Track. The projection on the earth's surface of the path of an aircraft, the direction of which path at any point is usually expressed in degrees from North (true, magnetic or grid).

VFR flight. A flight conducted in accordance with the visual flight rules.

Visual approach. An approach by an IFR flight when either part or all of an instrument approach procedure is not completed and the approach is executed in visual reference to terrain.

Visual meteorological conditions. Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling, equal to or better than specified minima.

1.2 COMMONLY USED ABBREVIATIONS

Note.— The abbreviations listed below are normally spoken using the constituent letters, rather than the spelling alphabet, except that those indicated by an asterisk are normally spoken as complete words.

ACC	Area control centre or area control
ADF	Automatic direction-finding equipment
ADR	Advisory route
AFIS	Aerodrome flight information service
AGL	Above ground level
AIP	Aeronautical information publication
AIRAC*	Aeronautical information regulation and control
AIS	Aeronautical information services
AMSL	Above mean sea level
ATC	Air traffic control (in general)
ATD	Actual time of departure
ATIS*	Automatic terminal information service

ATS	Air traffic services
ATZ	Aerodrome traffic zone
CAVOK*	Visibility, cloud and present weather better than prescribed values or conditions
CTR	Control zone
DME	Distance measuring equipment
EET	Estimated elapsed time
ETA	Estimated time of arrival or estimating arrival
ETD	Estimated time of departure or estimating departure
FIC	Flight information centre
FIR	Flight information region
FIS	Flight information service
GCA	Ground controlled approach system or ground controlled approach
HF	High frequency (3 to 30 MHz)
H24	Continuous day and night service
IFR	Instrument flight rules
ILS	Instrument landing system
IMC	Instrument meteorological conditions
INFO*	Information
INS	Inertial navigation system
LORAN*	LORAN (long-range air navigation system)
MET*	Meteorological or meteorology
MLS	Microwave landing system
MNPS	Minimum navigation performance specifications
NDB	Non-directional radio beacon
NIL*	None or I have nothing to send you
NOTAM*	A notice containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations
QFE	Atmospheric pressure at aerodrome elevation (or at runway threshold)

QNH	Altimeter sub-scale setting to obtain elevation when on the ground
RCC	Rescue co-ordination centre
RNAV*	Area navigation
RVR	Runway visual range
SELCAL*	A system which permits the selective calling of individual aircraft over radiotelephone channels linking a ground station with the aircraft
SID*	Standard instrument departure
SIGMET*	Information concerning en-route weather phenomena which may affect the safety of aircraft operations
SNOWTAM*	A special series NOTAM notifying the presence or removal of hazardous conditions due to snow, ice, slush or standing water associated with snow, slush and ice on the movement area, by means of a specific format
SPECIAL*	Special meteorological report (in abbreviated plain language)
SSR	Secondary surveillance radar
SST	Supersonic transport
STAR*	Standard (instrument) arrival
TACAN*	UHF tactical air navigation aid
TAF*	Aerodrome forecast
TMA	Terminal control area
UHF	Ultra-high frequency (300 to 3 000 MHz)
UIR	Upper flight information region
UTA	Upper control area
UTC	Co-ordinated universal time
VASIS*	Visual approach slope indicator system
VDF	Very high frequency direction-finding station
VFR	Visual flight rules
VHF	Very high frequency (30 to 300 MHz)
VIP	Very important person
VMC	Visual meteorological conditions
VOLMET*	Meteorological information for aircraft in flight
VOR	VHF omnidirectional radio range
VORTAC*	VOR and TACAN combination

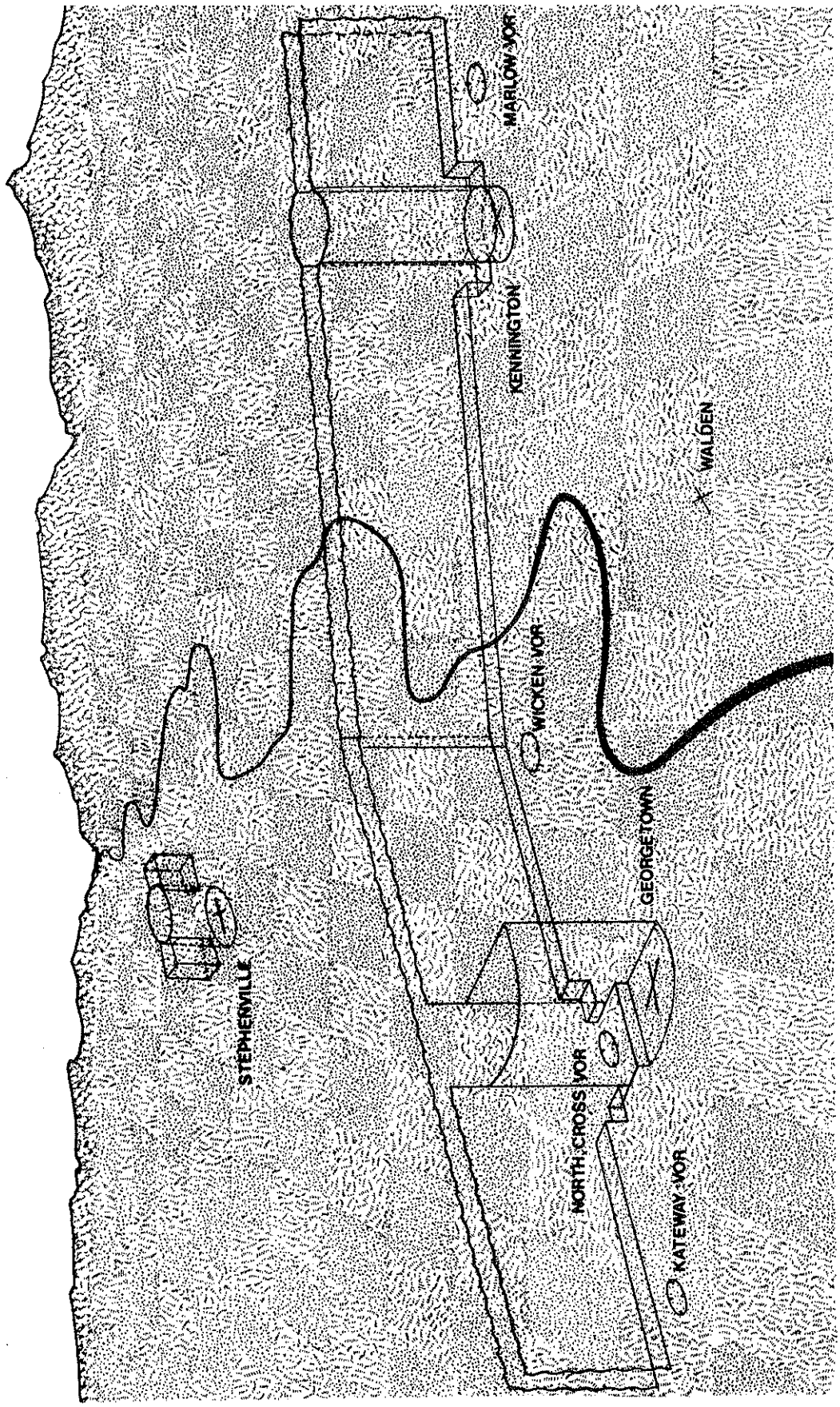


Figure 1. Geographical representation of the Alexander FIR

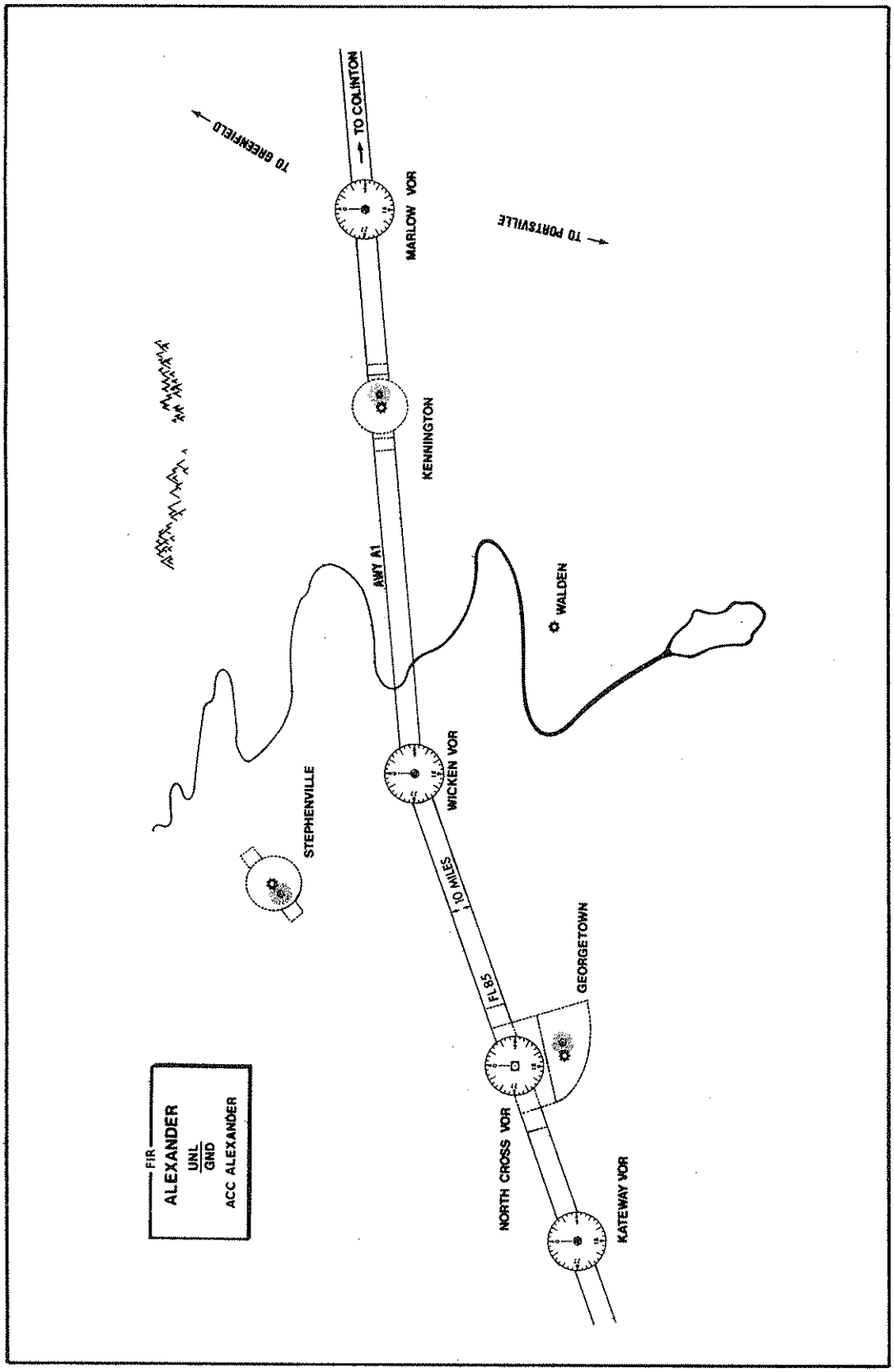
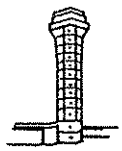
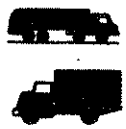


Figure 2. Diagrammatic representation of the Alexander FIR

Table 1

Callsign	*Symbol*	*Meaning*
G-ABCD G-CD		Aircraft operating in accordance with VFR
G-CDAB G-AB		General aviation aircraft operating in accordance with IFR
FASTAIR 345		Airline aircraft operating in accordance with IFR
TOWER GROUND		Aerodrome control service Surface movement control
APPROACH		Approach control service
CONTROL		Area control service
INFORMATION RADIO		Flight information service Aeronautical station
RADAR		Radar
TRUCKER 5 WORKER 21		Vehicles
TOW 5		Aircraft under tow
		Ground crew
APRON		Apron control/management service

1.3 EXPLANATION OF SCENARIO

1.3.1 In order to assist in understanding the context in which specific phrases are used, most of the examples of phraseology in this manual relate to typical situations, using fictitious call signs and locations. Any resemblance between locations in the area in which examples are set (see Figures 1 and 2) and actual locations is entirely coincidental. Any similarity with actual aircraft and ground station call signs is also coincidental.

1.3.2 In the examples, the aircraft or ground station transmitting is shown by the symbol in Table 1. The station initiating the exchange of messages is in bold type. To facilitate following the sequence of the messages each subsequent message commences below the previous one and this is continued throughout the exchange.

1.3.3 The scenario for the phraseologies throughout this manual is based on an imaginary country using the non-SI alternative units of measurement. Users of the manual in States which have adopted the SI units of measurement should substitute the correct units as appropriate.

Chapter 2
General Operating Procedures

2.1 INTRODUCTION

Radiotelephony (RTF) provides the means by which pilots and ground personnel communicate with each other. Used properly the information and instructions transmitted are of vital importance in assisting in the safe and expeditious operation of aircraft. On the other hand, the use of non-standard procedures and phraseology can cause misunderstanding. Incidents and accidents have occurred in which a contributing factor has been the misunderstanding caused by the use of poor phraseology. The importance of using correct and precise standard phraseology cannot be over-emphasized.

2.2 TRANSMITTING TECHNIQUE

2.2.1 The following transmitting techniques will assist in ensuring that transmitted speech is clearly and satisfactorily received:

a) Before transmitting listen out on the frequency to be used to ensure that there will be no interference with a transmission from another station.
b) Be familiar with good microphone operating techniques.
c) Use a normal conversational tone, speak clearly and distinctly.
d) Maintain an even rate of speech not exceeding 100 words per minute. When it is known that elements of the message will be written down by the recipient, speak at a slightly slower rate.
e) Maintain the speaking volume at a constant level.
f) A slight pause before and after numbers will assist in making them easier to understand.
g) Avoid using hesitation sounds such as "er".
h) Depress the transmit switch fully before speaking and do not release it until the message is completed. This will ensure that the entire message is transmitted.

2.2.2 An irritating and potentially dangerous situation in radiotelephony is a "stuck" microphone button. Operators should always ensure that the button is released after a transmission and the microphone placed in an appropriate place that will ensure that it will not inadvertently be switched on.

2.3 TRANSMISSION OF LETTERS

2.3.1 To expedite communications, the use of phonetic spelling should be dispensed with if there is no risk of this affecting correct reception and intelligibility of the message.

2.3.2 With the exception of the telephony designator and the type of aircraft, each letter in the aircraft callsign shall be spoken separately using the phonetic spelling.

2.3.3 The words in the table below shall be used when using the phonetic spelling.

Letter	*Word*	*Pronunciation*
A	Alpha	AL FAH
B	Bravo	BRAH VOH
C	Charlie	CHAR LEE *or* SHAR LEE
D	Delta	DELL TAH
E	Echo	ECK OH
F	Foxtrot	FOKS TROT
G	Golf	GOLF
H	Hotel	HOH TELL
I	India	IN DEE AH
J	Juliett	JEW LEE ETT
K	Kilo	KEY LOH
L	Lima	LEE MAH
M	Mike	MIKE
N	November	NO VEM BER
O	Oscar	OSS CAH
P	Papa	PAH PAH
Q	Quebec	KEH BECK
R	Romeo	ROW ME OH
S	Sierra	SEE AIR RAH
T	Tango	TANG GO
U	Uniform	YOU NEE FORM *or* OO NEE FORM
V	Victor	VIK TAH
W	Whiskey	WISS KEY
X	X-ray	ECKS RAY
Y	Yankee	YANG KEY
Z	Zulu	ZOO LOO

Note.— Syllables to be emphasized are underlined.

2.4 TRANSMISSION OF NUMBERS

2.4.1 When the English language is used, numbers shall be transmitted using the following pronunciation.

Numeral or numeral element	*Pronunciation*
0	ZE-RO
1	WUN
2	TOO
3	TREE
4	FOW-er
5	FIFE
6	SIX

Numeral or numeral element	*Pronunciation*
7	SEV-en
8	AIT
9	NIN-er
Decimal	DAY-SEE-MAL
Hundred	HUN-dred
Thousand	TOU-SAND

Note.— The syllables printed in capital letters in the above list are to be stressed; for example, the two syllables in ZE-RO are given equal emphasis, whereas the first syllable of FOW-er is given primary emphasis.

2.4.2 All numbers except whole hundreds, whole thousands and combinations of thousands and whole hundreds shall be transmitted by pronouncing each digit separately. Whole hundreds and whole thousands shall be transmitted by pronouncing each digit in the number of hundreds or thousands followed by the word HUNDRED or THOUSAND as appropriate. Combinations of thousands and whole hundreds shall be transmitted by pronouncing each digit in the number of thousands followed by the word THOUSAND and the number of hundreds followed by the word HUNDRED.

Number	*Transmitted as*	*Pronounced as*
10	ONE ZERO	WUN ZE-RO
75	SEVEN FIVE	SEV-en FIFE
100	ONE HUNDRED	WUN HUN-dred
583	FIVE EIGHT THREE	FIFE AIT TREE
2 500	TWO THOUSAND FIVE HUNDRED	TOO TOU-SAND FIFE HUND-dred
5 000	FIVE THOUSAND	FIFE TOU-SAND
11 000	ONE ONE THOUSAND	WUN WUN TOU-SAND
25 000	TWO FIVE THOUSAND	TOO FIFE TOU-SAND
38 143	THREE EIGHT ONE FOUR THREE	TREE AIT WUN FOW-er TREE

2.4.3 Numbers containing a decimal point shall be transmitted as prescribed in 2.4.1 with the decimal point in appropriate sequence being indicated by the word DECIMAL.

Number	*Transmitted as*	*Pronounced as*
118.1	ONE ONE EIGHT DECIMAL ONE	WUN WUN AIT DAY-SEE-MAL WUN
120.37	ONE TWO ZERO DECIMAL THREE SEVEN	WUN TOO ZE-RO DAY-SEE-MAL TREE SEV-en

Note.— Not more than two significant digits after the decimal place are used when identifying VHF frequencies.

2.4.4 When it is necessary to verify the accurate reception of numbers, the person transmitting the message shall request the person receiving the message to read back the numbers.

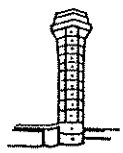
2.5 TRANSMISSION OF TIME

2.5.1 When transmitting time, only the minutes of the hour are normally required. However, the hour should be included if there is any possibility of confusion.

Time	*Transmitted as*	*Pronounced as*
0803	ZERO THREE *or* ZERO EIGHT ZERO THREE	ZE-RO TREE *or* ZE-RO AIT ZE-RO TREE
1300	ONE THREE ZERO ZERO	WUN TREE ZE-RO ZE-RO
2057	FIVE SEVEN *or* TWO ZERO FIVE SEVEN	FIFE SEV-en *or* TOO ZE-RO FIFE SEV-en

Note.— Co-ordinated universal time (UTC) shall be used.

2.5.2 Pilots may check the time with the appropriate ATS unit. Time checks shall be given to the nearest half minute.



FASTAIR 345 REQUEST TIME CHECK

FASTAIR 345 TIME 0611

or

FASTAIR 345 TIME 0715 AND A HALF

2.6 STANDARD WORDS AND PHRASES

The following words and phrases shall be used in radiotelephony communications as appropriate and shall have the meaning given below.

Word/Phrase	*Meaning*
ACKNOWLEDGE	Let me know that you have received and understood this message.
AFFIRM	Yes
APPROVED	Permission for proposed action granted.
BREAK	I hereby indicate the separation between portions of the message. (To be used where there is no clear distinction between the text and other portions of the message.)
BREAK BREAK	I hereby indicate the separation between messages transmitted to different aircraft in a very busy environment.

Word/Phrase	*Meaning*
CANCEL	Annul the previously transmitted clearance.
CHECK	Examine a system or procedure. (No answer is normally expected.)
CLEARED	Authorized to proceed under the conditions specified.
CONFIRM	Have I correctly received the following . . .? *or* Did you correctly receive this message?
CONTACT	Establish radio contact with . . .
CORRECT	That is correct.
CORRECTION	An error has been made in this transmission (or message indicated). The correct version is . . .
DISREGARD	Consider that transmission as not sent.
GO AHEAD	Proceed with your message. *Note.— The phrase "GO AHEAD" is not normally used in surface movement communications.*
HOW DO YOU READ	What is the readability of my transmission?
I SAY AGAIN	I repeat for clarity or emphasis.
MONITOR	Listen out on (frequency).
NEGATIVE	No *or* Permission not granted *or* That is not correct.
OUT	This exchange of transmissions is ended and no response is expected. *Note.— The word "OUT" is not normally used in VHF communications.*
OVER	My transmission is ended and I expect a response from you. *Note.— The word "OVER" is not normally used in VHF communications.*
READ BACK	Repeat all, or the specified part, of this message back to me exactly as received.
RECLEARED	A change has been made to your last clearance and this new clearance supersedes your previous clearance or part thereof.
REPORT	Pass me the following information.
REQUEST	I should like to know . . ., or I wish to obtain . . .
ROGER	I have received all of your last transmission. *Note.— Under no circumstances to be used in reply to a question requiring "READ BACK" or a direct answer in the affirmative (AFFIRM) or negative (NEGATIVE).*

Word/Phrase	*Meaning*
SAY AGAIN	Repeat all, or the following part, of your last transmission.
SPEAK SLOWER	Reduce your rate of speech.
STANDBY	Wait and I will call you.
VERIFY	Check and confirm with originator.
WILCO	(Abbreviation for "will comply".) I understand your message and will comply with it.
WORDS TWICE	a) As a request: Communication is difficult. Please send every word or group of words twice. b) As information: Since communication is difficult, every word or group of words in this message will be sent twice.

2.7 CALL SIGNS

2.7.1 Call signs for aeronautical stations

2.7.1.1 Aeronautical stations are identified by the name of the location followed by a suffix. The suffix indicates the type of unit or service provided.

Unit or service	*Call sign suffix*
Area control centre	CONTROL
Radar (in general)	RADAR
Approach control	APPROACH
Approach control radar arrivals	ARRIVAL
Approach control radar departures	DEPARTURE
Aerodrome control	TOWER
Surface movement control	GROUND
Clearance delivery	DELIVERY
Precision approach radar	PRECISION
Direction finding station	HOMER
Flight information service	INFORMATION
Apron control/management service	APRON
Company dispatch	DISPATCH
Aeronautical station	RADIO

2.7.1.2 When satisfactory communication has been established, and provided that it will not be confusing, the name of the location or the call sign suffix may be omitted.

2.7.2 Aircraft call signs

2.7.2.1 An aircraft call sign shall be one of the following types:

Type	*Example*
a) the characters corresponding to the registration marking of the aircraft;	G-ABCD or Cessna G-ABCD
b) the telephony designator of the aircraft operating agency, followed by the last four characters of the registration marking of the aircraft; or	FASTAIR DCAB
c) the telephony designator of the aircraft operating agency, followed by the flight identification.	FASTAIR 345

Note.— the name of the aircraft manufacturer or name of aircraft model may be used as a radiotelephony prefix to the Type a) above.

2.7.2.2 After satisfactory communication has been established, and provided that no confusion is likely to occur, aircraft call signs specified in 2.7.2.1 may be abbreviated as follows:

Type	*Example*
a) the first and at least the last two characters of the aircraft registration;	G-CD or Cessna G-CD
b) the telephony designator of the aircraft operating agency followed by at least the last two characters of the aircraft registration;	FASTAIR AB
c) No abbreviated form	—

2.7.2.2.1 An aircraft shall use its abbreviated call sign only after it has been addressed in this manner by the aeronautical station.

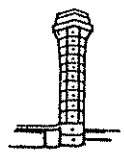
2.7.2.3 An aircraft shall not change its type of call sign or alter its call sign during flight except that where there is a likelihood that confusion may occur because of similar call signs, an aircraft may be instructed by an air traffic control unit to change the type of its call sign temporarily.

2.7.2.4 Aircraft in the heavy wake turbulence category shall include the word "HEAVY" immediately after the aircraft call sign in the initial call to the aerodrome control tower and the approach control unit.

2.8 COMMUNICATIONS

2.8.1 Establishment and continuation of communications

2.8.1.1 When establishing communications, an aircraft should use the full call sign of both the aircraft and the aeronautical station.



G-ABCD STEPHENVILLE TOWER
GO AHEAD

STEPHENVILLE TOWER G-ABCD

2.8.1.2 When a ground station wishes to broadcast information, the message should be prefaced by the call "ALL STATIONS".

**ALL STATIONS ALEXANDER
CONTROL, FUEL DUMPING
COMPLETED**

2.8.1.3 Also when an aircraft wishes to broadcast information to aircraft in its vicinity, the message should be prefaced by the call "ALL STATIONS".

**ALL STATIONS G-CDAB
WESTBOUND MARLOW VOR TO
STEPHENVILLE LEAVING FL260
NOW DESCENDING TO FL 150**

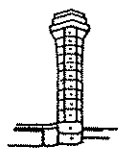
No reply is expected to such general calls unless individual stations are subsequently called upon to acknowledge receipt.

2.8.1.4 If there is doubt that a message has been correctly received, a repetition of the message shall be requested either in full or in part.

Phrase	*Meaning*
SAY AGAIN	Repeat entire message
SAY AGAIN . . . (item)	Repeat specific item
SAY AGAIN ALL BEFORE . . . (the first word satisfactorily received)	Repeat part of message

Phrase	*Meaning*
SAY AGAIN ALL AFTER . . . (the last word satisfactorily received)	Repeat part of message
SAY AGAIN ALL BETWEEN . . . AND . . .	Repeat part of message

2.8.1.5 When a station is called but is uncertain of the identification of the calling station, the calling station should be requested to repeat its call sign until identification is established.

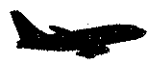


STATION CALLING GEORGETOWN GROUND SAY AGAIN YOUR CALL SIGN

GEORGETOWN GROUND 345

GEORGETOWN GROUND FASTAIR 345

2.8.1.6 When an error is made in a transmission the word "CORRECTION" shall be spoken, the last correct group or phrase repeated and then the correct version transmitted.



FASTAIR 345 WICKEN 47 FL 330 MARLOW 07 CORRECTION MARLOW 57

FASTAIR 345 ROGER

2.8.1.7 If a correction can best be made by repeating the entire message, the operator shall use the phrase "CORRECTION I SAY AGAIN" before transmitting the message a second time.

2.8.1.8 After contact has been established, continuous communication may be performed without further identification or call sign until termination of the contact, provided that no confusion or ambiguity will result.

2.8.1.9 When it is considered that reception is likely to be difficult, important elements of the message should be spoken twice.

GEORGETOWN, G-ABCD WALDEN 2 500 FEET, I SAY AGAIN 2 500 FEET, ENGINE LOSING POWER, ENGINE LOSING POWER.

2.8.2 Transfer of communications

2.8.2.1 An aircraft shall be advised by the appropriate aeronautical station to change from one radio frequency to another in accordance with agreed procedures. In the absence of such advice, the aircraft shall notify the aeronautical station before such a change takes place.

FASTAIR 345 CONTACT
ALEXANDER CONTROL 129.1

129.1 FASTAIR 345

2.8.2.2 An aircraft may be instructed to "standby" on a frequency when it is intended that the ATS unit will initiate further communications, and to "monitor" a frequency on which information is being broadcast.

FASTAIR 345 STANDBY 118.9
FOR TOWER

118.9 FASTAIR 345

FASTAIR 345 MONITOR ATIS 123.25

MONITORING 123.25 FASTAIR 345

2.8.3 Issue of clearance and readback requirements

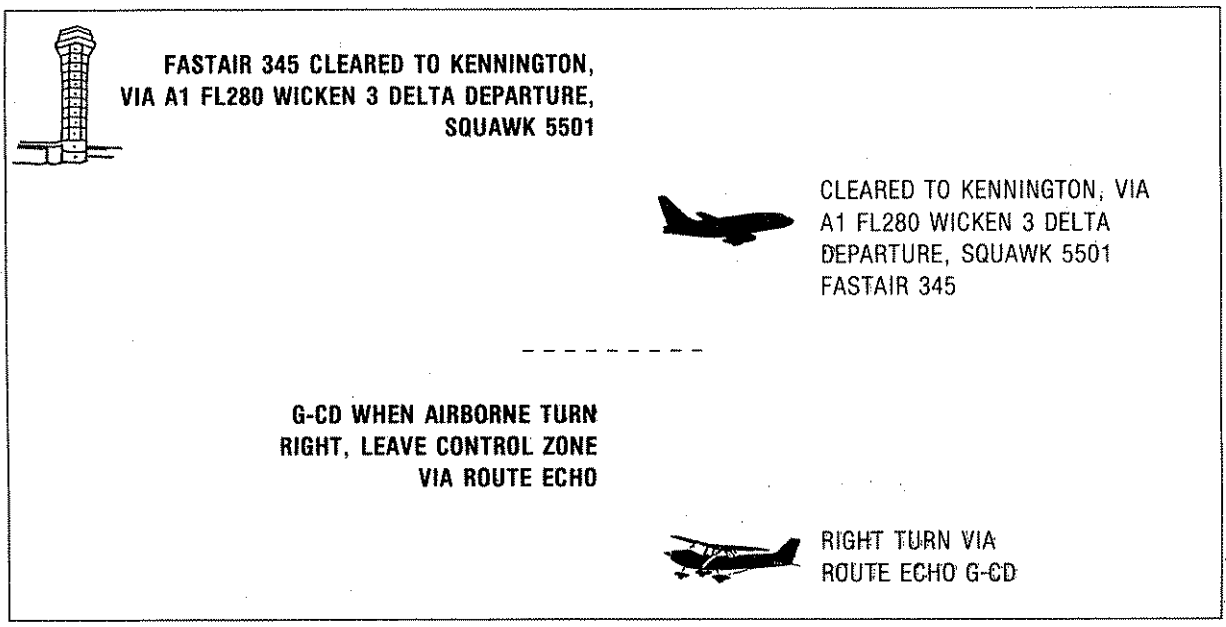
2.8.3.1 Provisions governing clearances are contained in the PANS-RAC. A clearance may vary in content from a detailed description of the route and levels to be flown to a brief landing clearance.

2.8.3.2 Controllers should pass a clearance slowly and clearly since the pilot needs to write it down and wasteful repetition will thus be avoided. Whenever possible a route clearance should be passed to an aircraft before start up. In any case controllers should avoid passing a clearance to a pilot engaged in complicated taxiing manoeuvres and on no occasion should a clearance be passed when the pilot is engaged in line up or take-off manoeuvres.

2.8.3.3 An ATC route clearance is *not* an instruction to take off or enter an active runway. The words "TAKE OFF" are used only when an aircraft is cleared for take-off, or when cancelling a take-off clearance. At other times the word "DEPARTURE" or "AIRBORNE" is used.

2.8.3.4 Readback requirements have been introduced in the interests of flight safety. The stringency of the read back requirement is directly related to the possible seriousness of a misunderstanding in the transmission and receipt of ATC clearances and instructions. Strict adherence to readback procedures ensures not only that the clearance has been received correctly but also that the clearance was transmitted as intended. It also serves as a check that the right aircraft, and only that aircraft, will take action on the clearance.

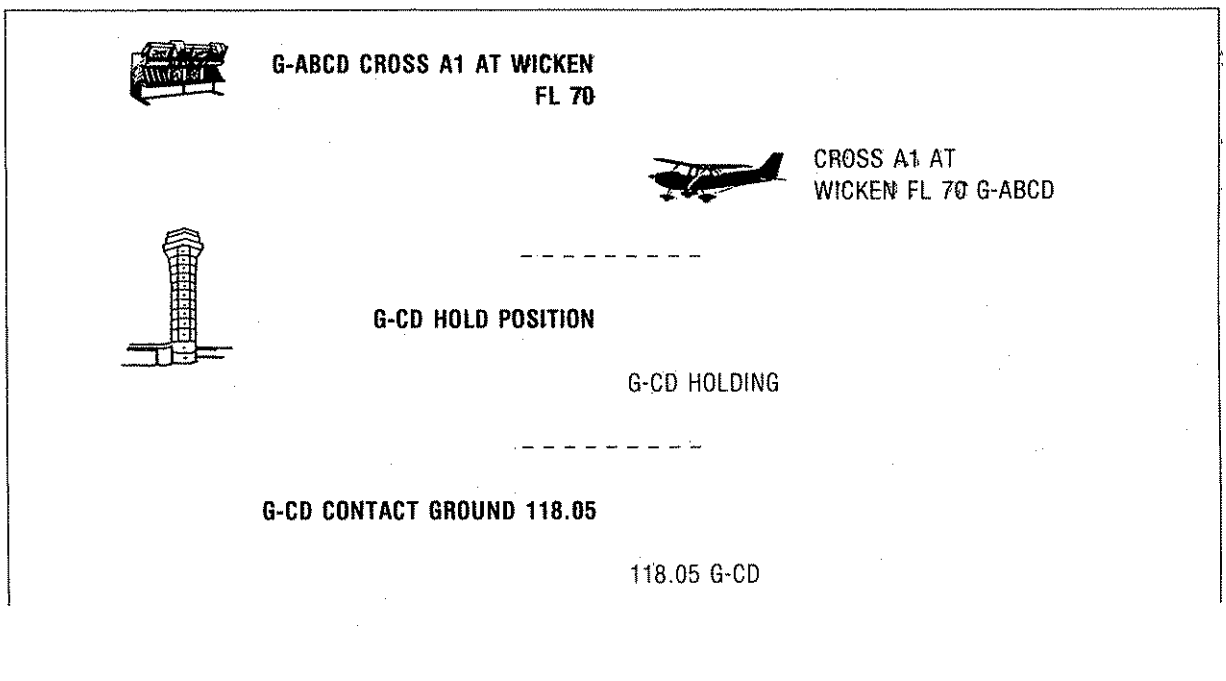
2.8.3.5 Clearances to enter, land on, take off on, cross and back-track on the runway in use shall be read back. ATC route clearances shall always be read back unless otherwise authorized by the appropriate ATS authority in which case they shall be acknowledged in a positive manner.



2.8.3.6 The runway in use, heading and speed instructions, level instructions, altimeter settings and SSR codes shall always be read back.

2.8.3.7 Other clearances and instructions (including conditional clearances) shall be read back or acknowledged in a manner which clearly indicates that they have been understood and accepted.

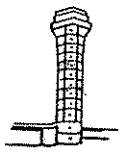
2.8.3.8 An aircraft should terminate the readback by its call sign.



FASTAIR 345 SQUAWK 6402

6402 FASTAIR 345

2.8.3.9 If an aircraft readback of a clearance or instruction is incorrect, the controller shall transmit the word "NEGATIVE" followed by the correct version.



G-CD QNH 1003

QNH 1013 G-CD

NEGATIVE QNH 1003

QNH 1003 G-CD

2.8.3.10 If there is a doubt as to whether a pilot can comply with an ATC clearance or instruction, the controller may follow the clearance or instruction by the phrase "if not possible advise", and subsequently offer an alternative. If at any time a pilot receives a clearance or instruction which cannot be complied with, that pilot should advise the controller using the phrase "UNABLE TO COMPLY" and give the reasons.

**FASTAIR 345 GEORGETOWN,
CLEARED TO COLINTON FL 290,
CROSS WICKEN FL 150
OR ABOVE**

GEORGETOWN FASTAIR 345
UNABLE TO COMPLY, CANNOT
CROSS WICKEN FL 150
DUE WEIGHT

2.8.4 Test procedures

2.8.4.1 Test transmissions should take the following form:

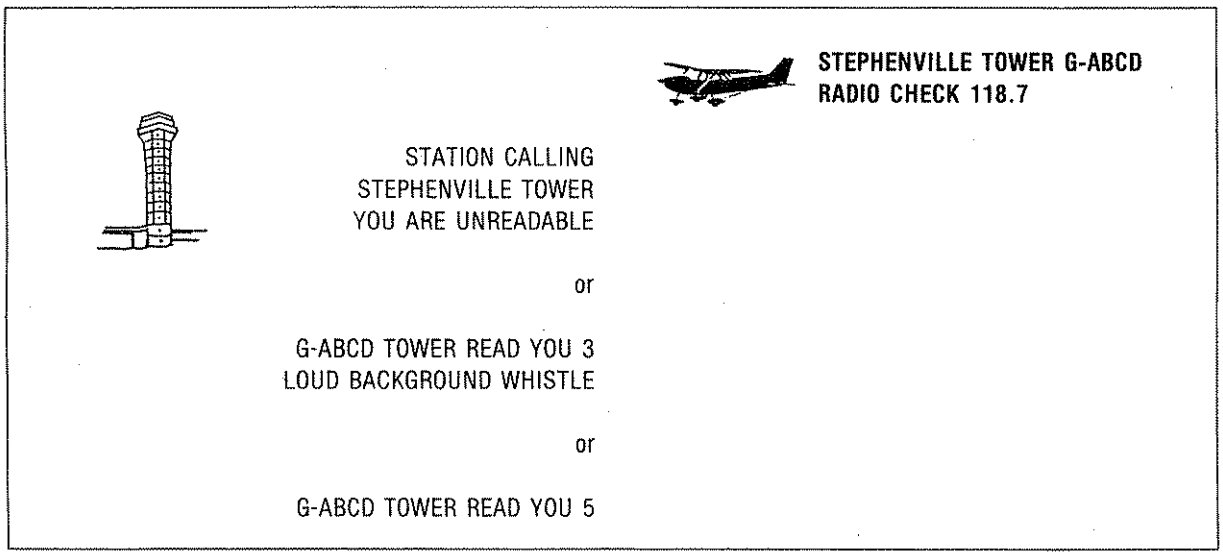
a) the identification of the aeronautical station being called;
b) the aircraft call sign;
c) the words "RADIO CHECK";
d) the frequency being used.

2.8.4.2 Replies to test transmissions should be as follows:

a) the identification of the station calling;
b) the identification of the station replying;
c) information regarding the readability of the transmission.

2.8.4.3 The readability of transmissions should be classified in accordance with the following readability scale:

1. Unreadable.
2. Readable now and then.
3. Readable but with difficulty.
4. Readable.
5. Perfectly readable.



2.8.4.4 When it is necessary for a ground station to make test signals, either for the adjustment of a transmitter before making a call or for the adjustment of a receiver, such signals shall not continue for more than 10 seconds and shall be composed of spoken numbers (ONE, TWO, THREE, etc.) followed by the radio call sign of the station transmitting the test signals.

Chapter 3
General Phraseology

3.1 INTRODUCTION

3.1.1 The phraseology detailed in this manual has been established for the purpose of ensuring uniformity in RTF communications. Obviously, it is not practicable to detail phraseology examples suitable for every situation which may occur. However, if standard phrases are adhered to when composing a message, any possible ambiguity will be reduced to a minimum.

3.1.2 Some abbreviations, which by their common usage have become part of aviation terminology, may be spoken using their constituent letters rather than the spelling alphabet, for example, ILS, QNH, RVR, etc. (see 1.2).

3.1.3 The following words may be omitted from transmissions provided that no confusion or ambiguity will result:

a) "SURFACE" in relation to surface wind direction and speed.
b) "DEGREES" in relation to radar headings.
c) "VISIBILITY", "CLOUD" and "HEIGHT" in meteorological reports.
d) "HECTOPASCALS" when giving pressure settings.

3.1.4 The use of courtesies should be avoided.

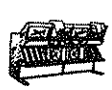
3.1.5 The word "IMMEDIATELY" should only be used when immediate action is required for safety reasons.

3.2 LEVEL INSTRUCTIONS

3.2.1 Only basic level instructions are detailed in this chapter. More comprehensive phrases are contained in subsequent chapters in the context in which they are most commonly used.

3.2.2 The precise phraseology used in the transmission and acknowledgement of climb and descent clearances will vary, depending upon the circumstances, traffic density and nature of the flight operations. However, care must be taken to ensure that misunderstandings are not generated as a consequence of the phraseology employed during these phases of flight. For example, levels may be reported as altitude, height or flight levels according to the phase of flight and the altimeter setting.

3.2.2.1 In the following examples the operations of climbing and descending are interchangeable and examples of only one form are given.



G-AB REPORT YOUR LEVEL

G-AB MAINTAINING 3 000 FEET

G-AB REPORT PASSING FL 80

G-AB WILCO . . . G-AB PASSING FL 80

- - - - - - - - -

G-AB MAINTAIN 2 500 FEET

MAINTAINING 2 500 FEET G-AB

- - - - - - - - -

G-AB CLIMB TO FL 70

LEAVING 2 000 FEET CLIMBING TO FL 70 G-AB

- - - - - - - - -

G-AB REQUEST DESCENT

G-AB DESCEND TO FL 60

LEAVING FL 90 DESCENDING TO FL 60 G-AB

- - - - - - - - -

FASTAIR 345 AFTER PASSING NORTH CROSS DESCEND TO FL 80

AFTER NORTH CROSS DESCEND TO FL 80 FASTAIR 345

3.2.2.2 Once having been given an instruction to climb or descend, a further overriding instruction may be given to a pilot.

FASTAIR 345 STOP DESCENT AT FL 150

STOP DESCENT AT FL 150 FASTAIR 345

- - - - - - - - -

FASTAIR 345 CONTINUE CLIMB TO FL 330

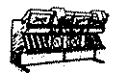
CLIMBING TO FL 330 FASTAIR 345

- - - - - - - - -

FASTAIR 345 RECLEARED FL 330

RECLEARED FL 330 FASTAIR 345

3.2.2.3 Occasionally, for traffic reasons, a higher than normal rate of climb or descent may be required.



FASTAIR 345 EXPEDITE DESCENT TO FL 80

EXPEDITING DESCENT TO FL 80
FASTAIR 345

- - - - - - - - -

FASTAIR 345 CLIMB TO FL 240 EXPEDITE UNTIL PASSING FL 180

FASTAIR 345 CLIMBING TO FL 240, EXPEDITING UNTIL PASSING FL 180

or

FASTAIR 345 UNABLE TO COMPLY

3.3 POSITION REPORTING

3.3.1 Position reports shall contain the following elements of information, except that elements 4), 5) and 6) may be omitted when prescribed on the basis of regional air navigation agreements:

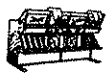
1) Aircraft identification
2) Position
3) Time
4) Level
5) Next position and time over
6) Ensuing significant point

3.3.2 When transmitting time, only the minutes of the hour should normally be required. Each digit should be pronounced separately. However, the hour should be included when any possibility of confusion is likely to arise.

FASTAIR 345 WICKEN 47 FL 330 MARLOW 57 COLINTON NEXT

FASTAIR 345 ROGER

3.3.3 Where adequate flight progress data are available from other sources, such as surveillance radar, flights may be exempted from the requirement to make compulsory position reports.



FASTAIR 345 NEXT REPORT COLINTON

FASTAIR 345 WILCO

FASTAIR 345 OMIT POSITION REPORTS UNTIL FIR BOUNDARY, NEXT REPORT COLINTON

FASTAIR 345 WILCO

FASTAIR 345 RESUME POSITION REPORTING

FASTAIR 345 WILCO

3.4 FLIGHT PLANS

3.4.1 A pilot may file a flight plan with an ATS unit during flight, although the use of busy air traffic control channels for this purpose should be avoided. Details should be passed using the flight plan format.

ALEXANDER INFORMATION G-CDAB REQUEST FILE FLIGHT PLAN

G-CDAB ALEXANDER INFORMATION READY TO COPY

3.4.2 During a flight a pilot may change from IFR to VFR flight.

ALEXANDER CONTROL G-AB CANCELLING IFR FLIGHT PLAN. PROCEEDING VFR ESTIMATING STEPHENVILLE AT 1732

G-AB IFR FLIGHT PLAN CANCELLED AT 47. CONTACT ALEXANDER INFORMATION 125.75

3.4.3 When a pilot has expressed the intention to change from IFR to VFR flight, the ATS unit should pass to the pilot any available meteorological information which makes it likely that flight in VMC cannot be maintained.

G-AB IMC REPORTED IN THE VICINITY OF KENNINGTON

G-AB ROGER MAINTAINING IFR

Chapter 4
Aerodrome Control: Aircraft

4.1 INTRODUCTION

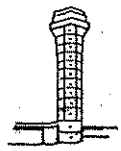
4.1.1 Concise and unambiguous phraseology used at the correct time is vital to the smooth, safe and expeditious operation of an aerodrome. It is not only the means by which controllers carry out their task, but it also assists pilots in maintaining an awareness of other traffic in their vicinity, particularly in poor visibility conditions.

4.1.2 Controllers should not transmit to an aircraft during take-off, the last part of final approach or the landing roll, unless it is necessary for safety reasons, as it may be distracting to the pilot at a time when the cockpit workload is often at its highest.

4.2 DEPARTURE INFORMATION AND ENGINE STARTING PROCEDURES

4.2.1 Where no ATIS is provided the pilot may ask for current aerodrome information before requesting start up.

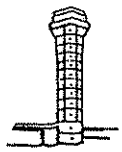
GEORGETOWN GROUND FASTAIR 345, IFR TO COLINTON, REQUEST DEPARTURE INFORMATION



FASTAIR 345
DEPARTURE RUNWAY 32,
WIND 290 DEGREES 4 KNOTS,
QNH 1022, TEMPERATURE MINUS 2,
DEWPOINT MINUS 3,
RVR 550 METRES

RUNWAY 32, QNH 1022, WILL CALL FOR START UP, FASTAIR 345

4.2.2 Requests to start engines are normally made to facilitate ATC planning and to avoid excessive fuel wastage by aircraft delayed on the ground. At certain aerodromes the pilot will state, along with the request, the location of the aircraft and acknowledge receipt of the ATIS broadcast. When there will be a delay to the departure of the aircraft the controller will normally indicate a time to start up or expect to start up.



GEORGETOWN GROUND FASTAIR 345, STAND 24 REQUEST START UP, INFORMATION BRAVO

FASTAIR 345 START UP
APPROVED QNH 1009

or

FASTAIR 345 START UP AT 35
QNH 1009

or

FASTAIR 345 EXPECT START UP AT 35
QNH 1009

or

FASTAIR 345 EXPECT DEPARTURE 49 START UP
AT OWN DISCRETION
QNH 1009

4.2.3 Having received ATC approval, the pilot starts the engines assisted as necessary by ground crew.

READY TO START UP

START NUMBER ONE

STARTING NUMBER ONE

4.3 PUSHBACK

4.3.1 At many aerodromes at which large aircraft operate, the aircraft are parked nose-in to the terminal in order to save parking space. Aircraft have to be pushed backwards by tugs before they can taxi for departure. Requests for pushback are made to ATC or apron control/management service depending on the local procedures.

APRON FASTAIR 345 STAND 27 REQUEST PUSHBACK

FASTAIR 345 PUSHBACK
APPROVED

or

FASTAIR 345 STANDBY. EXPECT ONE MINUTE
DELAY DUE B747 TAXIING BEHIND

4.3.2 The following phraseology should be used by the pilot and the ground crew to co-ordinate the pushback.

READY FOR PUSHBACK

CONFIRM BRAKES RELEASED

BRAKES RELEASED

COMMENCING PUSHBACK

PUSHBACK COMPLETED, CONFIRM BRAKES SET

BRAKES SET: DISCONNECT

DISCONNECTING STANDBY FOR VISUAL SIGNAL AT YOUR LEFT

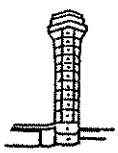
ROGER

4.3.3 When the manoeuvre is complete the ground crew gives the pilot a visual signal to indicate that the aircraft is free to taxi. Should the pilot wish to stop the manoeuvre at any stage the phrase "stop pushback" should be used.

4.4 TAXI INSTRUCTIONS

4.4.1 Taxi instructions issued by a controller will always contain a clearance limit, which is the point at which the aircraft must stop until further permission to proceed is given. For departing aircraft the clearance limit will normally be the holding point of the runway in use, but it may be any other position on the aerodrome depending on the prevailing traffic circumstances.

STEPHENVILLE TOWER G-ABCD C172 AT THE SOUTH SIDE HANGARS REQUEST TAXI FOR VFR LOCAL FLIGHT



G-ABCD TAXI VIA TAXIWAY CHARLIE TO HOLDING POINT RUNWAY 24 WIND 250 DEGREES 8 KNOTS QNH 1010 TIME TWO THREE AND A HALF

G-ABCD QNH 1010 REQUEST RUNWAY 14

G-CD RECLEARED HOLDING POINT RUNWAY 14, TAXI BEHIND SENECA COMING FROM YOUR LEFT

G-CD HOLDING POINT RUNWAY 14 TRAFFIC IN SIGHT

STEPHENVILLE TOWER G-ABCD C172 AT THE FUEL STATION VFR TO WALDEN REQUEST TAXI

G-ABCD RUNWAY 06 WIND 080 DEGREES 10 KNOTS QNH 1012 TAXI VIA TAXIWAY ALPHA TO HOLDING POINT RUNWAY 14

RUNWAY 06 QNH 1012 REQUEST TAXIWAY BRAVO AND BACKTRACK G-ABCD

G-CD APPROVED TAXI VIA BRAVO BACKTRACK AND LINE UP RUNWAY 06

BRAVO AND BACKTRACK RUNWAY 06 G-CD

- - - - - - - - -

G-CD EXPEDITE TAXI TRAFFIC ON FINAL RUNWAY 14

G-CD EXPEDITING

G-CD RUNWAY 14 VACATED

- - - - - - - - -

STEPHENVILLE TOWER G-ABCD AT THE FUEL STATION REQUEST TAXI TO FLYING CLUB

G-ABCD TAXI VIA TAXIWAY CHARLIE TO HOLDING POINT RUNWAY 24

VIA CHARLIE HOLDING POINT RUNWAY 24 G-ABCD

G-CD APPROACHING HOLDING POINT REQUEST CROSS RUNWAY 24

G-CD HOLD SHORT RUNWAY 24

G-CD HOLDING SHORT

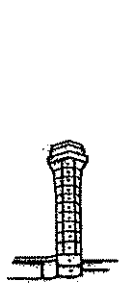
G-CD CROSS RUNWAY 24 REPORT VACATED CONTINUE TO FLYING CLUB

G-CD CROSSING

G-CD RUNWAY VACATED

G-CD ROGER

4.4.2 Where an aircraft acknowledges receipt of the ATIS broadcast the controller does not need to pass departure information to the pilot when giving taxi instructions.



GEORGETOWN GROUND FASTAIR 345 REQUEST TAXI INFORMATION CHARLIE

FASTAIR 345 TAXI TO HOLDING POINT RUNWAY 27 GIVE WAY TO B747 PASSING LEFT TO RIGHT QNH 1019

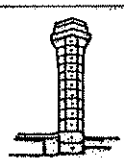
FASTAIR 345 HOLDING POINT RUNWAY 27 QNH 1019, TRAFFIC IN SIGHT

4.5 TAKE-OFF PROCEDURES

4.5.1 At busy aerodromes with separate GROUND and TOWER functions, aircraft are usually transferred to TOWER at or approaching the holding point.

4.5.2 Since misunderstandings in the granting and acknowledgement of take-off clearances can result in serious consequences, care should be taken to ensure that the phraseology employed during the taxi manoeuvres cannot be interpreted as a take-off clearance.

4.5.3 Some aircraft may be required to carry out checks prior to departure and are not always ready for take-off when they reach the holding point.



G-CD REPORT WHEN READY FOR DEPARTURE

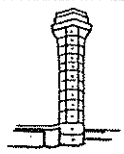
G-CD WILCO

G-CD READY

G-CD LINE UP

G-CD LINING UP

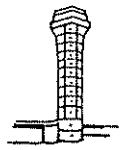
4.5.4 Except in cases of emergency, controllers should not transmit to an aircraft in the process of taking off or during the early stage of climb.



G-CD CLEARED FOR TAKE-OFF

CLEARED FOR TAKE-OFF G-CD

4.5.5 For traffic reasons it may be necessary for the aircraft to take off immediately after lining up.



FASTAIR 345 ARE YOU READY FOR IMMEDIATE DEPARTURE

FASTAIR 345 AFFIRM

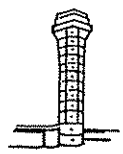
FASTAIR 345 LINE UP BE READY FOR IMMEDIATE DEPARTURE

FASTAIR 345 LINING UP

FASTAIR 345 CLEARED FOR TAKE-OFF

CLEARED FOR TAKE-OFF FASTAIR 345

4.5.6 In poor visibility the controller may request the pilot to report when airborne.



FASTAIR 345 CLEARED FOR TAKE-OFF REPORT AIRBORNE

CLEARED FOR TAKE-OFF WILCO FASTAIR 345

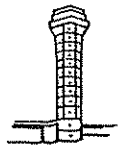
FASTAIR 345 AIRBORNE 57

FASTAIR 345 CONTACT DEPARTURE 121.75

121.75 FASTAIR 345

4.5.7 Conditional clearances shall not be used for movements affecting the active runway(s), except when the aircraft or vehicles concerned are seen by both the controller and pilot. When the conditional clearance involves a departing aircraft and an arriving aircraft it is important that the departing aircraft correctly identifies the arriving aircraft on which the conditional clearance is based. Reference to the arriving aircraft type may be insufficient and it may be necessary to add a description of the colour or the company name to ensure correct identification. A conditional clearance shall be given as follows:

a) call sign;
b) the condition;
c) the clearance.



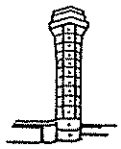
FASTAIR 345 REPORT THE AIRBUS ON FINAL IN SIGHT

FASTAIR 345 AIRBUS IN SIGHT

FASTAIR 345 AFTER THE LANDING AIRBUS HAS PASSED, LINE UP AND HOLD

AFTER THE AIRBUS, LINE UP AND HOLD, FASTAIR 345

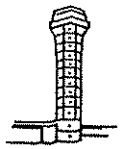
4.5.8 When several runways are in use and there is any possibility that the pilot may be confused as to which one to use, the runway number should be stated in the take-off clearance.



FASTAIR 345 CLEARED FOR TAKE-OFF RUNWAY 09

CLEARED FOR TAKE-OFF RUNWAY 09 FASTAIR 345

4.5.9 Local departure instructions may be given with the take-off clearance. Such instructions are normally given to ensure separation between aircraft operating in the vicinity of the aerodrome.



FASTAIR 345 CLIMB STRAIGHT AHEAD UNTIL 2 500 FEET BEFORE TURNING RIGHT CLEARED FOR TAKE-OFF

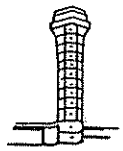
STRAIGHT AHEAD 2 500 FEET RIGHT TURN CLEARED FOR TAKE-OFF FASTAIR 345

G-CD REQUEST RIGHT TURN WHEN AIRBORNE

G-CD RIGHT TURN APPROVED CLEARED FOR TAKE-OFF

CLEARED FOR TAKE-OFF RIGHT TURN G-CD

4.5.10 Due to unexpected traffic developments or a departing aircraft taking longer to take off than anticipated, it is occasionally necessary to cancel the take-off clearance or quickly free the runway for landing traffic.



FASTAIR 345 TAKE OFF IMMEDIATELY OR HOLD SHORT OF RUNWAY

HOLDING SHORT FASTAIR 345

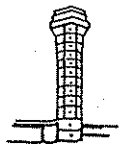
FASTAIR 345 TAKE OFF IMMEDIATELY OR VACATE RUNWAY

TAKING OFF FASTAIR 345

G-CD HOLD POSITION, CANCEL I SAY AGAIN CANCEL TAKE-OFF VEHICLE ON RUNWAY

HOLDING G-CD

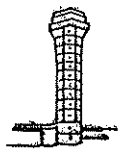
4.5.11 When an aircraft has commenced the take-off roll, and it is necessary for the aircraft to abandon take-off in order to avert a dangerous traffic situation, the aircraft should be instructed to stop immediately and this instruction and call sign repeated.



FASTAIR 345 STOP IMMEDIATELY FASTAIR 345 STOP IMMEDIATELY AIRCRAFT CROSSING RUNWAY

FASTAIR 345 STOPPING

4.5.12 When a pilot abandons the take-off manoeuvre the control tower should be so informed as soon as practicable, and assistance or taxi instructions should be requested as required.



FASTAIR 345 ROGER

FASTAIR 345 STOPPING

FASTAIR 345 REQUEST RETURN TO RAMP

FASTAIR 345 TAKE NEXT RIGHT RETURN TO RAMP
CONTACT GROUND 118.35

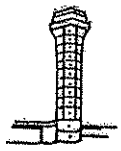
NEXT RIGHT 118.35 FASTAIR 345

4.6 AERODROME TRAFFIC CIRCUIT

(See Figure 3)

4.6.1 Requests for circuit-joining instructions should be made in sufficient time to allow for a planned entry into the circuit taking other traffic into account. When the traffic circuit is a right-hand pattern it should be specified. A left-hand pattern need not be specified although it may be advisable to do so if there has been a recent change where the circuit direction is variable.

**WALDEN TOWER G-ABCD C172
10 MILES NORTH 2 500 FEET
FOR LANDING**

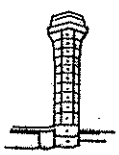


G-CD JOIN DOWNWIND
RUNWAY 24 WIND 270 DEGREES
5 KNOTS, QNH 1012

JOIN DOWNWIND
RUNWAY 24 QNH 1012 G-CD

4.6.2 Where ATIS is provided, receipt of the broadcast should be acknowledged in the initial call to the aerodrome.

**WALDEN TOWER G-ABCD C172
10 MILES NORTH
2 500 FEET INFORMATION
BRAVO, FOR LANDING**



G-CD JOIN DOWNWIND RIGHT
HAND RUNWAY 34 QNH 1012

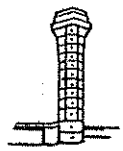
RIGHT HAND RUNWAY 34 QNH 1012 G-CD

G-CD TRAFFIC CHEROKEE TAKING OFF AND A TRI-PACER DOWNWIND

G-CD

4.6.3 Depending on prevailing traffic conditions and the direction from which an aircraft is arriving, it may be possible to give a straight-in approach.

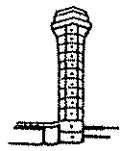
WALDEN TOWER G-ABCD C172 10 MILES NORTH 2 500 FEET FOR LANDING



G-CD MAKE STRAIGHT-IN APPROACH RUNWAY 16 WIND 190 DEGREES 5 KNOTS QNH 1009

STRAIGHT-IN RUNWAY 16 QNH 1009 G-CD

4.6.4 The pilot having joined the traffic circuit makes routine reports as required by local procedures.



G-CD DOWNWIND

G-CD NUMBER 2 FOLLOW THE CHEROKEE ON BASE

G-CD NUMBER 2, TRAFFIC IN SIGHT

G-CD BASE

G-CD REPORT FINAL

G-CD

G-CD FINAL

G-CD CONTINUE APPROACH WIND 270 DEGREES 7 KNOTS

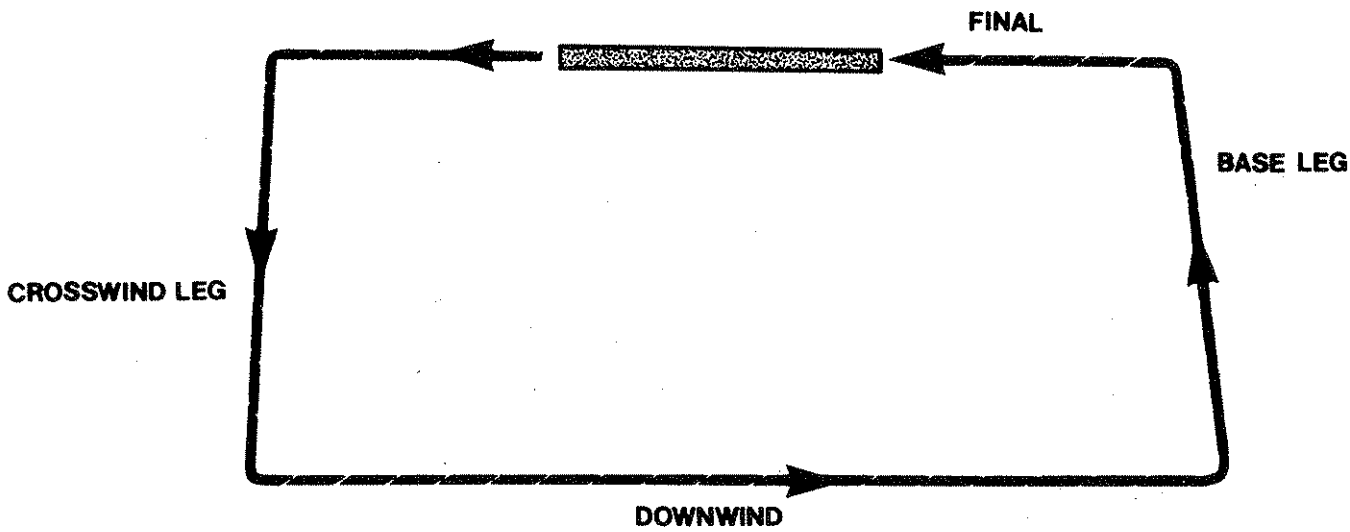
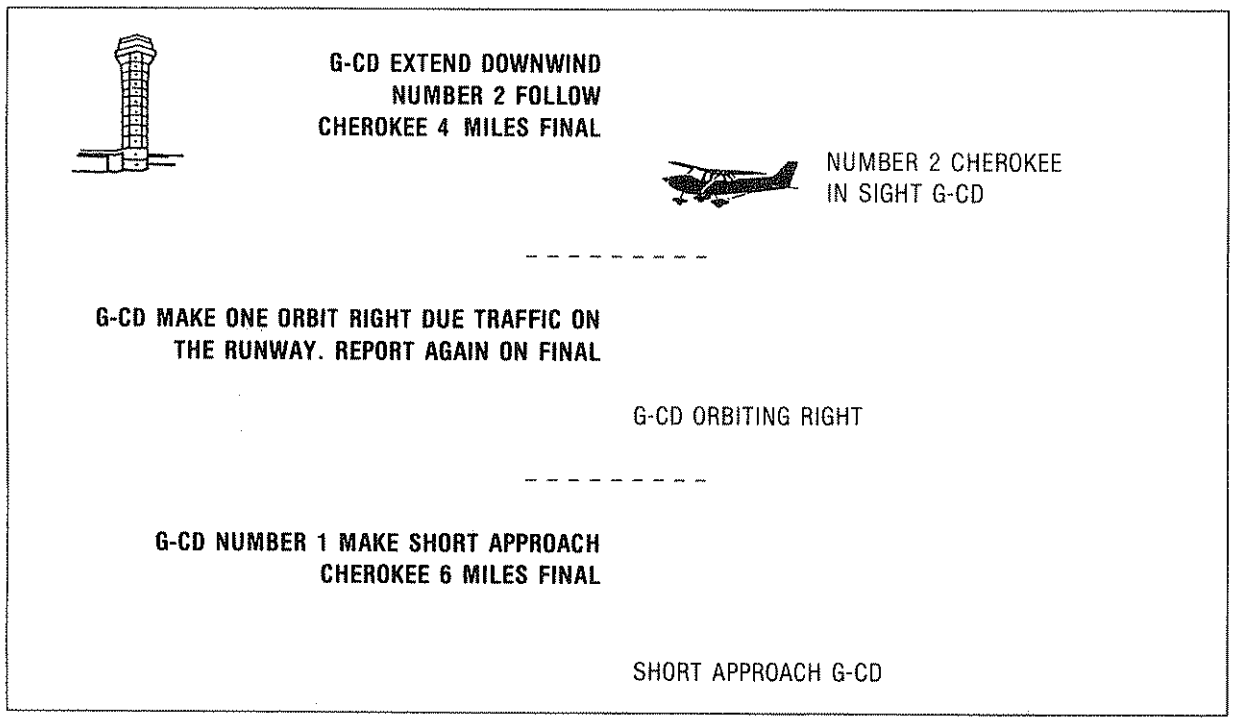


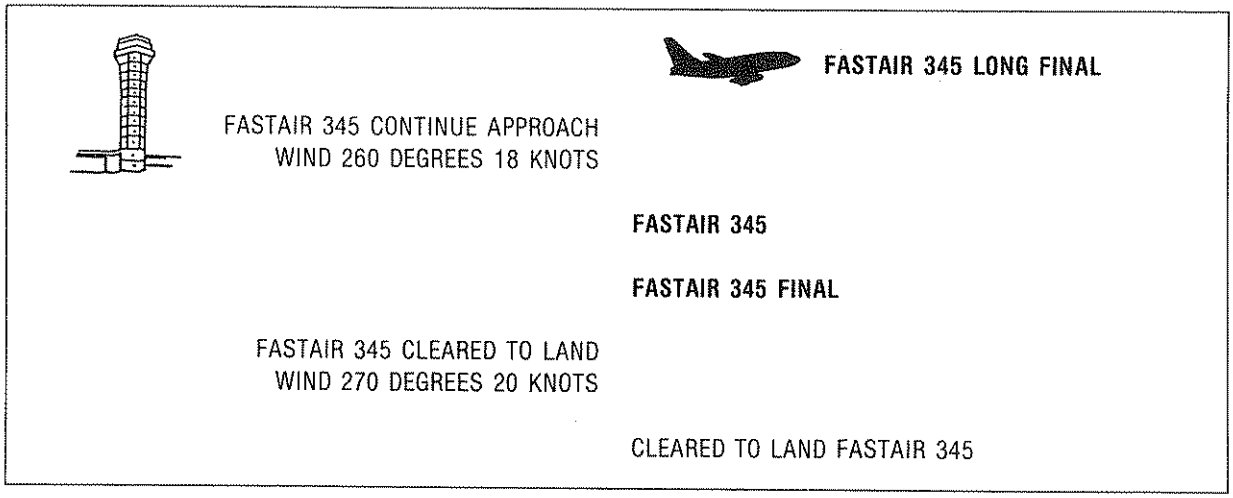
Figure 3. Reporting in the traffic circuit

4.6.5 It may be necessary in order to co-ordinate traffic in the circuit to issue delaying or expediting instructions.

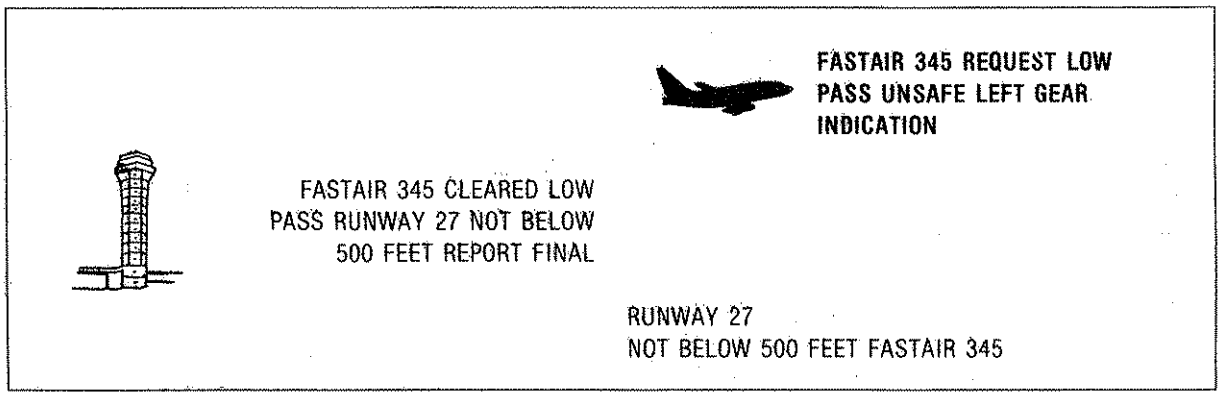


4.7 FINAL APPROACH AND LANDING

4.7.1 A "FINAL" report is made when an aircraft turns onto final within 7 km (4 NM) from touchdown. If and when the turn onto final is made at a greater distance, a "LONG FINAL" report is made. If the aircraft is making a straight-in-approach, a "LONG FINAL" report is made at about 15 km (8 NM) from touchdown. If no landing clearance is received at that time, a "FINAL" report is made at 7 km (4 NM) from touchdown.



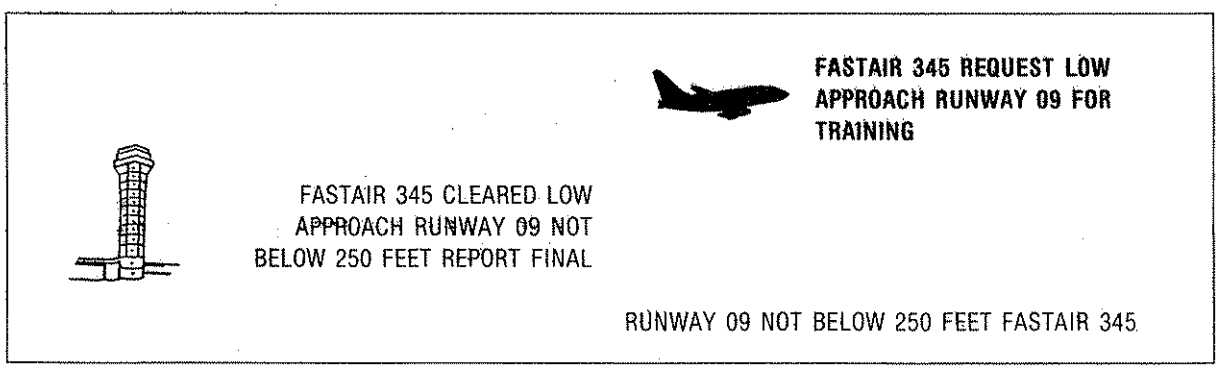
4.7.2 A pilot may request to fly past the control tower or other observation point for the purpose of visual inspection from the ground.



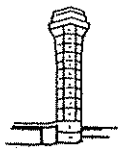
4.7.3 If the low pass is made for the purpose of observing the undercarriage, one of the following replies could be used to describe its condition but these examples are not exhaustive:

a) LANDING GEAR APPEARS DOWN;
b) RIGHT (or LEFT, or NOSE) WHEEL APPEARS UP (or DOWN);
c) WHEELS APPEAR UP;
d) RIGHT (or LEFT, or NOSE) WHEEL DOES NOT APPEAR UP (or DOWN).

4.7.4 For training purposes, a pilot may request permission to make an approach along, or parallel to the runway, without landing.



4.7.5 In order to save taxiing time when flying training in the traffic circuit pilots may request to carry out a "TOUCH AND GO", i.e. the aircraft lands, continues rolling and takes-off, without stopping.



G-CD REQUEST TOUCH AND GO

G-CD CLEARED TOUCH AND GO

CLEARED TOUCH AND GO G-CD

or

G-CD UNABLE TO APPROVE DUE TRAFFIC CONGESTION MAKE FULL STOP CLEARED TO LAND

CLEARED TO LAND FOR FULL STOP G-CD

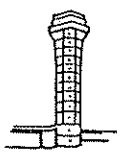
or

G-CD MAKE ANOTHER CIRCUIT REPORT DOWNWIND

G-CD WILCO

4.8 GO AROUND

4.8.1 Instructions to carry out a missed approach may be given to avert an unsafe situation. When a missed approach is initiated cockpit workload is inevitably high. Any transmissions to aircraft going around should be brief and kept to a minimum.

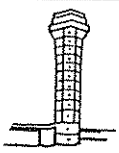


FASTAIR 345 GO AROUND
AIRCRAFT ON THE RUNWAY

FASTAIR 345 GOING AROUND

4.8.2 Unless instructions are issued to the contrary, an aircraft on an instrument approach will carry out the missed approach procedure and an aircraft operating VFR will continue in the normal traffic circuit.

4.8.3 In the event that the missed approach is initiated by the pilot the phrase "GOING AROUND" shall be used.

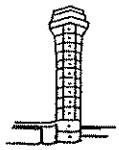


G-CD GOING AROUND

G-CD REPORT DOWNWIND

4.9 AFTER LANDING

Unless absolutely necessary, controllers should not direct taxi instructions to pilots until the landing roll is completed. Unless otherwise advised pilots should remain on tower frequency until the runway is vacated.



FASTAIR 345 VACATE LEFT

FASTAIR 345

FASTAIR 345 TAKE FIRST RIGHT WHEN VACATED CONTACT GROUND 118.35

FIRST RIGHT 118.35 FASTAIR 345

GEORGETOWN GROUND FASTAIR 345 RUNWAY VACATED

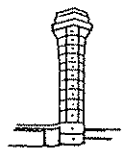
FASTAIR 345 TAXI TO STAND 27 VIA TAXIWAY ALPHA

TAXIWAY ALPHA FASTAIR 345

4.10 ESSENTIAL AERODROME INFORMATION

4.10.1 Essential aerodrome information is information regarding the manoeuvring area and its associated facilities which is necessary to ensure the safe operation of aircraft. Aerodrome information should be passed to aircraft whenever possible prior to start-up or taxi and prior to the commencement of final approach. It includes information regarding the following:

a) construction or maintenance work on, or immediately adjacent to the manoeuvring area;
b) rough or broken surfaces on a runway or a taxiway, whether marked or not;
c) snow or ice on a runway or a taxiway;
d) water on a runway;
e) snow banks or drifts adjacent to a runway or a taxiway;
f) other temporary hazards, including parked aircraft and birds on the ground or in the air;
g) failure or irregular operation of part or all of the aerodrome lighting systems;
h) any other pertinent information.



FASTAIR 345 CAUTION
CONSTRUCTION WORK
ADJACENT TO GATE 37

FASTAIR 345

. . . WORK IN PROGRESS AHEAD NORTH SIDE OF TAXIWAY ALPHA

. . . CENTRE LINE TAXIWAY LIGHTING UNSERVICEABLE

. . . VASIS RUNWAY 27 UNSERVICEABLE

. . . LARGE FLOCK OF BIRDS NORTH OF RUNWAY 27 NEAR CENTRAL TAXIWAY

. . . ILS 09 UNSERVICEABLE

. . . RUNWAY CONDITIONS 09:
AVAILABLE WIDTH 32 METRES, COVERED WITH THIN PATCHES OF ICE, BRAKING ACTION POOR
SNOW UP TO 30 CM ALONG EDGES

Chapter 5
Aerodrome Control: Vehicles

5.1 INTRODUCTION

5.1.1 The expeditious movement of vehicles plays an essential supporting role in the operation of an aerodrome. Wherever possible the areas in which vehicles and aircraft operate are segregated. However, there are many occasions when vehicles need to move on the manoeuvring area for maintenance purposes or in direct support of aircraft operations.

5.1.2 Procedures governing the movement of vehicles vary widely from aerodrome to aerodrome, but certain factors to be taken into account when driving on an aerodrome are common to all:

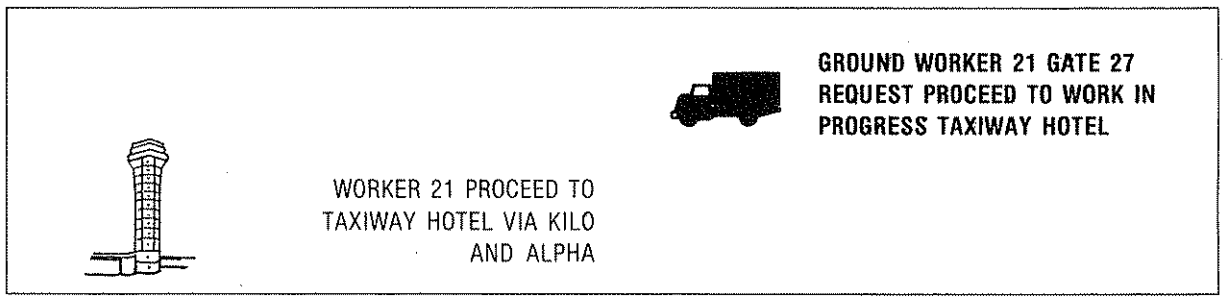
a) in general, aircraft are by no means as manoeuvrable as ground vehicles;
b) the visibility from an aircraft cockpit for ground movement purposes is often restricted compared to that from a ground vehicle.

Therefore, when vehicles are operating in close proximity to aircraft, drivers should be extremely vigilant and comply in full with local procedures and ATC instructions.

5.1.3 Correct RTF operating technique must be observed by all users. It is important that a continuous listening watch is maintained by all vehicles on the movement area, not only in case of further instructions from the control tower, but also so that drivers can be aware of the movements, and intended movements, of other traffic, thereby reducing the risk of confliction.

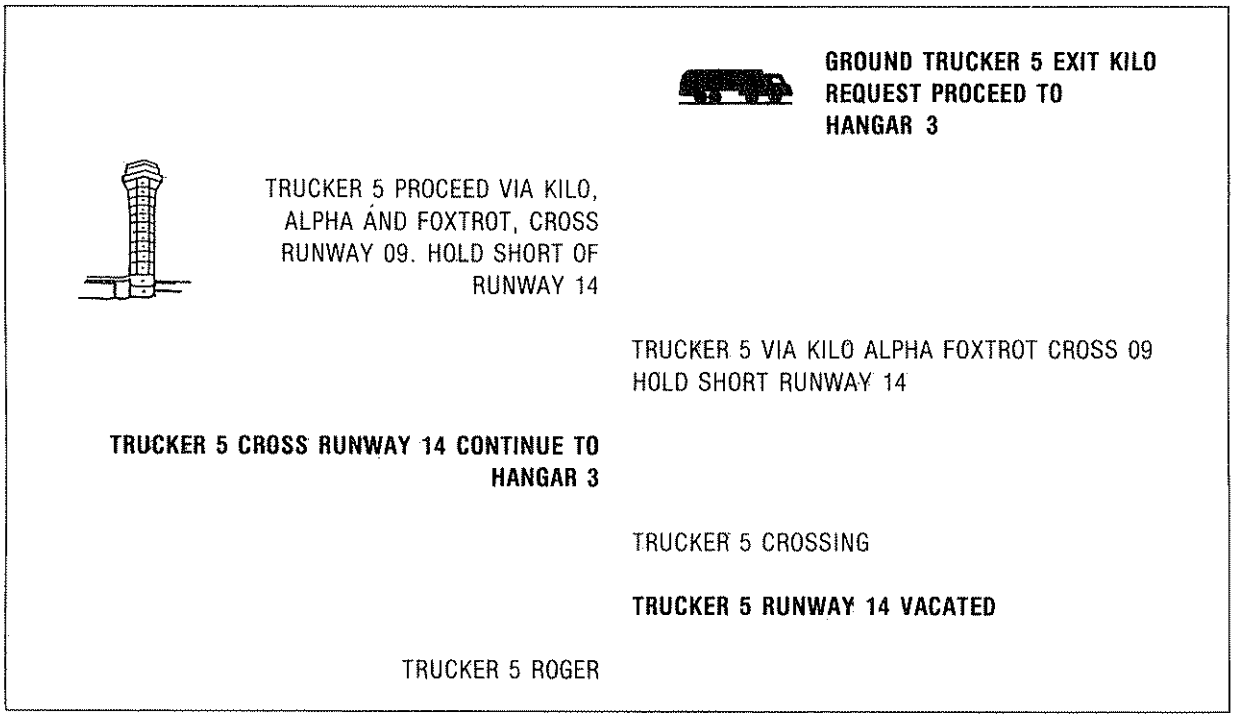
5.2 MOVEMENT INSTRUCTIONS

5.2.1 Drivers on first call should identify themselves by their vehicle call sign, state their position and intended destination (and possibly required route).

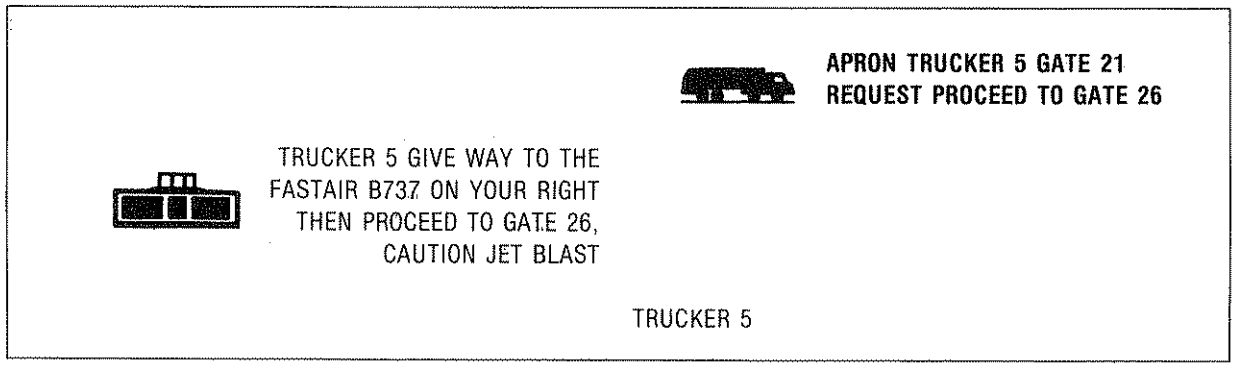


5.2.2 The controller, if too busy to give instructions, will reply "standby". This means that the driver should wait until the controller calls back. The driver shall ***not*** proceed until permission is given.

5.2.3 When there is conflicting traffic the controller may reply "HOLD POSITION". This means that the driver shall not proceed until the controller calls back with permission. All other replies should contain a clearly defined point to which the driver may proceed; this may or may not be the intended destination. If it is not the intended destination drivers must stop at this point and request permission before proceeding further.



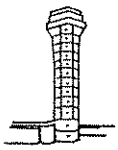
5.2.4 Permission to proceed on the apron may include such instructions regarding other traffic as are thought necessary to ensure safe operations.



Note.— The phrase "GO AHEAD" is not normally used in communications with vehicles.

5.3 CROSSING RUNWAYS

5.3.1 Drivers should note carefully the position to which they may proceed, particularly where the intended route involves crossing a runway. Some aerodromes may have procedures that will allow vehicles to proceed to a holding point on the movement area and then request runway crossing instructions. Under no circumstances shall a driver cross a runway unless ***positive permission has been given and acknowledged.*** A runway vacated report shall not be made until the vehicle (and tow) is clear of the designated runway area.



WORKER 21 PROCEED VIA INDIA AND BRAVO. HOLD SHORT OF RUNWAY 27

GROUND WORKER 21 BY THE CONTROL TOWER REQUEST PROCEED TO MAINTENANCE BASE

VIA INDIA AND BRAVO
HOLD SHORT OF RUNWAY 27 WORKER 21

WORKER 21 HOLDING SHORT RUNWAY 27

WORKER 21 STANDBY

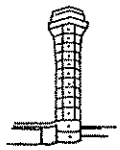
WORKER 21 CROSS RUNWAY 27 TO TAXIWAY MIKE REPORT VACATED RUNWAY

WORKER 21 CROSSING RUNWAY 27

WORKER 21 RUNWAY VACATED

WORKER 21 CONTINUE ON MIKE TO MAINTENANCE

5.3.2 If a vehicle is operating on the runway, it shall be instructed to leave the runway when it is expected that an aircraft will be landing or taking off.



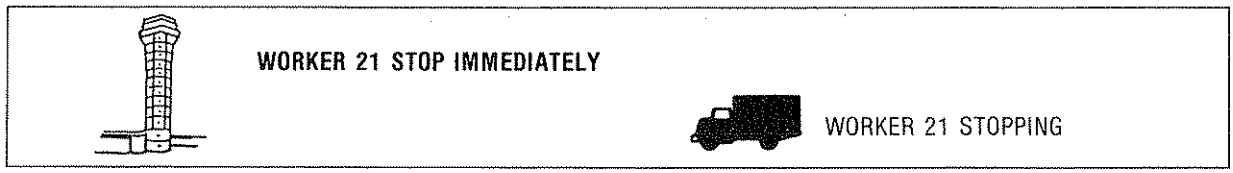
WORKER 21 VACATE RUNWAY 27 TAKE NEXT RIGHT, REPORT VACATED

WORKER 21 WILCO

WORKER 21 RUNWAY 27 VACATED

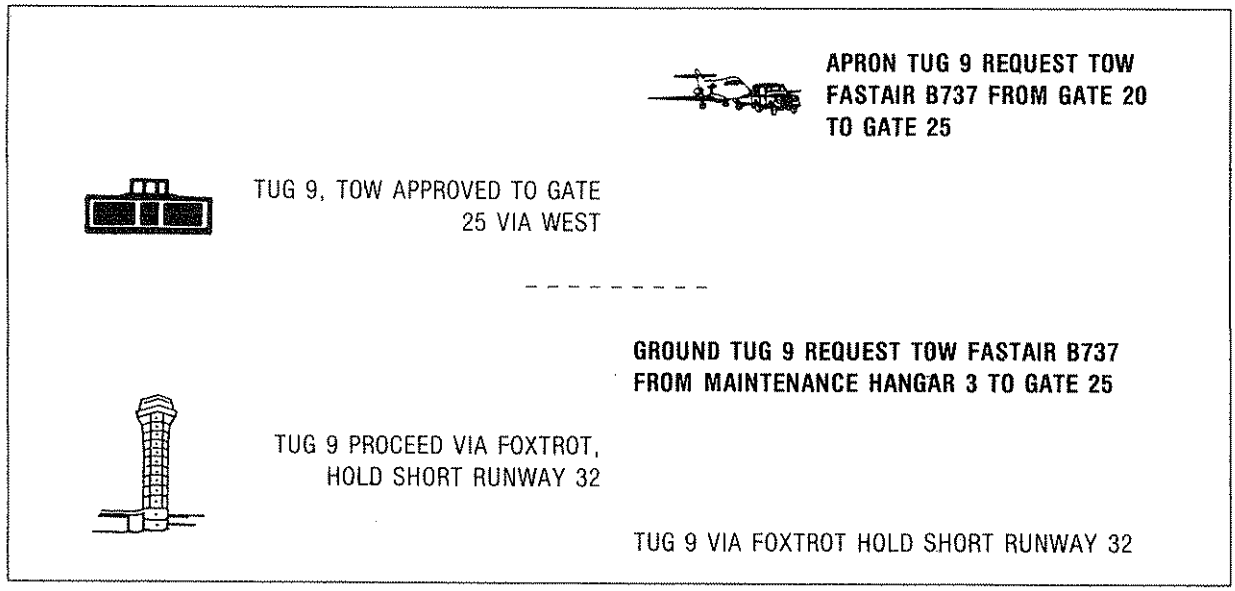
WORKER 21 ROGER

5.3.3 When a vehicle is moving on the movement area it may be necessary to inform the vehicle of a potentially dangerous situation and to instruct it to stop.



5.4 VEHICLES TOWING AIRCRAFT

Drivers of vehicles required to tow aircraft should not assume that the receiving station is aware that an aircraft is to be towed. The performance and manoeuvrability of ground vehicles is obviously considerably reduced when towing aircraft and this is taken into account when instructions to such vehicles are issued. Therefore, in order to avoid any confusion, and as an aid to identification, drivers should state the type, and where applicable the operator, of the aircraft to be towed.



Chapter 6
General Radar Phraseology

6.1 INTRODUCTION

6.1.1 This chapter contains general radar phraseology which is commonly used in communications between aircraft and all types of radar units. Phraseology which is more applicable to approach radar control or area radar control is to be found in Chapters 7 and 8 as appropriate.

6.1.2 The phrase "UNDER RADAR CONTROL" shall only be used when a radar control service is being provided. Normally, however, the call sign suffix used by the radar unit is sufficient to indicate its function.

6.1.3 In a radar environment heading information given by the pilot and heading instructions given by controllers are in degrees magnetic.

6.2 RADAR IDENTIFICATION AND VECTORING

6.2.1 Radar vectors may be given to establish the identification of an aircraft. Other means of radar identification are the use of position report information, requesting the aircraft to make turns, the use of bearing and distance information from a prominent object or radio aid, and the use of SSR.

G-AB REPORT YOUR HEADING AND LEVEL

G-AB HEADING 110 AT 2 500 FEET

G-AB FOR IDENTIFICATION TURN LEFT HEADING 080

LEFT HEADING 080 G-AB

G-AB IDENTIFIED 20 MILES NORTH WEST OF KENNINGTON CONTINUE PRESENT HEADING

G-AB

or

G-AB NOT IDENTIFIED. NOT YET WITHIN RADAR COVER. RESUME OWN NAVIGATION TO MARLOW

G-AB

6.2.2 The pilot should be advised if identification is lost, or about to be lost, and appropriate instructions given.

G-AB RADAR IDENTIFICATION LOST DUE RADAR FAILURE. CONTACT ALEXANDER CONTROL ON 128.75

128.75 G-AB

- - - - - - - - -

G-AB WILL SHORTLY LOSE RADAR IDENTIFICATION TEMPORARILY DUE FADE AREA. REMAIN THIS FREQUENCY

G-AB

6.3 RADAR VECTORING

6.3.1 Aircraft may be given specific vectors to fly in order to establish lateral separation. Unless it is self-evident, pilots should be informed of the reasons why radar vectors are necessary.

FASTAIR 345 TURN LEFT HEADING 050 FOR SEPARATION

LEFT 050 FASTAIR 345

- - - - - - - - -

FASTAIR 345 FLY HEADING 050

HEADING 050 FASTAIR 345

6.3.2 It may be necessary for ATC purposes to know the heading of an aircraft as lateral separation can often be established by instructing an aircraft to continue on its existing heading. Conflicting traffic can then be separated laterally.

FASTAIR 345 REPORT YOUR HEADING

FASTAIR 345 HEADING 050

FASTAIR 345 ROGER CONTINUE HEADING 050

FASTAIR 345 WILCO

6.3.3 When vectoring is completed, pilots shall be instructed to resume their own navigation and given position information and appropriate instructions as necessary.

FASTAIR 345 RESUME OWN NAVIGATION DIRECT WICKEN

DIRECT WICKEN
FASTAIR 345

or

FASTAIR 345 RESUME OWN NAVIGATION DIRECT WICKEN TRACK 070 DISTANCE 27 MILES

070 27 MILES DIRECT WICKEN
FASTAIR 345

or

G-CD RESUME OWN NAVIGATION POSITION 15 MILES SOUTHEAST OF KENNINGTON

G-CD WILCO

6.3.4 Occasionally an aircraft may be instructed to make a complete turn (known as an orbit or a 360 degree turn), for delaying purposes or to achieve a required spacing behind preceding traffic.

FASTAIR 345 MAKE A THREE SIXTY TURN LEFT FOR DELAYING ACTION

THREE SIXTY TURN LEFT
FASTAIR 345

- - - - - - - - -

G-AB MAKE ONE ORBIT LEFT FOR SEQUENCING

ORBIT LEFT G-AB

6.4 TRAFFIC INFORMATION AND AVOIDING ACTION

6.4.1 Whenever practicable, information regarding traffic on a conflicting path should be given in the following form:

a) relative bearing of the conflicting traffic in terms of the 12-hour clock;
b) distance from the conflicting traffic;
c) direction of flight of the conflicting traffic; and
d) level and type of aircraft or, if unknown, relative speed of the conflicting traffic, e.g. slow or fast.

6.4.2 Relative movement should be described by using the following terms as applicable:

"closing, converging, parallel, same direction, opposite direction, diverging, overtaking, crossing left to right, crossing right to left."

FASTAIR 345 UNKNOWN
TRAFFIC 1 O'CLOCK 3 MILES
OPPOSITE DIRECTION FAST
MOVING

FASTAIR 345 LOOKING

FASTAIR 345 TRAFFIC IN SIGHT
NOW PASSED CLEAR

6.4.3 Depending on the circumstances vectors may be offered by the controller or requested by the pilot. The controller should inform the pilot when the conflict no longer exists.

FASTAIR 345 UNKNOWN
TRAFFIC 10 O'CLOCK 11 MILES
CROSSING LEFT TO RIGHT
FAST MOVING

FASTAIR 345 NEGATIVE
CONTACT, REQUEST VECTORS

FASTAIR 345 TURN LEFT HEADING 050

LEFT 050 FASTAIR 345

FASTAIR 345 CLEAR OF TRAFFIC, RESUME OWN
NAVIGATION DIRECT WICKEN

DIRECT WICKEN FASTAIR 345

G-CD TRAFFIC 2 O'CLOCK 5 MILES NORTH BOUND CHEROKEE AT 2 000 FEET

G-CD LOOKING

G-CD DO YOU WANT VECTORS

G-CD NEGATIVE VECTORS, TRAFFIC IN SIGHT

G-CD

6.4.4 Avoiding action to be taken by the pilot is given when the controller considers that an imminent risk of collision will exist if action is not taken immediately.

FASTAIR 345 TURN RIGHT IMMEDIATELY HEADING 110 TO AVOID TRAFFIC 12 O'CLOCK 4 MILES

RIGHT HEADING 110
FASTAIR 345

- - - - - - - - -

FASTAIR 345 NOW CLEAR OF TRAFFIC RESUME OWN NAVIGATION DIRECT WICKEN

DIRECT WICKEN FASTAIR 345

6.5 SECONDARY SURVEILLANCE RADAR

6.5.1 The following phrases together with their meanings are instructions which may be given by controllers to pilots regarding the operation of SSR transponders.

Phrase	*Meaning*
SQUAWK (code)	Set the mode A code as instructed
CONFIRM SQUAWK	Confirm mode A code set on the transponder
RECYCLE (code)	Reselect assigned mode A code
SQUAWK IDENT	Operate the "IDENT" feature
SQUAWK MAYDAY	Select emergency code
SQUAWK STANDBY	Select the standby feature
SQUAWK CHARLIE	Select pressure altitude transmission feature

Phrase	*Meaning*
CHECK ALTIMETER SETTING AND CONFIRM LEVEL	Check pressure setting and confirm present level
STOP SQUAWK CHARLIE WRONG INDICATION	Deselect pressure altitude transmission feature because of faulty operation
*VERIFY LEVEL	Check and confirm your level
CHECK ID SQUAWK	For a mode S equipped aircraft, check the setting of the aircraft identification feature

* Used to verify the accuracy of the Mode C derived level information displayed to the controller.

6.5.2 The pilot reply to SSR instructions is usually either an acknowledgement or readback.

FASTAIR 345 ADVISE TYPE OF TRANSPONDER

FASTAIR 345 TRANSPONDER CHARLIE

FASTAIR 345 SQUAWK 6411

6411 FASTAIR 345

FASTAIR 345 CONFIRM SQUAWK

FASTAIR 345 SQUAWKING 6411

FASTAIR 345 RECYCLE 6411

FASTAIR 345 RECYCLING 6411

- - - - - - - - -

FASTAIR 345 CHECK ALTIMETER SETTING AND CONFIRM LEVEL

FASTAIR 345 ALTIMETER 1013 FLIGHT LEVEL 80

- - - - - - - - -

FASTAIR 345 CONFIRM TRANSPONDER OPERATING

FASTAIR 345 NEGATIVE, TRANSPONDER UNSERVICEABLE

6.6 RADAR ASSISTANCE TO AIRCRAFT WITH RADIOCOMMUNICATIONS FAILURE

When a controller suspects that an aircraft is able to receive but not transmit messages, the radar may be used to confirm that the pilot has received instructions.

G-DCAB REPLY NOT RECEIVED IF YOU READ TURN LEFT HEADING 040

G-DCAB TURN OBSERVED POSITION 5 MILES SOUTH OF WICKEN VOR WILL CONTINUE TO PASS INSTRUCTIONS

FASTAIR 345 REPLY NOT RECEIVED IF YOU READ SQUAWK IDENT

FASTAIR 345 IDENT OBSERVED WILL CONTINUE TO PASS INSTRUCTIONS

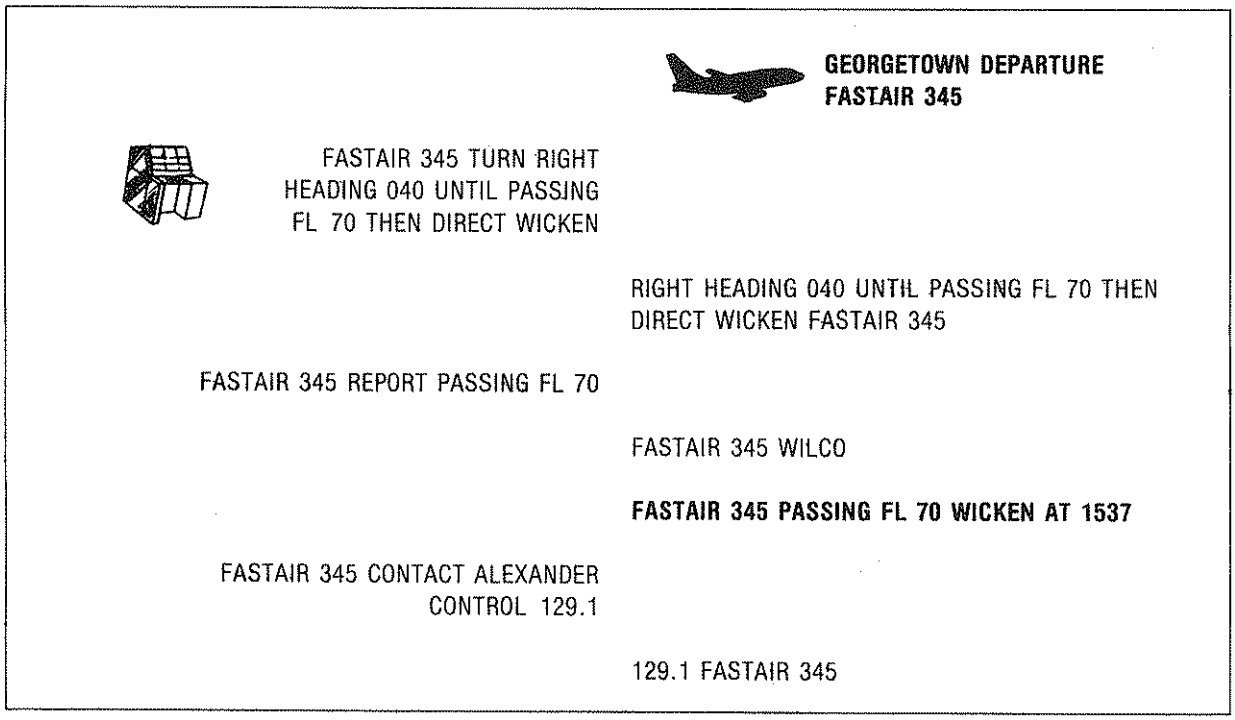
Note.— An aircraft experiencing a radiocommunications failure is expected to select SSR code 7600.

Chapter 7
Approach Control

7.1 IFR DEPARTURES

7.1.1 At many airports both arrivals and departures are handled by a single approach control unit. At busier airports departures and arrivals may be handled separately by specific arrival and departure control units.

7.1.2 In addition to the ATC route clearance, departing IFR flights may be given departure instructions in order to provide separation. These may be given in plain language or in the form of a Standard Instrument Departure (SID).



7.2 VFR DEPARTURES

7.2.1 Departing VFR flights, when handled by approach control, may be passed information on relevant known traffic in order to assist the pilots in maintaining their own separation. Pilots should report leaving the area of jurisdiction of the approach control unit.

G-CD CONTACT ALEXANDER INFORMATION 125.75 FOR FLIGHT INFORMATION

APPROACH G-CD PASSING THE ZONE BOUNDARY

125.75 G-CD

7.2.2 Special VFR flights will be cleared to leave the control zone in accordance with laid down procedures.

G-CD LEAVE CONTROL ZONE SPECIAL VFR VIA ROUTE WHISKEY, 3 000 FEET OR BELOW, REPORT WHISKEY ONE

SPECIAL VFR, ROUTE WHISKEY 3 000 FEET OR BELOW, WILL REPORT WHISKEY ONE G-CD

G-CD

7.3 IFR ARRIVALS

7.3.1 Approach control will normally advise, on initial contact, the type of approach to be expected.

GEORGETOWN APPROACH FASTAIR 345 FL 80 ESTIMATING NORTH CROSS 46 INFORMATION DELTA

FASTAIR 345 DESCEND TO 4000 FEET EXPECT ILS APPROACH RUNWAY 24 QNH 1005

DESCENDING TO 4000 FEET RUNWAY 24 QNH 1005 FASTAIR 345

- - - - - - - - -

FASTAIR 345 EXPECT ILS APPROACH RUNWAY 24 QNH 1014

RUNWAY 24 QNH 1014 REQUEST STRAIGHT-IN APPROACH ON ILS FASTAIR 345

FASTAIR 345 CLEARED STRAIGHT-IN APPROACH REPORT ESTABLISHED

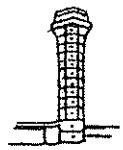
FASTAIR 345

FASTAIR 345 ESTABLISHED RUNWAY IN SIGHT

FASTAIR 345 CONTACT TOWER 118.7

118.7 FASTAIR 345

STEPHENVILLE TOWER FASTAIR 345



FASTAIR 345 REPORT OUTER MARKER

FASTAIR 345

FASTAIR 345 OUTER MARKER

FASTAIR 345 CLEARED TO LAND WIND 280 DEGREES 8 KNOTS

CLEARED TO LAND FASTAIR 345

STEPHENVILLE APPROACH G-DCAB

G-DCAB STEPHENVILLE APPROACH

G-DCAB PA 31 FROM KENNINGTON IFR FL 100 STEPHENVILLE 47 INFORMATION DELTA

G-AB CLEARED DIRECT STEPHENVILLE NDB, FL 70. ENTER CONTROLLED AIRSPACE FL 100 OR BELOW. HOLD STEPHENVILLE NDB FL70, RIGHT HAND PATTERN, EXPECTED APPROACH TIME 52.

CLEARED TO STEPHENVILLE NDB FL 70. ENTER CONTROLLED AIRSPACE FL 100 OR BELOW. HOLD STEPHENVILLE NDB FL70 RIGHT HAND G-AB.

G-AB EXPECT ILS APPROACH RUNWAY 24

RUNWAY 24 G-AB

G-AB REVISED EXPECTED APPROACH TIME 48

ROGER G-AB

G-AB DESCEND TO 3 500 FEET QNH 1015

LEAVING FL 70 FOR 3 500 FEET QNH 1015 G-AB

G-AB ROGER

G-AB CLEARED ILS APPROACH RUNWAY 24 REPORT CROSSING STEPHENVILLE NDB OUTBOUND

ILS RUNWAY 24 G-AB

G-AB STEPHENVILLE OUTBOUND

G-AB REPORT ESTABLISHED ON THE LOCALIZER

G-AB

G-AB ESTABLISHED LOCALIZER

G-AB REPORT OUTER MARKER

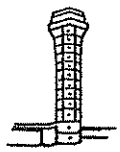
G-AB

G-AB OUTER MARKER

G-AB CONTACT TOWER 118.7

118.7 G-AB

STEPHENVILLE TOWER G-DCAB OUTER MARKER



G-AB CLEARED TO LAND WIND 260 DEGREES 22 KNOTS

CLEARED TO LAND G-AB

7.3.2 On occasion IFR aircraft do not complete the instrument approach procedure but request permission to make a visual approach. A request for a visual approach does not imply that the aircraft is flying in VMC but only that the specified requirements for a visual approach have been met and that the pilot can maintain visual reference to the terrain.

STEPHENVILLE APPROACH G-DCAB

G-DCAB STEPHENVILLE APPROACH

G-DCAB ESTIMATING STEPHENVILLE NDB AT 18 FL 70

G-AB CLEARED NDB APPROACH RUNWAY 24
DESCEND TO 3 000 FEET QNH 1011,
NO DELAY EXPECTED

NDB APPROACH RUNWAY 24 LEAVING FL 70
DESCENDING TO 3 000 FEET QNH 1011 G-AB

G-AB OVER STEPHENVILLE NDB 3 000 FEET FIELD IN SIGHT, REQUEST VISUAL APPROACH

G-AB CLEARED VISUAL APPROACH RUNWAY 24
CONTACT TOWER 118.7

118.7 G-AB

7.3.3 Normally a holding procedure should be published. However, when the pilot requires a detailed description of the holding procedure based on a facility, the following phraseology should be used.

FASTAIR 345 HOLD AT NORTH CROSS FL 100

FASTAIR 345 REQUEST HOLDING INSTRUCTIONS

FASTAIR 345 HOLD AT NORTH CROSS NDB FL 100
INBOUND TRACK 250 DEGREES LEFT HAND
PATTERN OUTBOUND TIME 1 MINUTE

FASTAIR 345 REQUEST HOLDING PROCEDURE

FASTAIR 345 HOLD ON THE 265 RADIAL OF THE
MARLOW VOR BETWEEN 25 MILES AND
30 MILES DME FL 100 INBOUND TRACK 085
RIGHT HAND PATTERN
EXPECTED APPROACH TIME 1032

Note.— It may assist controllers to know that the above information should be passed in the following order:

a) Fix
b) Level
c) Inbound track
d) Right or left turns
e) Time of leg (if necessary)

7.4 VFR ARRIVALS

Depending on the procedures in use, the pilot of an arriving VFR flight may be required to establish contact with the approach control unit and request instructions before entering its area of jurisdiction. Where there is an ATIS broadcast the pilot should acknowledge if it has been received; where no ATIS broadcast is provided the approach controller will pass the aerodrome data.

STEPHENVILLE APPROACH
G-ABCD

G-ABCD STEPHENVILLE APPROACH

G-ABCD C172 VFR FROM WALDEN TO STEPHENVILLE 2 500 FEET ZONE BOUNDARY 52 STEPHENVILLE 02 INFORMATION GOLF

G-CD CLEARED TO STEPHENVILLE VFR QNH 1012 TRAFFIC SOUTHBOUND CHEROKEE 2 000 FEET VFR ESTIMATING ZONE BOUNDARY 53

CLEARED TO STEPHENVILLE VFR QNH 1012 TRAFFIC IN SIGHT G-CD

G-CD REPORT AERODROME IN SIGHT

G-CD

G-CD AERODROME IN SIGHT

G-CD CONTACT TOWER 118.7

118.7 G-CD

Note.— The phraseology for joining the aerodrome traffic circuit is detailed in Chapter 4.

7.5 RADAR VECTORS TO FINAL APPROACH

7.5.1 Radar vectors are given to arriving flights to position them onto a pilot-interpreted final approach aid, or to a point from which a radar-assisted approach can be made, or to a point from which a visual approach can be made. In the following example an identified aircraft inbound to Georgetown is given radar vectors to the ILS.

GEORGETOWN ARRIVAL FASTAIR 345 FL 60 APPROACHING NORTH CROSS INFORMATION GOLF

FASTAIR 345 VECTORING FOR ILS APPROACH RUNWAY 27 QNH 1008

RUNWAY 27 QNH 1008 FASTAIR 345

FASTAIR 345 LEAVE NORTH CROSS HEADING 110

LEAVE NORTH CROSS HEADING 110 FASTAIR 345

FASTAIR 345 REPORT SPEED

FASTAIR 345 SPEED 260 KNOTS

FASTAIR 345 REDUCE SPEED TO 210 KNOTS

FASTAIR 345 REDUCING TO 210 KNOTS

FASTAIR 345 DESCEND TO 2 500 FEET QNH 1008 NUMBER 4 IN TRAFFIC

LEAVING FL 60 FOR 2 500 FEET QNH 1008 FASTAIR 345

FASTAIR 345 POSITION 10 MILES NORTHEAST OF GEORGETOWN

FASTAIR 345

FASTAIR 345 TURN RIGHT HEADING 180 BASE LEG, NO ATC SPEED RESTRICTIONS

HEADING 180 FASTAIR 345

FASTAIR 345 12 MILES FROM TOUCHDOWN TURN RIGHT HEADING 230 CLEARED FOR ILS RUNWAY 27 REPORT ESTABLISHED

HEADING 230 ILS RUNWAY 27 FASTAIR 345

FASTAIR 345 ESTABLISHED

FASTAIR 345 CONTACT TOWER 118.9

118.9 FASTAIR 345

Note.— The radar controller should advise the aircraft of its position at least once prior to turning onto final approach.

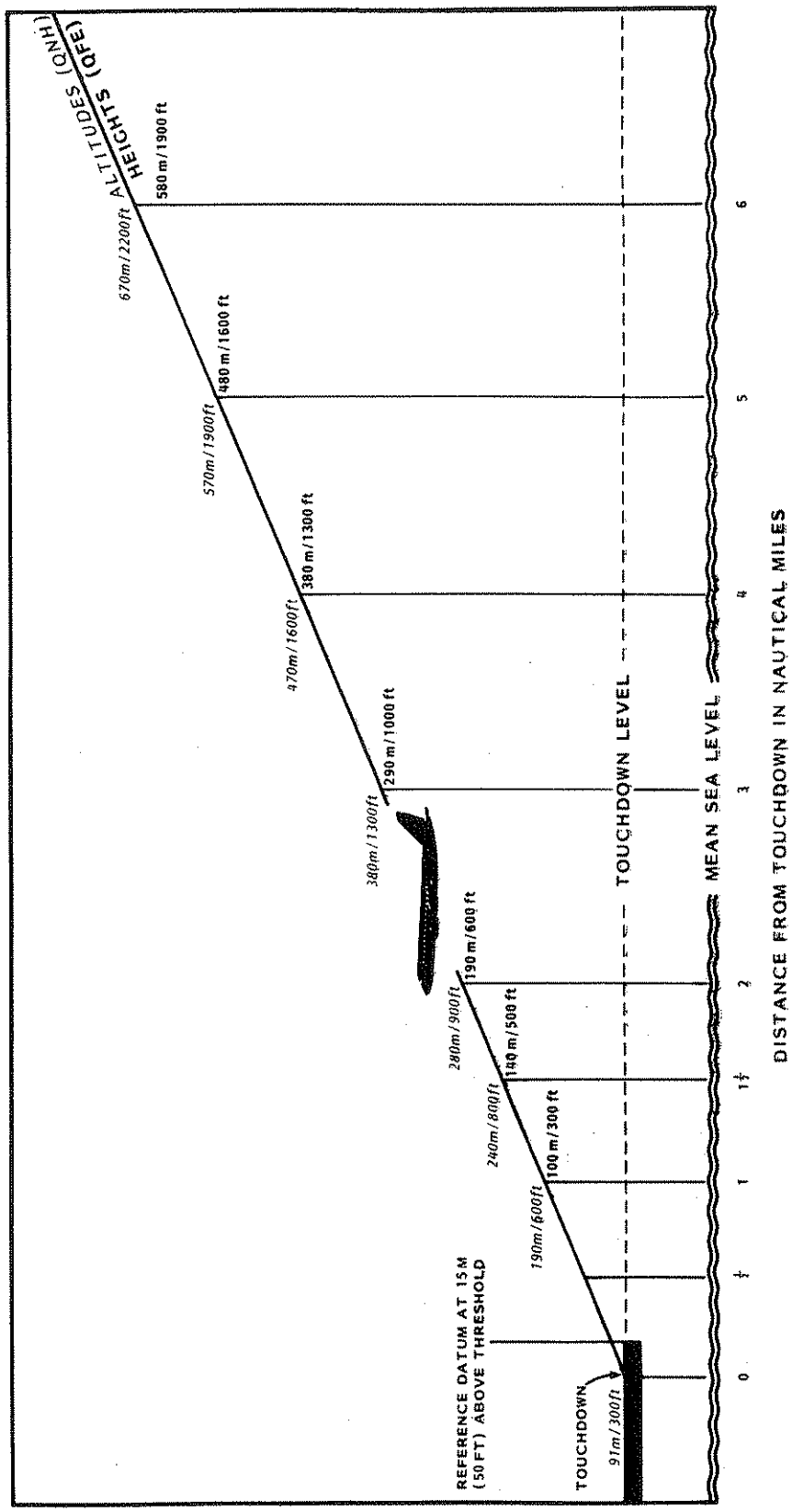


Figure 4. Surveillance radar approach: typical pre-computed levels for a three-degree glide path

7.5.2 In the example above the approach speed of the aircraft is reduced in order to ensure adequate separation from the preceding aircraft. Speed adjustment can often reduce the need for radar vectoring in establishing an approach sequence. Where speed adjustment would be insufficient to ensure correct spacing it may be necessary to issue additional vectors.

FASTAIR 345 MAKE A THREE SIXTY TURN LEFT FOR DELAYING ACTION

THREE SIXTY TURN LEFT
FASTAIR 345

or

FASTAIR 345 CONTINUE PRESENT HEADING TAKING YOU THROUGH THE LOCALIZER FOR SPACING

FASTAIR 345

7.6 SURVEILLANCE RADAR APPROACH

On a surveillance radar approach (SRA) the pilot is given distances from touchdown, advisory altitude or height information and azimuth instructions so as to be able to carry out an approach. In the following example it is presupposed that the aircraft has been vectored to intercept the final approach track at 8 NM from touchdown at 2 200 ft QNH and that the touchdown elevation is 300 ft. Advisory altitudes relate to a 3 degree glide path.

RADAR FASTAIR 345

FASTAIR 345 THIS WILL BE A SURVEILLANCE RADAR APPROACH RUNWAY 27 TERMINATING AT ½ MILE FROM TOUCHDOWN OBSTACLE CLEARANCE ALTITUDE 400 FEET MAINTAIN 2 200 FEET CHECK YOUR MINIMA

2 200 FEET RUNWAY 27 FASTAIR 345

FASTAIR 345 TURN RIGHT HEADING 275 FINAL APPROACH REPORT RUNWAY IN SIGHT
(see Note 3)

HEADING 275 FASTAIR 345

FASTAIR 345 APPROACHING 6 MILES FROM TOUCHDOWN COMMENCE DESCENT NOW TO MAINTAIN A 3 DEGREE GLIDE PATH

FASTAIR 345 DESCENDING

FASTAIR 345 CHECK WHEELS DOWN AND LOCKED

FASTAIR 345

FASTAIR 345 5½ MILES FROM TOUCHDOWN ALTITUDE SHOULD BE 2 000 FEET

FASTAIR 345

FASTAIR 345 GOING RIGHT OF TRACK TURN LEFT HEADING 270

HEADING 270 FASTAIR 345

FASTAIR 345 5 MILES FROM TOUCHDOWN ALTITUDE SHOULD BE 1 900 FEET

FASTAIR 345

FASTAIR 345 CLOSING SLOWLY FROM THE RIGHT 4½ MILES FROM TOUCHDOWN ALTITUDE SHOULD BE 1 700 FEET

FASTAIR 345

FASTAIR 345 CLEARED TO LAND WIND CALM

CLEARED TO LAND FASTAIR 345

FASTAIR 345 4 MILES FROM TOUCHDOWN ALTITUDE SHOULD BE 1 600 FEET DO NOT ACKNOWLEDGE FURTHER TRANSMISSIONS

3½ MILES FROM TOUCHDOWN ALTITUDE SHOULD BE 1 400 FEET

ON TRACK TURN RIGHT HEADING 272 3 MILES FROM TOUCHDOWN ALTITUDE SHOULD BE 1 300 FEET

2½ MILES FROM TOUCHDOWN ALTITUDE SHOULD BE 1 100 FEET

2 MILES FROM TOUCHDOWN ALTITUDE SHOULD BE 900 FEET

ON TRACK HEADING IS GOOD 1½ MILES FROM TOUCHDOWN ALTITUDE SHOULD BE 800 FEET

ON TRACK 1 MILE FROM TOUCHDOWN APPROACH COMPLETED OUT

Note 1.— Where an SRA procedure terminates at 2 miles from touchdown, the distance from touchdown and advisory altitude checks are normally passed at 1 mile intervals. Where the SRA terminates at less than 2 miles from touchdown, such checks are given each half mile.

Note 2.— Aircraft replies are expected to all transmissions. However, when the SRA terminates at less than 2 miles from touchdown, the controller's transmissions should not be interrupted for intervals of more than 5 seconds and aircraft replies are not expected once the aircraft is within 4 miles from touchdown.

Note 3.— When the pilot reports runway in sight during an SRA and there is reasonable assurance that a landing will be effected, the SRA may be terminated.

7.7 PRECISION RADAR APPROACH

7.7.1 In a precision radar approach the controller, in addition to providing heading instructions during the continuous talk-down, provides information on altitudes relative to the glide slope, together with instructions on corrective action in the event that the aircraft is too high or too low. In the following example based on a 3-degree glide slope to runway 27 at Georgetown, it is presupposed that the aircraft has been radar vectored into precision approach radar (PAR) coverage and has been identified to the PAR controller by radar transfer.

FASTAIR 345 GEORGETOWN PRECISION REPORT HEADING AND ALTITUDE

HEADING 240 AT 3 000 FEET FASTAIR 345

FASTAIR 345 POSITION 6 MILES EAST OF GEORGETOWN TURN RIGHT HEADING 260 DESCEND TO 2 500 FEET QNH 1014

HEADING 260 DESCENDING TO 2 500 QNH 1014 FASTAIR 345

FASTAIR 345 CLOSING FROM THE RIGHT TURN RIGHT HEADING 270

RIGHT HEADING 270 FASTAIR 345

FASTAIR 345 APPROACHING GLIDE PATH HEADING IS GOOD

FASTAIR 345

FASTAIR 345 HOW DO YOU READ

READ YOU 5 FASTAIR 345

FASTAIR 345 DO NOT ACKNOWLEDGE FURTHER TRANSMISSIONS, ON TRACK APPROACHING GLIDE PATH . . . CHECK YOUR MINIMA . . . COMMENCE DESCENT NOW AT 500 FEET PER MINUTE . . . I SAY AGAIN 500 FEET PER MINUTE . . . CHECK WHEELS DOWN AND LOCKED . . . ON GLIDE PATH 5 MILES FROM TOUCHDOWN . . . TURN RIGHT 5 DEGREES NEW HEADING 275 I SAY AGAIN 275 . . . 4 MILES FROM TOUCHDOWN SLIGHTLY BELOW GLIDE PATH . . . BELOW GLIDE PATH 100 FEET ADJUST RATE OF DESCENT . . . 50 FEET BELOW GLIDE PATH TURN LEFT HEADING 270 3 MILES FROM TOUCHDOWN . . . COMING BACK TO THE GLIDE PATH . . . ON GLIDE PATH 2½ MILES FROM TOUCHDOWN . . . FASTAIR 345 CLEARED TO LAND . . . ON GLIDE PATH . . . HEADING 270 IS GOOD SLIGHTLY ABOVE GLIDE PATH . . . 2 MILES FROM TOUCHDOWN . . . COMING BACK TO THE GLIDE PATH . . . ON GLIDE PATH 1¾ MILES FROM TOUCHDOWN . . . TURN RIGHT 2 DEGREES NEW HEADING 272 . . . 1½ MILES FROM TOUCHDOWN . . . ON GLIDE PATH 1¼ MILES FROM TOUCHDOWN RATE OF DESCENT IS GOOD ON GLIDE PATH 1 MILE FROM TOUCHDOWN . . . ¾ OF A MILE FROM TOUCHDOWN ON GLIDE PATH . . . ½ MILE FROM TOUCHDOWN ON GLIDE PATH . . . ¼ MILE FROM TOUCHDOWN APPROACH COMPLETED OUT

7.7.2 When the radar returns on the elevation element of the PAR indicate that the pilot may be making a missed approach, the radar controller shall, when there is sufficient time to obtain a reply from the pilot, pass the aircraft's height above the glide path and ask the pilot if a missed approach is intended.

. . . SLIGHTLY ABOVE GLIDE PATH 4 MILES FROM TOUCHDOWN . . . STILL ABOVE GLIDE PATH 3½ MILES FROM TOUCHDOWN — GOING FURTHER ABOVE GLIDE PATH 3 MILES FROM TOUCHDOWN ARE YOU GOING AROUND OVER

7.7.3 In similar circumstances, but when there is not sufficient time to obtain a reply from the pilot, the controller should continue the precision approach emphasizing the aircraft's displacement. If it becomes apparent that the pilot is making a missed approach, either before or after the normal termination point, the radar controller shall pass missed approach instructions.

Chapter 8
Area Control

8.1 AREA CONTROL UNITS

8.1.1 Area control units vary in size from simple one person procedural units to large sophisticated centres which may contain departure, arrival and terminal control sections equipped with radar. RTF phraseology given below would be suitable for any of the above air traffic services.

8.1.2 Much of the phraseology used in area control is of a general nature and is detailed in Chapter 3. However, many instructions used in area control (particularly where radar is not available) are related to specific conditions in order to maintain aircraft separation.

8.1.3 The following examples provide a cross-section of phraseology used in area control. They may be varied, or added to, by combining their component parts according to the requirements of the prevailing traffic situation.

FASTAIR 345 REQUEST DESCENT

FASTAIR 345 MAINTAIN FL 350
EXPECT DESCENT AFTER
KATEWAY

MAINTAINING FL 350 FASTAIR 345

- - - - - - - - -

FASTAIR 345 MAINTAIN FL 350 UNTIL FURTHER ADVISED

MAINTAINING FL 350 FASTAIR 345

- - - - - - - - -

FASTAIR 345 DESCEND TO FL 130 CROSS WICKEN FL 170 OR ABOVE

LEAVING FL 280 FOR FL 130 CROSS WICKEN
FL170 OR ABOVE FASTAIR 345

- - - - - - - - -

FASTAIR 345 ARE YOU ABLE TO CROSS WICKEN AT 52

FASTAIR 345 AFFIRM

FASTAIR 345 CROSS WICKEN AT 52 OR LATER

CROSS WICKEN AT 52 OR LATER FASTAIR 345

- - - - - - - - -

FASTAIR 345 LANDING DELAYS AT GEORGETOWN CAN YOU LOSE TIME EN ROUTE

FASTAIR 345 AFFIRM

- - - - - - - - -

FASTAIR 345 ARE YOU ABLE TO LOSE 10 MINUTES

FASTAIR 345 NEGATIVE ONLY 8 MINUTES

FASTAIR 345 REPORT REVISED ESTIMATE FOR NORTH CROSS

FASTAIR 345 NORTH CROSS 1246

8.2 POSITION INFORMATION

In order to assist in establishing separation, pilots may be instructed to provide additional position report information as well as routine reports.

FASTAIR 345 REPORT WICKEN

FASTAIR 345

FASTAIR 345 WICKEN 47 FL 350 MARLOW 55

FASTAIR 345 ROGER

- - - - - - - - -

FASTAIR 345 REPORT 25 MILES WICKEN DME

FASTAIR 345

- - - - - - - - -

FASTAIR 345 REPORT DISTANCE FROM STEPHENVILLE

FASTAIR 345 37 MILES

- - - - - - - - -

FASTAIR 345 REPORT PASSING 270 RADIAL WICKEN VOR

FASTAIR 345

- - - - - - - - -

FASTAIR 345 REPORT 25 MILES DME RADIAL 270 WICKEN VOR

FASTAIR 345

8.3 LEVEL INFORMATION

8.3.1 Level information consists of climb and descent clearances or instructions and reports of leaving, reaching and passing levels as detailed in 3.2. Unless advice is received to the contrary, the aircraft is expected to vacate the level as soon as practicable.

FASTAIR 345 DESCEND WHEN READY TO FL 180

DESCEND TO FL 180 WILL REPORT LEAVING FL 350 FASTAIR 345

- - - - - - - - -

FASTAIR 345 DESCEND TO FL 180, REPORT PASSING EVEN LEVELS

LEAVING FL 350 FOR FL 180, FASTAIR 345

- - - - - - - - -

FASTAIR 345 CLIMB TO FL 220 REPORT PASSING FL 100

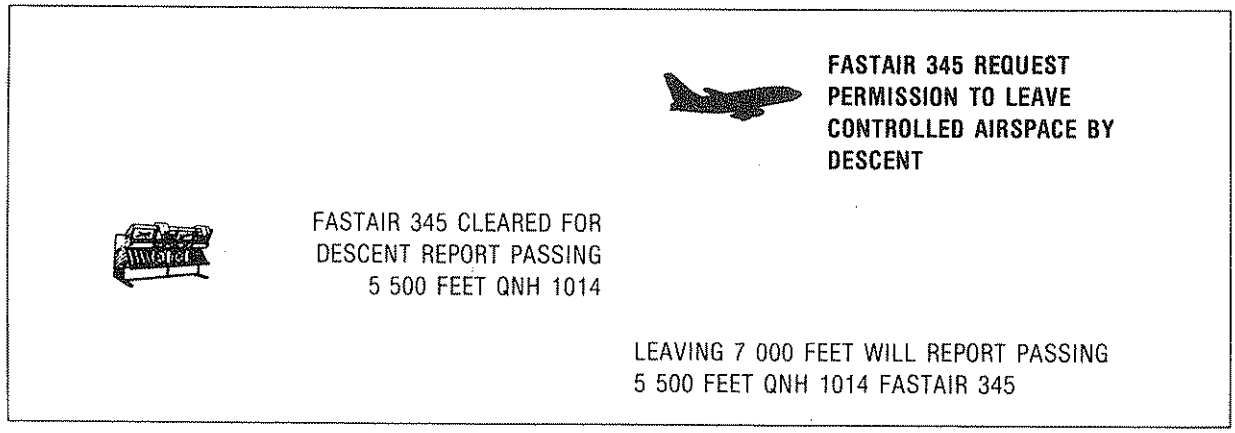
CLIMBING TO FL 220 FASTAIR 345

- - - - - - - - -

FASTAIR 345 DESCEND IMMEDIATELY TO FL 200 DUE TRAFFIC

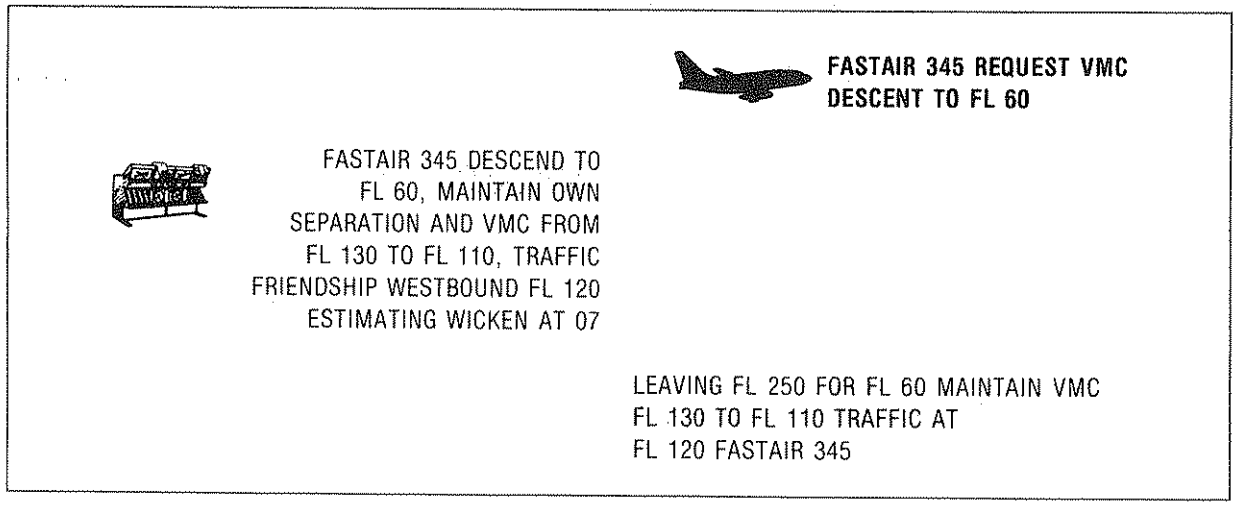
LEAVING FL 220 FOR FL 200 FASTAIR 345

8.3.2 An aircraft may request permission to leave controlled airspace by descent.



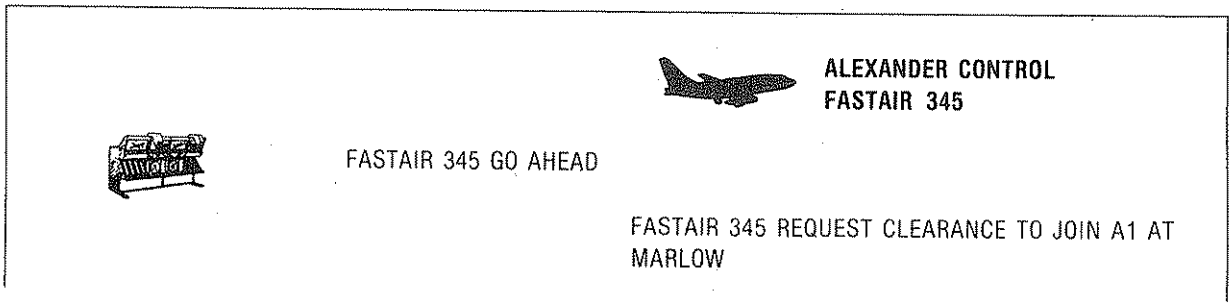
Note.— In the above example the base of the airway is 5 500 feet.

8.3.3 An aircraft may request a clearance to climb or descend maintaining own separation while in VMC. The clearance shall include information on essential traffic.



8.4 FLIGHTS JOINING AIRWAYS

8.4.1 Aircraft requiring to join an airway should make their request to the appropriate ATS unit. Where no flight plan has been filed, the request should include the filing of an airborne flight plan (see 3.4). Where a flight plan has already been filed an abbreviated call may be made.



FASTAIR 345 CLEARED TO GEORGETOWN FLIGHT PLANNED ROUTE FL 240. JOIN A1 AT MARLOW AT FL 240.

CLEARED TO GEORGETOWN VIA MARLOW FLIGHT PLANNED ROUTE FL 240. TO ENTER CONTROLLED AIRSPACE FL 240 FASTAIR 345

FASTAIR 345 CORRECT

8.4.2 It may be that because of the prevailing traffic situation a clearance cannot be issued immediately.

FASTAIR 345 REMAIN OUTSIDE CONTROLLED AIRSPACE EXPECT CLEARANCE AT 55

FASTAIR 345 REMAINING OUTSIDE

8.4.3 In the event that the requested flight level is already occupied, the controller should offer an alternative.

FASTAIR 345 REQUEST FL 240

FASTAIR 345 FL 240 NOT AVAILABLE DUE TRAFFIC. ALTERNATIVE IS FL 220. ADVISE.

FASTAIR 345 ACCEPT FL 220

8.5 FLIGHTS LEAVING AIRWAYS

Flights leaving controlled airspace will normally be given a specific point at which to leave, together with any other relevant instructions necessary to ensure separation.

FASTAIR 345 CLEARED TO LEAVE CONTROL AREA VIA MARLOW. MAINTAIN FL 230 WHILE IN CONTROL AREA

CLEARED TO LEAVE CONTROL AREA VIA MARLOW. MAINTAIN FL 230 WHILE IN CONTROL AREA. FASTAIR 345

8.6 FLIGHTS CROSSING AIRWAYS

An IFR aircraft requiring to cross an airway should make its request to the appropriate ATS unit.

G-DCAB ALEXANDER CONTROL

ALEXANDER CONTROL G-DCAB

G-DCAB PA31 20 MILES NORTH OF WICKEN FL 80 WICKEN AT 33 REQUEST CLEARANCE TO CROSS AIRWAY A1 AT WICKEN

G-AB IS CLEARED TO CROSS A1 AT WICKEN FL 80

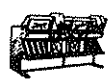
CLEARED TO CROSS A1 AT WICKEN FL 80 G-AB

G-AB REPORT WICKEN

G-AB

8.7 FLIGHTS HOLDING EN ROUTE

8.7.1 When an aircraft is required to hold en route, the controller will issue holding instructions and a time at which onward clearance can be expected. Where it is not self-evident, the reason for the delay should also be given.



FASTAIR 345 HOLD AT WICKEN FL 220, EXPECT FURTHER CLEARANCE AT 02, LANDING DELAYS AT GEORGETOWN 20 MINUTES

HOLD AT WICKEN FL 220
FASTAIR 345

- - - - - - - - -

FASTAIR 345 HOLD AT NORTH CROSS FL 100

HOLD AT NORTH CROSS FL 100. WHAT IS THE DELAY, FASTAIR 345

FASTAIR 345 EXPECTED DELAY 10 MINUTES

FASTAIR 345 ROGER

8.7.2 In the case of *en-route* holding an aircraft will normally hold in a standard pattern based on the track of the ATS route. For an extended delay a pilot may request or receive an extended holding pattern.

FASTAIR 345 HOLD BETWEEN KENNINGTON AND MARLOW FL 100 TURNS RIGHT EXPECT FURTHER CLEARANCE AT 1105

FASTAIR 345 REQUEST EXTENDED HOLDING

HOLD BETWEEN KENNINGTON AND MARLOW FL 100 RIGHT TURNS FASTAIR 345

8.8 RADAR

8.8.1 The phraseology used in area radar control is usually a combination of the phraseology detailed in the earlier parts of this chapter, combined with the basic radar phraseology in Chapter 6.

8.8.2 Where it is not self-evident pilots will normally be informed by the controller when they are under radar control.

FASTAIR 345 UNDER RADAR CONTROL

FASTAIR 345

FASTAIR 345 RADAR CONTROL TERMINATED

FASTAIR 345

8.9 OCEANIC CONTROL

8.9.1 While radiotelephony phraseology used for oceanic control purposes is basically the same as that contained in this manual, it is recommended that reference should be made to the appropriate regional procedures for precise guidance.

8.9.2 Oceanic control usually involves communication on HF frequencies. Thus the direct pilot-controller relationship which occurs on VHF air-ground channels is replaced by communication through a communications officer or air-ground operator. Consequently, messages from aircraft on oceanic routes have to be passed by the air-ground operator to the controller and replies must also be routed in this manner. Pilots and controllers in oceanic airspace, when exchanging control information and instructions, should bear in mind the inevitable delay factor which occurs when communications are conducted through a third party.

Chapter 9
Distress and Urgency Procedures and Communications Failure Procedures

9.1 INTRODUCTION

9.1.1 Distress and urgency communication procedures are fully detailed in Annex 10, Volume II, Chapter 5.

9.1.2 Distress and urgency conditions are defined as:

a) *Distress:* a condition of being threatened by serious and/or imminent danger and of requiring immediate assistance.
b) *Urgency:* a condition concerning the safety of an aircraft or other vehicle, or of some person on board or within sight, but which does not require immediate assistance.

9.1.3 The word "MAYDAY" spoken at the start identifies a distress message, and the words "PAN PAN" spoken at the start identifies an urgency message. The words "MAYDAY" or "PAN PAN", as appropriate, should preferably be spoken three times at the start of the initial distress or urgency call.

9.1.4 Distress messages have priority over all other transmissions, and urgency messages have priority over all transmissions except distress messages.

9.1.5 Pilots making distress or urgency calls should attempt to speak slowly and clearly so as to avoid any unnecessary repetition.

9.1.6 Pilots should adapt the phraseology procedures in this chapter to their specific needs and to the time available.

9.1.7 Pilots should seek assistance whenever there is any doubt as to the safety of a flight. In this way the risk of a more serious situation developing can often be avoided.

9.1.8 A distress or urgency call should normally be made on the frequency in use at the time. Distress communications should be continued on this frequency unless it is considered that better assistance can be provided by changing to another frequency. The frequency 121.5 MHz has been designated the international aeronautical emergency frequency although not all aeronautical stations maintain a continuous watch on that frequency. These provisions are not intended to prevent the use of any other communications frequency if considered necessary or desirable, including the maritime mobile service RTF calling frequencies.

9.1.9 If the ground station called by the aircraft in distress or urgency does not reply, then any other ground station or aircraft shall reply and give whatever assistance possible.

9.1.10 A station replying (or originating a reply) to an aircraft in distress or urgency should provide only such advice, information and instructions as is necessary to assist the pilot. Superfluous transmissions may be distracting at a time when the pilot's hands are already full.

9.1.11 Aeronautical stations shall refrain from further use of a frequency on which distress or urgency traffic is heard, unless directly involved in rendering assistance or until after the emergency traffic has been terminated.

9.1.12 When a distress message has been intercepted which apparently receives no acknowledgement, the aircraft intercepting the distress message should, if time and circumstances seem appropriate, acknowledge the message and then broadcast it.

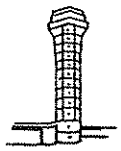
9.2 DISTRESS MESSAGES

9.2.1 Aircraft in distress

9.2.1.1 A distress message should contain as many as possible of the following elements, if possible in the order shown:

a) name of the station addressed;
b) identification of the aircraft;
c) nature of the distress condition;
d) intention of the person in command;
e) position, level and heading of the aircraft;
f) any other useful information.

MAYDAY MAYDAY MAYDAY
G-ABCD ENGINE ON FIRE
MAKING FORCED LANDING
20 MILES SOUTH OF WALDEN.
PASSING 3 000 FEET
HEADING 360



G-ABCD WALDEN TOWER ROGER
MAYDAY

- - - - - - - - -

MAYDAY MAYDAY MAYDAY WALDEN TOWER
G-ABCD ENGINE FAILED. WILL ATTEMPT TO LAND
YOUR FIELD, 5 MILES SOUTH, 4 000 FEET
HEADING 360

G-ABCD WALDEN TOWER ROGER MAYDAY CLEARED
STRAIGHT-IN RUNWAY 35 WIND 360 DEGREES
10 KNOTS QNH 1008, YOU ARE NUMBER ONE

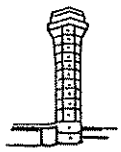
CLEARED STRAIGHT-IN RUNWAY 35
QNH 1008 G-CD

9.2.1.2 These provisions are not intended to prevent the aircraft using any means at its disposal to attract attention and make known its condition (including the activation of the appropriate SSR code, 7700), nor any station taking any means at its disposal to assist an aircraft in distress. Variation on the elements listed under 9.2.1.1 is permissible when the transmitting station is not itself in distress, provided that such circumstance is clearly stated.

9.2.1.3 The station addressed will normally be that station communicating with the aircraft or the station in whose area of responsibility the aircraft is operating.

9.2.2 Imposition of silence

9.2.2.1 An aircraft in distress or a station in control of distress traffic may impose silence, either on all aircraft on the frequency or on a particular aircraft which interferes with the distress traffic. Aircraft so requested will maintain radio silence until advised that the distress traffic has ended.



ALL STATIONS WALDEN TOWER
STOP TRANSMITTING. MAYDAY

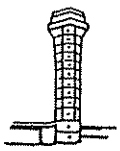
or

FASTAIR 345 STOP
TRANSMITTING. MAYDAY

9.2.3 Termination of distress and silence

9.2.3.1 When an aircraft is no longer in distress, it shall transmit a message cancelling the distress condition.

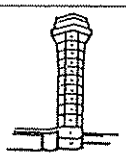
WALDEN TOWER G-CD
CANCEL DISTRESS. ENGINE
SERVICEABLE, RUNWAY IN
SIGHT. REQUEST LANDING



G-CD CLEARED TO LAND
RUNWAY 35

RUNWAY 35 CLEARED TO LAND G-CD

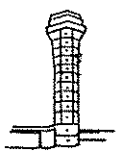
9.2.3.2 When the ground station controlling the distress traffic is aware that the aircraft is no longer in distress it shall terminate the distress communication and silence condition.



ALL STATIONS WALDEN TOWER
DISTRESS TRAFFIC ENDED

9.3 URGENCY MESSAGES

9.3.1 An urgency message should contain as many of the elements detailed in 9.2.1.1 as are required by the circumstances. The call should be made on the frequency in use at the time, and the station addressed will normally be that station communicating with the aircraft, or in whose area of responsibility the aircraft is operating. All other stations should take care not to interfere with the transmission of urgency traffic.



PAN PAN, PAN PAN, PAN PAN WALDEN TOWER G-ABCD C172 2 000 FEET HEADING 190 ABOVE CLOUD UNSURE OF MY POSITION REQUEST HEADING TO WALDEN

G-ABCD FLY HEADING 160

HEADING 160 G-ABCD

- - - - - - - - -

PAN PAN, PAN PAN, PAN PAN WALDEN TOWER G-ABCD 10 MILES NORTH AT 2 000 FEET. PASSENGER WITH SUSPECTED HEART ATTACK REQUEST PRIORITY LANDING

G-CD WALDEN TOWER NUMBER 1 STRAIGHT-IN RUNWAY 17 WIND 180 DEGREES 10 KNOTS QNH 1008 AMBULANCE REQUESTED

RUNWAY 17 QNH 1008 G-CD

- - - - - - - - -

PAN PAN, PAN PAN, PAN PAN WALDEN TOWER G-BBCC INTERCEPTED URGENCY CALL FROM G-ABCD PASSENGER WITH SUSPECTED HEART ATTACK REQUESTING PRIORITY LANDING WALDEN. HIS POSITION 10 MILES NORTH AT 2 000 FEET

G-BBCC ROGER

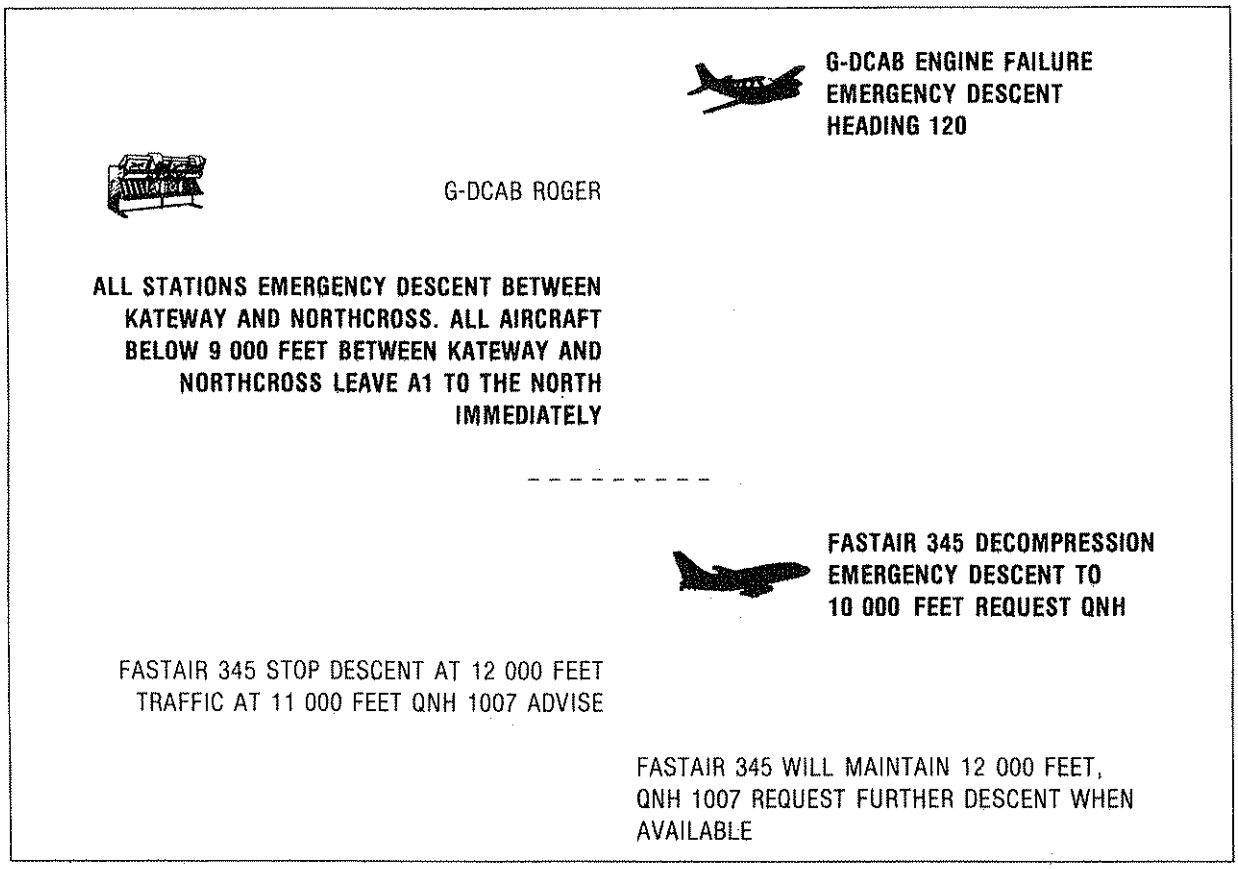
G-ABCD WALDEN TOWER RUNWAY 35 WIND 340 DEGREES 10 KNOTS QNH 1008 TRAFFIC NIL

(if G-ABCD does not acknowledge this message G-BBCC will relay)

9.3.2 In the first example above further questions might be asked of the pilot in order to assist in ascertaining the position of the aircraft.

9.4 EMERGENCY DESCENT

9.4.1 When an aircraft announces that it is making an emergency descent, the controller will take all possible action to safeguard other aircraft.



9.4.2 The general broadcast to warn aircraft of an emergency descent should be followed, as necessary, by specific instructions.

9.5 AIRCRAFT COMMUNICATIONS FAILURE

Note.— General rules which are applicable in the event of communications failure are contained in Annex 10, Volume II.

9.5.1 When an aircraft station fails to establish contact with the aeronautical station on the designated frequency, it shall attempt to establish contact on another frequency appropriate to the route. If this attempt fails, the aircraft shall attempt to establish communication with other aircraft or other aeronautical stations on frequencies appropriate to the route.

9.5.2 If the attempts specified under 9.5.1 fail the aircraft shall transmit its message twice on the designated frequency(ies), preceded by the phrase "TRANSMITTING BLIND" and, if necessary, include the addressee(s) for which the message is intended.

9.5.3 When an aircraft is unable to establish communication due to receiver failure, it shall transmit reports at the scheduled times, or positions, on the frequency in use, preceded by the phrase "TRANSMITTING BLIND DUE TO RECEIVER FAILURE". The aircraft shall transmit the intended message, following this by a complete repetition. During this procedure, the aircraft shall also advise the time of its next intended transmission.

9.5.4 An aircraft which is provided with air traffic control or advisory service shall, in addition to complying with 9.5.3, transmit information regarding the intention of the pilot-in-command with respect to the continuation of the flight of the aircraft.

9.5.5 When an aircraft is unable to establish communication due to airborne equipment failure it shall, if so equipped, select the appropriate SSR code to indicate radio failure.

9.5.6 When an aeronautical station has been unable to establish contact with an aircraft after calls on the frequencies on which the aircraft is believed to be listening, it shall:

a) request other aeronautical stations to render assistance by calling the aircraft and relaying traffic, if necessary;
b) request aircraft on the route to attempt to establish communication with the aircraft and relay messages, if necessary.

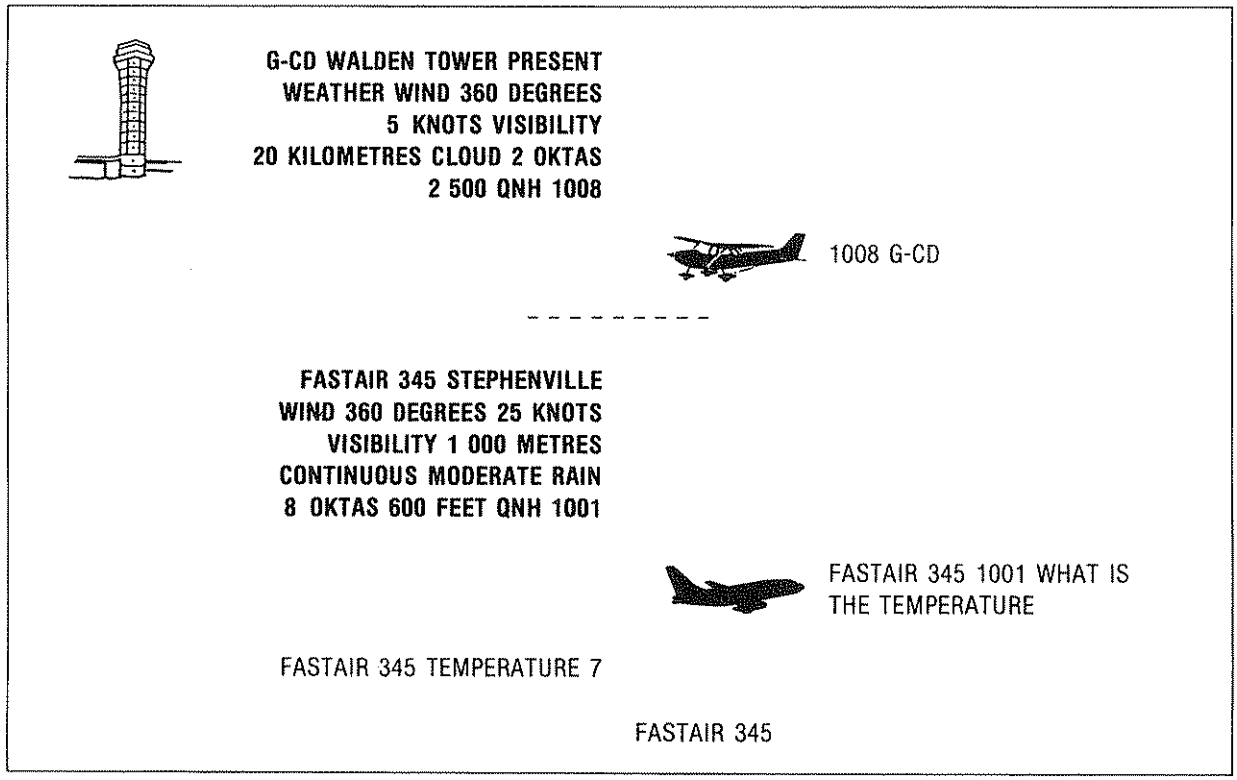
9.5.7 If the attempts specified in 9.5.6 fail, the aeronautical station should transmit messages addressed to the aircraft, other than messages containing air traffic control clearances, by blind transmission on the frequency(ies) on which the aircraft is believed to be listening.

9.5.8 Blind transmission of air traffic control clearances shall not be made to aircraft, except at the specific request of the originator.

Chapter 10
Transmission of Meteorological and Other Aerodrome Information

10.1 INTRODUCTION

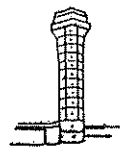
Meteorological information in the form of reports, forecasts or warnings is made available to pilots using the aeronautical mobile service either by broadcast (e.g. VOLMET) or by means of specific transmissions from ground personnel to pilots. Standard meteorological abbreviations and terms should be used and the information should be transmitted slowly and enunciated clearly in order that the recipient may record such data as are necessary.



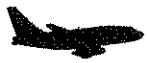
10.2 RUNWAY VISUAL RANGE (RVR)

10.2.1 When transmitting the runway visual range the words "RUNWAY VISUAL RANGE" or the abbreviation RVR should be used followed by the runway number, the positions for multiple readings if necessary, and the RVR value(s).

10.2.2 Where multiple RVR observations are available, they are always transmitted commencing with the reading for the touchdown zone.



FASTAIR 345 RVR RUNWAY 27
TOUCHDOWN 650 METRES
MID-POINT 700 METRES
STOP END 600 METRES



FASTAIR 345

10.3 RUNWAY SURFACE CONDITIONS

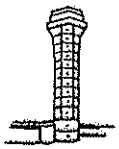
10.3.1 Procedures for the measurement and reporting of runway surface conditions are detailed in Annex 14.

10.3.2 Reports from pilots may be re-transmitted by a controller when it is felt that the information may prove useful to other aircraft:

"BRAKING ACTION REPORTED BY (aircraft type) AT (time) (assessment of braking action)".

10.3.3 Whenever a controller deems it necessary, information that water is on a runway shall be passed to aircraft using the terms "DAMP", "WET", "WATER PATCHES " or "FLOODED" according to the amount of water present.

10.3.4 Other runway surface conditions which may be of concern to a pilot shall be transmitted at an appropriate time.



G-CD WALDEN GRASS MOWING
IN PROGRESS NEAR CENTRE OF
AERODROME

G-CD MOWERS IN SIGHT

FASTAIR 345 THRESHOLD
RUNWAY 27 DISPLACED
500 FEET DUE BROKEN
SURFACE

FASTAIR 345

FASTAIR 345 TAXIWAY GOLF CLOSED DUE
MAINTENANCE USE ALPHA TO VACATE

FASTAIR 345

Chapter 11
Miscellaneous Flight Handling

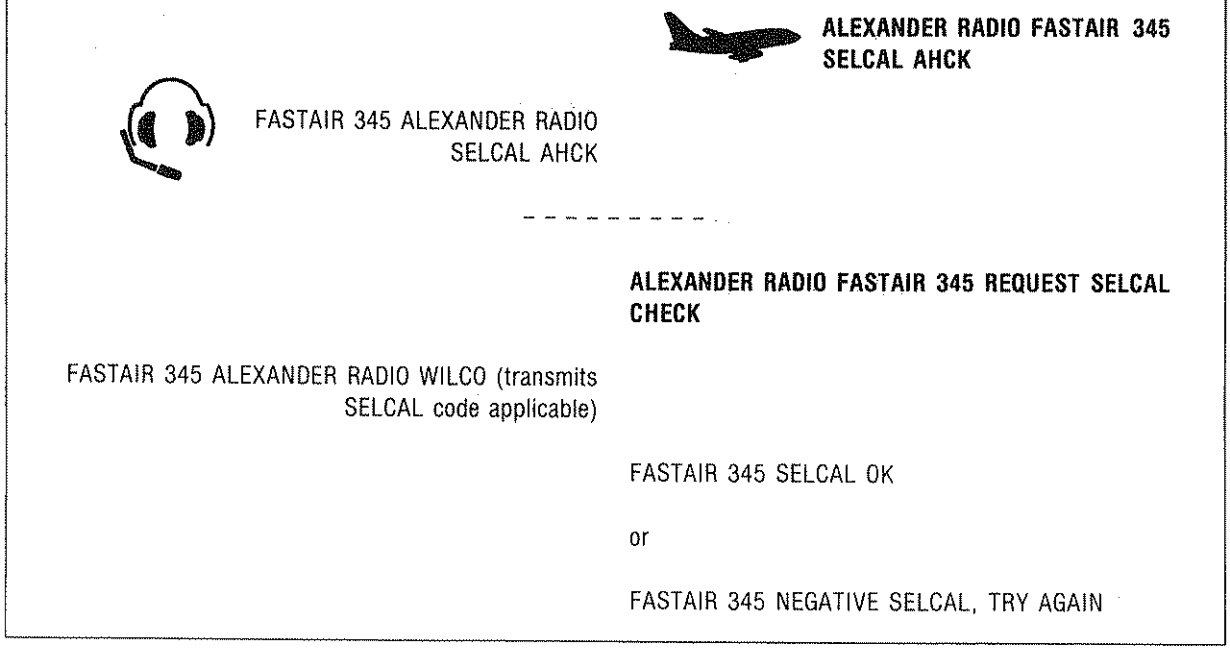
11.1 SELECTIVE CALLING (SELCAL)

11.1.1 SELCAL is a system by which voice calling is replaced by the transmission of coded tones on the frequency in use. Receipt of the assigned SELCAL code activates a calling system in the cockpit, and the need for a continuous listening watch by the pilot is obviated. Detailed SELCAL procedures may be found in Annex 10, Volume II.

11.1.2 For a flight during which it is anticipated that SELCAL will be used, the SELCAL code shall be included in the flight plan. However, if there is doubt that the ground station has the information, the pilot shall include the code of the aircraft SELCAL in the initial call using the phrase "SELCAL (code number)". If the SELCAL equipment is or becomes inoperative, the phrase "INOPERATIVE SELCAL" should be used.

11.1.3 Any necessary SELCAL check shall be initiated by using the phrase "REQUEST SELCAL CHECK". Subsequent receipt of the SELCAL code tone should be acknowledged by the phrase "SELCAL OK".

11.1.4 In case the coded signal is weak or unable to activate the cockpit call system, the pilot should advise by using the phrase "NEGATIVE SELCAL, TRY AGAIN".



11.2 FUEL DUMPING

When an aircraft has informed an ATS unit that it intends to dump fuel the ATS unit will broadcast a warning to other aircraft.

ALL STATIONS ALEXANDER CONTROL DC8 DUMPING FUEL FL 90 BEGINNING 10 MILES SOUTH OF KENNINGTON ON TRACK 180 FOR 20 MILES. AVOID FLIGHT BELOW FL 120 WITHIN 10 NM OF FUEL DUMPING TRACK

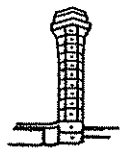
ALL STATIONS ALEXANDER CONTROL DUMPING COMPLETED

11.3 WAKE TURBULENCE

When wake turbulence is suspected or known to exist ATC will warn aircraft as appropriate.

G-CD EXTEND DOWNWIND DUE WAKE TURBULENCE DC8 LANDING AHEAD

G-CD

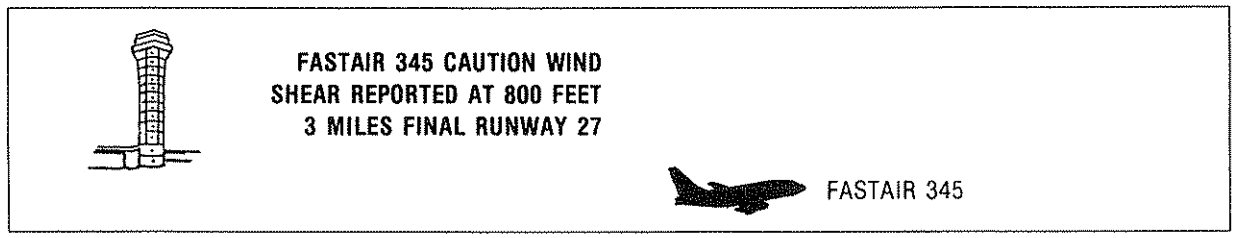


G-CD HOLD POSITION DUE WAKE TURBULENCE AIRBUS DEPARTING AHEAD

G-CD

11.4 WIND SHEAR

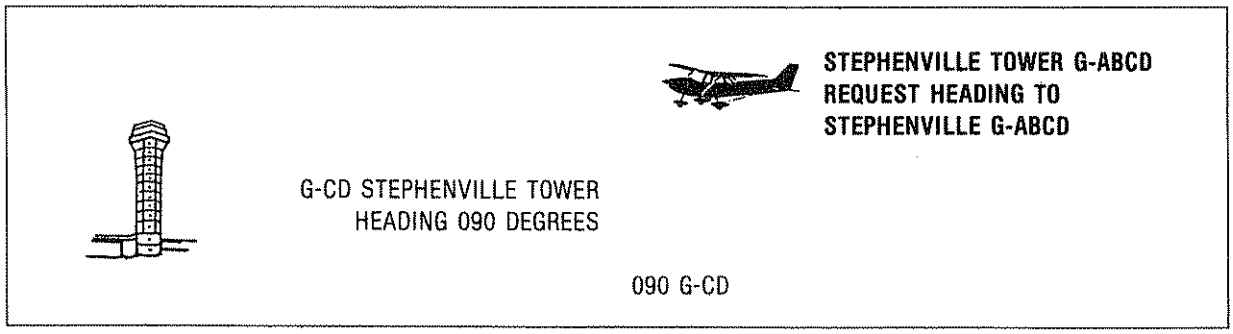
When wind shear is forecast or is reported by aircraft, ATC will warn other aircraft until such time as aircraft report the phenomenon no longer exists.



11.5 DIRECTION FINDING

11.5.1 A pilot may request a bearing or heading using the appropriate phrase to specify the service required. The transmission shall be ended by the aircraft call sign. The direction-finding station will reply in the following manner:

1) the appropriate phrase;
2) the bearing or heading in degrees in relation to the direction-finding station.



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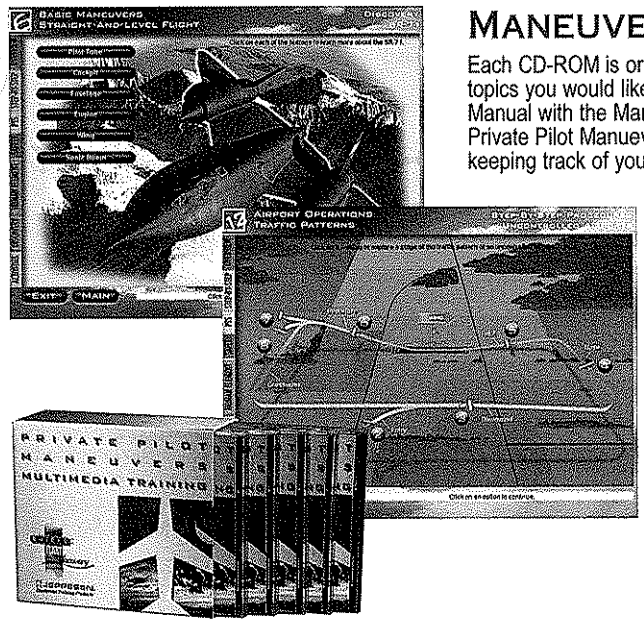

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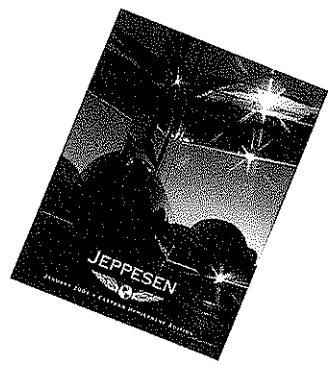

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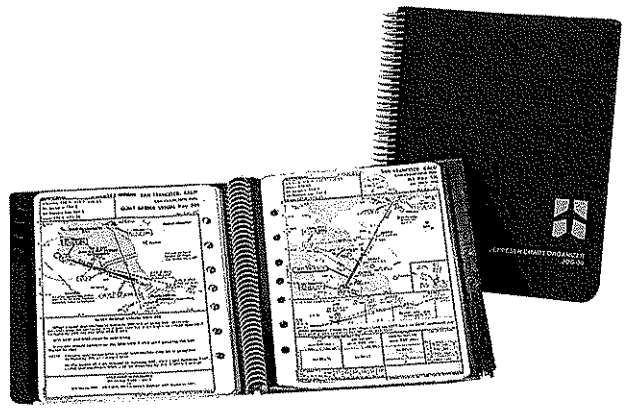

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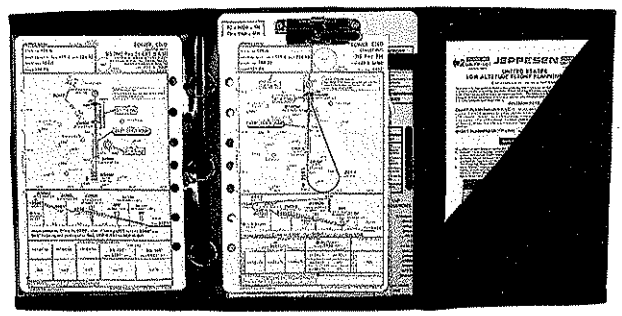

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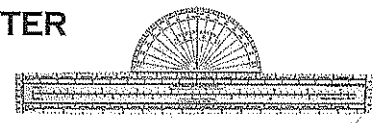

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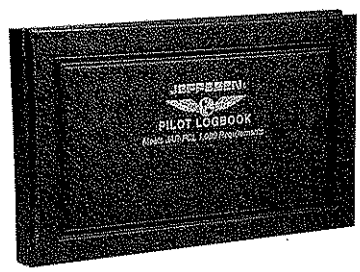

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