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# COMMUNICATIONS

ATPL(A)  
2025

MAURICE SCHMITT

# 090 - COMMUNICATIONS

## 090-01 - Concepts - 114Q.



- 071-01-01 - ICAO Annex 6
- 071-01-02 - Operational requirements
- 071-01-03 - Long-range flights

## 071-02 - Special Operational Procedures and Hazards (General Aspects) - 564Q.



- 071-02-01 - Operations manual
- 071-02-02 - Icing conditions
- 071-02-03 - Bird-strike risk
- 071-02-04 - Noise abatement
- 071-02-05 - Fire and smoke
- 071-02-06 - Decompression of pressurised cabin
- 071-02-07 - Wind shear and microburst
- 071-02-08 - Wake turbulence
- 071-02-09 - Security (unlawful events)
- 071-02-10 - Emergency and precautionary landing, and ditching
- 071-02-11 - Fuel jettisoning
- 071-02-12 - Transport of dangerous goods by air
- 071-02-13 - Contaminated runways

## 071-04 - Specialised Operations - 6Q.



- 071-04-01 - Specialized Operations



## 090-01 CONCEPTS (114Q.)

### 090-01-01 Associated Terms

- **Priority Indicator**
  - **SS** = distreSS
  - **DD** = DDurgency
  - **FF** = Flight Fafety
  - **GG** = meteoroloGGical / reGGularity
  - **KK** = "kk just gimme a break with this admin stuff pls"
    - **Order of priority:**
      - **1. SS**
      - **2. DD FF**
      - **3. GG KK**
    - *Sandfiggker!*
- **Q-Codes**
  - **QDM** - Magnetic to station
  - **QDR** - Magnetic from station
  - **QUJ** - True track to station
  - **QTE** - True track from station
  - **QNH** - Altitude (Obtain Elevation)
  - **QFE** - Height (At Elevation/RWY THR)

- **Messages**

Message Category	Beispiel / Inhalt
<b>Distress</b> calls/messages/traffic	Mayday, Notfälle, SAR (Search and Rescue)
<b>Urgency</b> messages (incl. medical transport signal)	Pan-Pan, Ambulanzflüge
Communications for <b>Direction Finding</b>	Funkpeilung / Standortbestimmung
<b>Flight Safety</b> messages	Anweisungen von ATC, Verkehrswarnungen, Notams
<b>Meteorological</b> messages	SIGMET, AIRMET, TAF, METAR
<b>Flight Regularity</b> messages	Verspätungen, Wartung, Airline-interne Nachrichten

- **Abbreviations & Codes**
  - **HX**. No specific working hours
  - **HR**. Hours
  - **HJ**. Sunrise to sunset
  - **HN**. Sunset to sunrise
  - **HS**. Service available during hours of scheduled operations
  - **H24**. Continuous day and night service

## 090-01 CONCEPTS (114Q.)

### 090-01-01 Associated Terms

- **Communications**
  - Ground-air: **two** way
  - Ground-TO-air: **one** way
  - Simplex: 2 stations , **1 direction** at a time.
  - Duplex: 2 stations, **2 directions** simultaneously.
- **Final**
  - Normal = **4NM**
  - Long = **8NM**
- **Interpilot Air-to-Air**
  - 2-Way Comm
  - Specific designated channel (123.450)
  - Used over remote areas
  - Used to exchange operational information

## 090-01 CONCEPTS (114Q.)

### 090-01-01 Associated Terms

- **Frequencies**

Service Description	Callsign
Area control centre (without radar)	<b>CONTROL</b>
Approach control (arrival and departure without radar)	<b>APPROACH</b>
Approach control radar arrivals	<b>ARRIVAL</b>
Approach control radar departures	<b>DEPARTURE</b>
Aerodrome control (take-off, landing, CTR)	<b>TOWER</b>
Surface movement control (all airport movement except apron)	<b>GROUND</b>
Radar, in general (enroute services)	<b>RADAR</b>
Precision approach radar (final approach guidance)	<b>PRECISION</b>
Direction-finding station	<b>HOMER</b>
Flight information service	<b>INFORMATION</b>
Clearance delivery (enroute clearance transmission)	<b>DELIVERY</b>
Apron control (guidance on the apron – airport operator)	<b>APRON</b>
Company dispatch (flight regularity messages by airline/operator)	<b>DISPATCH</b>
Aeronautical station	<b>RADIO</b>

## 090-01 CONCEPTS (114Q.)

### 090-01-01 Associated Terms - Definitions & Abbreviations

- **Aeronautical Station** = Station in Aeronautical Mobile Service Located on Land/or on board ship/platform at sea
  - **Significant Point** = Specified Geographical Position used in defining an ATS Route or Flight Path of A/C, for other navigation and ATS purposes
  - **Clearance Limit** = The point to which an aircraft is granted to an air traffic control clearance
  - **CAVOK** = VIS 10km+, No Clouds below 5000ft or highest MSA, no CB/TCU, No Sig. Weather
  - **Broadcast** = Transmission of information relating air nav. that is not addressed to specific station
  - **Blind Transmission** = Transmission from one to another Station, where 2-way cannot established, but believed that the called station is able to receive the transmission
  - **Visual Approach** = Approach (IFR) either part or all of instrument approach not completed, reference to terrain
  - **Expected Approach Time** = Time at which ATC expects an arr. A/C, following a delay, leave holding point to complete approach for landing
  - **SELCAL** = Signaling method which can alert an individual aircraft that a ground station wishes to comm. with
- 
- **PAPI** = Precision Approach Path Indicator
  - **VFR** = Visual Flight Rules
  - **RNAV** = Area Navigation
  - **LPV** = Localiser performance with vertical guidance
  - **SSR** = Secondary Surveillance Radar
  - **ATIS** = Automatic Terminal Information Service
  - **SID** = Standard instrument departure
  - **STAR** = Standard Instrument Arrival
  - **APV** = Approach **Procedure** with vertical guidance
  - **MLS** = Microwave Landing System
  - **AIS** = Aeronautical Information Service
  - **UTC** = Co-ordinated universal time
  - **GMT** = Greenwich Mean Time
  - **AIS** = Aeronautical Information Services
  - **CAVOK** = Ceiling and Visibility OK
  - **IMC** = Instrument meteorological conditions
  - **VMC** = Visual Meteorological Conditions
  - **CTR** = Control Zone
  - **CTA** = Control Area
  - **TA** = Traffic Advisory & Transition Altitude
  - **RNP AR** APCH = Authorization Required
  - **AFIS** = Aerodrome flight information service
  - **TMA** = Terminal Control Area
  - **FIR** = Flight Information Region
  - **SELCAL** = Selective Calling System

## 090-02 GENERAL OPERATING PROCEDURES (566Q.)

### 090-02 GENERAL OPERATING PROCEDURES

- **Readback Item**

- ATC route clearances
- Runway clearances and instructions to: enter, land on, take off from, hold short of, cross, taxi and backtrack
- Runway in use
- Altimeter settings
- SSR codes
- Newly assigned communication channels
- Level instructions
- Heading and speed instructions
- Transition levels (even if obtained from ATIS)
- Conditional clearances
- Other clearances or instructions

- **Readability Scale - How do you read?**

- 1 Unreadable
- 2 Readable now and then
- 3 Readable but with difficulty
- 4 Readable
- 5 Perfectly readable

- **Callsigns**

- 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

- **Transponder Codes**

- Mode A: Only transmits **position** information.
- Mode C: Transmits **position** and **altitude** information (minimum requirement for TCAS RA)
- Mode S: The transponder **sends information to the TCAS systems of other** aircrafts. → QNH1013: FL sonst Alt
  - Squawk "1234" → Set the transponder code "1234"
  - Reset squawk "1234" → Reset the previously issued code "1234"
  - Squawk IDENT → Turn on the function IDENT
  - Squawk standby (STBY) → Operate your transponder in the standby mode
  - Confirm squawk → Confirm your squawk, read your squawk
  - Stop squawk → Turn off the transponder
  - Squawk Alpha/Charlie/Sierra → Change the transponder mode to Alpha/Charlie/sierra
  - Squawk VFR → Squawk 7000 in most European countries, Squawk 1200 in North America
  - Squawk Mayday → Set the emergency code 7700 on your transponder

- **Missed Approach**

- ATC: Go Around
- Pilot: Going Around

## 090-02 GENERAL OPERATING PROCEDURES (566Q.)

### 090-02 GENERAL OPERATING PROCEDURES

- **Phraseology**
  - UNABLE = **Not possible** → “Unable (LAP4S) due to Turbulence”
  - NEGATIVE = **Not Equipped** “NEGATIVE RNAV”
  - Blocked = **Two / or more** simultaneous transmission **occurred at same time** (Repeat your message)
  - TCAS RA = “TCAS RA” → “ROGER” // Clear of conflict, returning to FL.... → Roger
- **Backtrack**
  - Request backtrack → Backtrack approved
  - Backtrack on RWY 12 → Backtracking on RWY 12
- **Reporting Time**
  - No confusion: 08 → **Just the minutes**
  - Confusion: 10:08 → **Hours & Minutes**
- **Transmitting Digits**
  - QNH1001: 1 - 0 - 0 - 1 / QNH1000: QNH One Thousand
  - 128.500 MHz: 128.5
  - 13 500ft = one three thousand five hundred
  - Expected Approach Time: Expected Approach Time Five Zero Always UTC!
- **Radio Check**
  - the identification of the aeronautical station being called;
  - the aircraft identification;
  - the words “RADIO CHECK”; and
  - the frequency being used.
- **Wake Turbulence Categories**
  - Super - When classified as SUPER according regulations
  - a) **HEAVY (H)** — all aircraft types of **136 000 kg or more**;
  - b) **MEDIUM (M)** — aircraft types **less than 136 000 kg but more than 7000 kg**; and
  - c) **LIGHT (L)** — aircraft types of **7000 kg or less**.
- **Channel Spacing**
  - Frequency not 8.33 KHz Equipped: **Negative Eight Point Three Three**
- **SELCAL (Selective Calling System)**
  - Crew should contact appropriate ATC unit to request SELCAL Check, **giving their code if necessary**
  - Logon Purpose = Info on systems supported by A/C, Unique Ident. of A/C, additional info with flight plan
    - FANS Application → A/C Info, Datalink Capability (prior operating any datalink)
  - **Controller start conversation** (initiated by ATC) - or **following contact request from other ATS unit**
  - **Purpose: Controller will give you instructions/clearances**
    - You reply station: “**GO AHEAD**”
    - Manually Logon: “DISCONNECT CPDLC THEN LOGON TO ...”
    - SELCAL OK or NEGATIVE SELCAL, TRY AGAIN
      - Gander Radio, D-EIBG, Request SELCAL Check ALBM
      - After successful connection: **SELCAL utilized by ATSU** to initiate a call

## 090-02 GENERAL OPERATING PROCEDURES (566Q.)

### 090-02 GENERAL OPERATING PROCEDURES

- **Wind Shear**
  - WS ALL RWY
- **Traffic**
  - ... to pass traffic information
    - TRAFFIC (information);
    - NO REPORTED TRAFFIC;
  - ... to acknowledge traffic information
    - **LOOKING OUT;**
    - **TRAFFIC IN SIGHT;**
    - **NEGATIVE CONTACT [reasons];**
- **Radio Vectoring - Terrain Clearance**
  - Radio Vectoring: **ATC** (Pilot have to pay attention!)
  - Normal: **Pilot**
- **Abandon Takeoff**
  - D-EIBG, STOP IMMEDIATELY, D-EIBG, STOP IMMEDIATELY
- **CPDLC Message - CONTROLLER-PILOT DATA LINK COMMUNICATIONS**
  - Disregard CPDLC Message → Followed by correct
  - Reason LOG-ON → Exchanging Application Information (AC->ATSU). Provides Flight Data to ATSU
- **Traffic Information**
  - Same ALT, Opposite Heading: “NEGATIVE CONTACT, REQUEST VECTORS”
- **GPS**
  - **RAIM ALERT:** Signal Unreliable, System **cannot ensure the accuracy** required for navigation
- **Spelling out**
  - When it is **doubtful**.
- **Pushback**
  - **Ground Crew: Ready** for Pushback
  - **ATC: Request** Pushback
- **Confirm if something is possible**
  - **ADVISE** if ..... able
- **Radar Service Terminated = No longer** provided with **radar control**
- **Radar Identified = Radar identification** has been **achieved**
- **Holding Instructions (FLIRT)**
  - Fix
  - Level
  - Inbound track
  - R/L (standard turn Right)
  - Time
    - *or: “Request holding instructions”*
- **Starts Descent**
  - **Leaving** FL200... **Descending** FL120...
- **Tenerfie Accident**
  - They **blocked each other out! Nothing** or **interference** noises might have been **heard** instead

## 090-02 GENERAL OPERATING PROCEDURES (566Q.)

### 090-02 GENERAL OPERATING PROCEDURES

- **VFR Departures**
  - Should Report Zone Boundary
  - ATC may pass information about traffic
- **Good Transmitting Technique**
  - Normal Conversation Tone, speak clearly and distinctly
- **Malfunction PTT Button**
  - ATC not able receive / transmit ANY calls
- **Changing Frequency**
  - If limited in speed, inform next frequency in initial call
- **Holding Short**
  - ATC: Hold Short of (position)
  - Pilot: Holding Short of (position)
- **Changing Call Sign**
  - When Instructed by ATC
  - Interest of Safety
- **“Over” & “Out”**
  - Not Used in VHF! (But are ICAO Std. Terminology)
- **Transmitting to more than one station**
  - “All Stations”... → NO Acknowledge
- **Before Transmitting**
  - Listen on frequency to ensure no interference will occur with another station that is already transmitting
  - To ensure transmission doesn't interrupt dialogue/block another transmission (Wait 10 sec!)
- **Request QFE**
  - Normally speaking using constituent letters
- **RWY Vacated**
  - When ENTIRE A/C is beyond RWY Holding Position
- **Change Frequency**
  - Only after notifying aeronautical station that change is needed
- **Orbit right**
  - Make 360 degree to the right
- **Check Definition**
  - Examine a system/procedure
- **CPDLC**
  - Single Message Failure: Try to send again & transmit that CPDLC message failed, cleared via radio
  - Complete Failure for all: All Stations CPDLC Failure (Instructions)
- **Revert to flight plan call sign**
  - No Likelihood that confusion may occur because of similar call signs!
- **Weather Deviation and rejoined original cleared route**
  - “Back on route”

## 090-02 GENERAL OPERATING PROCEDURES (566Q.)

### 090-02 GENERAL OPERATING PROCEDURES

- ***Taxi Clearances (Clearance Limit)***
  - When instruction contains a rwy: Shall Contain Explicit clearance to cross/hold short of RWY
- **General Call**
  - ALL Stations Stepehenville Control
- **Stuck Button**
  - Frequency can not be used by others
- **Position Report**
  - aircraft identification;
  - position;
  - time;
  - flight level or altitude, including passing level and cleared level if not maintaining the cleared level;
  - next position and time over; and
  - ensuing significant point.
- **Essential Aerodrome Information**
  - Any information to ensure safe operation of an aircraft on the movement area
- **EU Airspace, Radio Comm Equip**
  - Must align with: Airspace Requirements
  - Min. Two Independent Radio Comm Systems
- **Report Flight Conditions**
  - Indicate where you are flying IMC/VMC
- **Reduce your rate of speech**
  - Speak slower
- **QNH included**
  - Metar AND Volmet
- **Abbreviated Call Sign**
  - Used: After abbreviated call sign has been used by ground station
  - When comm. established & no confusion likely to occur
- **Data Downlink** = Transmission from A/C in flight to station on Earth
- **Data Uplink** = Transmission from station on Earth to A/C in flight
- **Flying Offset**
  - Parallel Route offset from standard route
- **Test Transmission**
  - Not longer than 10 sec
- **Request True Bearing**
  - 1. Use of the phrase 'true bearing' spoken 3 times:
    - "True bearing, true bearing, Bern approach, G-ABCD, request true bearing, G-ABCD"
  - 2. Use of the relevant Q code, spoken only once:
    - "Bern approach, G-ABCD, request QTE"
- **Send every word/group of words twice**
  - "Words twice"

## 090-02 GENERAL OPERATING PROCEDURES (566Q.)

### 090-02 GENERAL OPERATING PROCEDURES

- **Take Off**
  - Only used in takeoff clearance or when cancelling it
- **Prepared for take-off**
  - “Ready”
- **FL100**
  - Can be transmitted as One Hundred
- **No Response on new Frequency.**
  - Noise : Alternative
  - No Noise : Previous
- **PBN Related Message**
  - “Unable RNP 4 due to loss of Raim”
- **Ground Station Elements**
  - Location
  - Suffix (e.g.Delivery) - indicating Service being provided by that station
- **On Final, just transmitting Wind**
  - ATC Intentionally delays clearance to land because is occupied but will be vacated soon
- **Only understood a part of a message**
  - Say Again all after....
- **Transmission Technique**
  - Plain Language or ICAO Phraseologies (common language)
  - Maintain Speaking Volume at constant level
  - Max. 100 words/min
- **VFR Passing Boundary.**
  - Approach, EC-IOs, Passing the control zone boundary (will cleared to leave with est. procedures)
- **Uncontrolled Aerodrome (Aerodrome Flight Information Service)**
  - With AFIS: Information
  - Without AFIS: Radio
- **Radar Vectoring completed**
  - Resume Own Navigation → (Direct sig. point) (Mag. Track) (Numbers)
    - Resume Own Navigation to LESDO
- **Test Transmission**
  - “One two three four, Lille Approach”
- **Always transmit**
  - Decimal
  - “TO” followed by Height/Altitude
- **Helicopter taxi**
  - Air-taxiing
- **Frequency Spacing**
  - 8.33khz increase by 0.005 Mhz
  - 25 khz increase by 0.025Mhz

## 090-02 GENERAL OPERATING PROCEDURES (566Q.)

### 090-02 GENERAL OPERATING PROCEDURES

- **Repeat for clarity / emphasis**
  - “I say again”
- **Unsure if understood “VOR” Position Report**
  - Repeat VOR Name Using intl. phonetic convention
- **Omit Call Sign Suffix**
  - If Communication Established
  - If it will NOT cause any confusion
- **Maintain Present Speed**
  - Answer: “WILCO”
- **Transponder Capability**
  - “Advise Transponder Capability”
- **Not Equipped with Transponder**
  - “Negative transponder”
- **SATCOM**
  - CPDLC via ACARS
- **Microphone button stuck**
  - The A/C with stuck button, pilot hears intercom & back ground noise
  - ATC can only receive transmission from A/C with stuck button
- **CPDLC → Expect flight level change passing 10 West...**
  - Expect → Expect
    - In CPDLC: “Roger”
- **Abandon Take-Off Manoeuvre**
  - “Stopping”
- **ATC Receives: “Disconnected LOVV. Connecting to LOVL”**
  - A/C has automatically disconnected from CPDLC LOVV and connected to CPDLC LOVL
- **Stop Squawk Charlie, Wrong Indication**
  - You should deselect altitude reporting function on transponder
- **Stop Turning**
  - “Stop Turn Heading 335\*”
- **Monitor (Standby)** = Listen out on (frequency)
- **MSAW** = Minimum Safe Altitude Warning
- **MSA** = Minimum Sector Altitude
- **PBN** = Performance based navigation

## 090-02 GENERAL OPERATING PROCEDURES (566Q.)

### 090-02 GENERAL OPERATING PROCEDURES

- Phraseology

Phrase	Meaning
<b>ACKNOWLEDGE</b>	Confirm you received and understood
<b>AFFIRM</b>	Yes
<b>APPROVED</b>	Permission granted
<b>BREAK</b>	Separation between message parts
<b>BREAK BREAK</b>	Separation between messages to different aircraft
<b>CANCEL</b>	Annul previous clearance
<b>CONFIRM</b>	Please verify (clearance, info, etc.)
<b>CONTACT</b>	Establish radio contact with...
<b>CORRECT</b>	True / Accurate
<b>CORRECTION</b>	There was an error, the correct version is...
<b>DISREGARD</b>	Ignore that message
<b>I SAY AGAIN</b>	I repeat (for clarity/emphasis)
<b>GO AHEAD</b>	Send your message (⚠ not permission to proceed!)
<b>MONITOR</b>	Just listen on this frequency
<b>NEGATIVE</b>	No / Not correct / Not approved
<b>READ BACK</b>	Repeat the message exactly
<b>RECLEARED</b>	Your clearance has changed
<b>REPORT</b>	Give me this information...
<b>ROGER</b>	Message received

## 090-03 RELEVANT WEATHER INFORMATION (84Q.)

### 090-03 RELEVANT WEATHER INFORMATION

- **METAR - LFPG 150505Z 27015KT 9999 SCT016 OVC024 M09/M12 Q1006 NOSIG**
  - 27015KT = wind at 270° at 15 kts
  - 9999 = visibility 10 km or more
  - SCT016 = scattered layer of clouds at 1600 ft (above ground, elevation)
  - OVC024 = overcast layer of clouds at 2400 ft (above ground, elevation)
  - M09/M12 = temperature -09°C, dewpoint -12°C
  - Q1006 = QHN 1006 (Q indicates the sea level pressure hectopascals)
  - NOSIG = no significant change is expected to the reported conditions within the next 2 hours.
- **New METAR required**
  - Wind Change 60\* +
  - Speed 10kt+/- (and gusts)
  - Freezing, Mod/Heavy Precipitation, Thunderstorms
  - Clouds below 1500ft: SCT → BKN/OVC or BKN/OVC → SCT or less
- **Automated Weather Reports**
  - Without data link --> exempt from the need
  - With data link(climb) --> expected to report every 30 s for the first 10 minutes of the flight.
  - With data link(cruise) --> expected to report every 15 mins
- **RVR (Runway Visual Range) - R28/1000U → RVR constituent letters!**
  - **Runway 28, 1000 metres changing upwards**
  - U - upwards/increasing tendency
  - D - downwards/decreasing tendency
  - N - no tendency
    - By ATC: RVR RWY 16 Touchdown.. Metres, Mid Point ... Meters, Stop End ... Meters
- **Special Air Report**
  - Severe - Embedded Icing & Turbulence
  - Severe Mountain Wave
  - Thunderstorms (obscured, embedded, widespread, squall lines)
  - Heavy Duststorm/Sandstorm
  - Volcanic Ash
    - Braking Action (worse than expected)
- **Weather**
  - VOLMET = METARs & SPECIs of specific airports // or D-VOLMET (Datalink VOLMET by ACARS)
    - SPECI = Correction of METAR or TAF
  - Wind = METAR → True // Tower → Magnetic
- **Clouds**
  - FEW - few clouds, 1-2 oktas (out of 8) of the sky is covered.
  - SCT - scattered clouds, 3-4 oktas of the sky is covered.
  - BKN - broken, 5-7 oktas of the sky is covered.
  - OVC - overcast, 8 oktas of the sky is covered (solid cloud cover).
  - SKC - sky clear (no clouds detected).
  - NSC - no significant cloud.
- **Frequencies**
  - ATIS = Discrete VHF or/and VOR Frequency
  - Oceanic (without datalink) = HF
- **ATIS**
  - Reported all clouds up to 5000ft or MSA, whichever higher

## 090-03 RELEVANT WEATHER INFORMATION (84Q.)

### 090-03 RELEVANT WEATHER INFORMATION

- **Frequency Band**

- VOLMET (Meteo. info in flight) = VHF
  - 5,450 kHz (5 thousand kHz) = 5.450 MHz (5 Mhz) -> HF band.

Frequency Band	Frequencies	Wave Band	Wavelength
<b>VLF – Very Low Frequency</b>	3 – 30 kHz	Very Long	100 km – 10 km
<b>LF – Low Frequency</b>	30 – 300 kHz	Long	10 km – 1 km
<b>MF – Medium Frequency</b>	300 – 3000 kHz (0.3–3 MHz)	Medium	1 km – 100 m
<b>HF – High Frequency</b>	3 – 30 MHz	Short	100 m – 10 m
<b>VHF – Very High Frequency</b>	30 – 300 MHz	Short	10 m – 1 m
<b>UHF – Ultra High Frequency</b>	300 – 3000 MHz	Ultra Short	1 m – 10 cm
<b>SHF – Super High Frequency</b>	3 – 30 GHz (3000–30 000 MHz)	Super Short	10 cm – 1 cm
<b>EHF – Extremely High Frequency</b>	30 – 300 GHz	Extremely Short	1 cm – 1 mm

- **Visibility**

- Up to 5km = Meters
- Above 5km = Km

- **Numbers**

- HDG100 = One-Zero-Zero
- FL100 = (UK) One hundred, Europe normally 1-0-0

## 090-04 VOICE COMMUNICATION FAILURE (98Q.)

### 090-04 VOICE COMMUNICATION FAILURE

- **Transmitting blind**
  - Twice!
  - Watch out for Instructions may be issued by visual signals
  - On Frequency in use!
    - "TRANSMITTING BLIND DUE TO RECEIVER FAILURE" + message + intention + time of next transmission + complete repetition
- **Communication Failure**
  - **VMC**
    - Continue to fly in VMC
    - Land at nearest suitable aerodrome
    - Report arrival to the appropriate ATSU as soon as possible after landing
  - **IMC**
    - Radar Vectored: Proceed in most direct manner
    - Radar Separation: Maintain speed & level 7mins → Then accordance flight plan
      - After Latest: Reaching Last Level, Squawk 7600, Missing Compulsory Point
    - No Radar (Procedural Separation): Maintain speed & level 20 mins → Follow Flight Plan (speed, level)
      - e.g. Cleared to climb FL380, Comm. Fail @FL100. → Continue climb 380, maintain for 7mins
  - **Route Adjustment:**
    - If vectored/RNAV offset Rejoin flight plan ASAP (next fix max).
    - Fly to destination fix/navaid, hold if needed.
  - **Descent & Approach:**
    - Descend at last received EAT or flight plan ETA. (Where ? → NAV AID/FIX / When? → EAT)
    - Perform normal instrument approach.
  - **Landing:**
    - Land within 30 min of ETA or last Eat (whichever later)
  - **Instructions to acknowledge**
    - Operate IDENT
  - **Important**
    - Always refer to the ETA (Est. Time of Arrival) → from CURRENT Flight Plan (CPL)
- **Further**
  - VFR Flight may enter relevant control zones (under certain circumstances)
  - Transponder Fail before departure = Obtain prior permission from ATC
    - During Flight: Inform ATC immediately
  - Continue IMC (IFR)? → Yes, if PIC consider inadvisable to continue VMC
  - Frequency Silent, No Answer → Previous Frequency
  - Always take into consideration: Minimum Flight Altitude!
- **Relay Message**
  - If ATC cannot establish radio contact with A/C in flight
- **Blocked Frequency**
  - Crew hears Click, but no Voice. → Carrier Wave received but not modulated

## 090-04 VOICE COMMUNICATION FAILURE (98Q.)

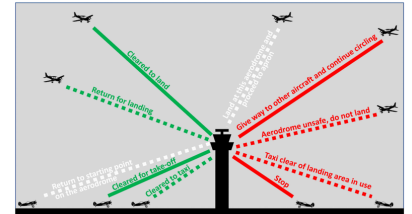
### 090-04 VOICE COMMUNICATION FAILURE

- **Flash Lights (Ground)**

- **Steady green** - Cleared to for take-off
- **Steady red** - Stop
- **Series of green flashes** - Cleared to taxi
- **Series of red flashes** - Taxi clear of landing area in use
- **Series of white flashes** - Return to starting point on the aerodrome

- **Flash Lights (Air)**

- **Steady green** - Cleared to land
- **Steady red** - Give Way / Continue Circle
- **Series of green flashes** - Return for Landing
- **Series of red flashes** - Aerodrome Unsafe - DO NOT LAND
- **Series of white flashes** - N/A



- **Squawks**

- 7500 -> (seven five - man with a knife) - interference awful
- 7600 -> (seven six - radio fix) - communication failure
- 7700 -> (seven seven - pray to heaven) - emergency

- **Re-Establish Communication**

- Contact other A/C
- Use previous frequency
- Use another frequency appropriate to the route
- Contact other aeronautical stations

- **Communication Failure in Control Zone**

- In CTR: Continue (follow clearance) in case of transit, unless incompatible with regulation
- May Receive additional instructions + can be acknowledged operating transponder
  - Leave CTR shortest route (VMC)

- **Actions (Understood)**

- **Daylight Hours**
  - Ground: Move Ailerons, Rudder
  - In Flight: Rockwing Wings
- **Darkness**
  - Flashing on/off twice aircraft landing light
  - Switching on/off navigation lights twice

## 090-05 DISTRESS AND URGENCY PROCEDURES (118Q.)

### 090-05 DISTRESS AND URGENCY PROCEDURES

- **Definitions**

- Concerning Safety of A/C, Vehicle, ship, Person on Board or within sight & ...
  - **DISTRESS** = Require immediate **assistance** (MAYDAY)
  - **URGENCY** = DOES **NOT** require immediate **assistance** (PANPAN)
  - **"MEDICAL"** = Carry Cargo by goverment (medical supplies) (PANPAN MEDICAL)
    - Report: **Position, Type, Intended Route, Estimated Time Arrival at Dest. & Altitude**

- **Transmit**

- Name Station (can be omitted)
- Identification Aircraft
- Nature
- Intention
- Position
- Any other information....

- **Procedure**

- Communicate on frequency in use (unless advised by ATC)
- Do not transmit on the frequency, unless
  - Distress cancelled or terminated
  - All Distress Traffic transferred
  - Station gives you permission
  - You can render assistance
    - Or if you & aircraft in distress are only stations on frequency
- If ATC doesnt answer: Reply to distress message, advise ATS unit, take control of communication if necess. Take immediate action to make all necessary available to appropriate ATS unit!

- **Hearing Emergency**

- Urgency = Monitor Frequency, Offer Assistance if required
- Distress = Acknowledge the message (write message down, check if assistance provided)
  - Impose Silence: Stop Transmitting, MAYDAY
  - When transferred/terminated: Distress Traffic Ended
- If you're outside CTR, no Clearance: Stay outside CTR! Do not transmit.
- ATC should notify other ATC = To prevent that other ATC Unit transferring traffic to emergency area

- **Emergency Frequency (121.5 → 243.0 →)**

- Used by Police, ATC, Forest Fire Protection
- Band Protection: 121.475 - 121.525
- Nearest Available: 121.450 - 121.550

- **Changing Frequency**

- If its considered that besser assistance can be provided by transferring to another frequency
- To allow direct contact between emergency aircraft & rescue on discrete frequency
- Allowed to speak: ATC & Officer Emergency Operation → Everyone who takes part in emergency action

- **Hijacking**

- Try to contact ATC via CPDLC

- **TCAS (Traffic Collision Avoidance System)**

- TA = Traffic Advisory (No need to Report!) "TRAFFIC, TRAFFIC"
- RA = Resolution Advisory (Always Report!) → "UNABLE, TCAS RA" / "TCAS RA" // "CLIMB/DESCEND"
  - + = above you
  - - = below you

- **Squawk**

- 7700 (Distress & Urgency) → Mode A always!

## 090-05 DISTRESS AND URGENCY PROCEDURES (118Q.)

### 090-05 DISTRESS AND URGENCY PROCEDURES

- **Frequency Spacing**
  - Std. 8.33KHZ Channel Spacing
    - e.g. 121.5 MHz → Next available: 121.490 & 121.510
- **First Station Acknowledging Message**
  - Monitor/Acknowledge
  - Immediate Action ensure that all necessary info, asap to the ATS concerned
  - Take Control of communications or specifically and clearly transfer that responsibility
- **ATS Unit in contact should**
  - Immediately clear airspace, provide priority assistance
- **PANPAN Situation**
  - Inform ATS Unit concerned
  - Inform the Aircraft Operator
- **ATC forgets about you**
  - Remind ATC of your position, if this is possible without interfering with distress traffic

## 090-06 - VHF PROPAGATION AND ALLOCATION OF FREQUENCIES (98Q.)

### 090-06 - VHF Propagation and Allocation of Frequencies

- **Change Range of Radio Transmission**
  - Transmitter power (affects the most)
  - Receiver Sensitivity
  - Distance to horizon
- **Transmitter Factor**
  - Range increased 50 → 100NM / Power of Transmitter increased Factor of 4. ( $P = R^2$ )
    - VHF & HF: x4
    - PRIMARY RADAR: x16
- **VHF Transmission Range (Limits)**
  - Earth's Curvature
  - Line of sight
- **VHF Transmission Factors**
  - Level Aircraft
  - Terrain Elevation
- **VHF Propagation Characteristics**
  - Partially straight-line similar to light waves
- **Weaken/Degrade Quality of Signal Received in Mobile Service**
  - Shielding by parts of the aircraft
- **Solid Reception**
  - A/C High Level, Vicinity of Ground Station
- **ATIS (Automatic Terminal Information Service)**
  - Weather
  - RWY
  - Type Approach to be expected
- **ATTENUATION.....Increase**
  - WHAT.....Wavelength.....Decrease
  - THE.....Temp.....Decrease
  - FUCK.....Frequency.....Increase
  - DUDE.....Density.....Increase
- **Approaches**
  - 5m - VOR = Very high
  - 100m - NDB = Medium
- **Communication Channel Spacing**
  - 8.33 kHz mandatory above FL195
  - Either 8.33 or 25 kHz below that altitude.
    - Between VHF Frequencies (Frequency Spacing): 25 KHz / UHF: 50 KHz
- **Communication Frequency**
  - VHF (Normal), Amplitude Modulated direct waves 118.0 - 136.975
  - HF (Oceanic), Amplitude Modulated
  - VOR → 108 - 117.975 Mhz (ATIS, Precision Approach ILS/LAAS)
    - "air band" 108 - 136.992 (Comm & NAV)
- **Reception Radio Signal**
  - Improve with cold air mass moving over warm sea, because refraction

## 090-06 - VHF PROPAGATION AND ALLOCATION OF FREQUENCIES (98Q.)

### 090-06 - VHF Propagation and Allocation of Frequencies

- **Range VHF Frequency (line of sight), depends on:**
  - Power of Transmission
  - Elevation of Transmitter
  - Altitude of Aircraft / Receiver
  - Any terrain causing obstruction
    - Most: Terrain
- **VHF Propagation**
  - Line-Of-Sight Propagation (direct wave)
- **Short transmission range caused by**
  - Low power output of the signal
  - Low elevation of transmitter aerial, due to terrain & curve of earth
    - e.g. 5W is lower transmission & 800ft lowest level for transmitter
- **Examples reduced range**
  - Vehicles parked close to ground transmitter
- **Longest Theoretical Range**
  - Highest Alt. & Lowest MHz → 3000ft at 120 MHz
- **Calculate Range Radio Waves**
  - Maximum theoretical range (in nm) =  $1.23 \times \sqrt{H1} + 1.23 \times \sqrt{H2}$
  - H1 = Height (ft) transmitter above MSL
  - H2 = Height (ft) of receiver above MSL
- **Range & Quality of Radio Transmission (reduced VHF and above due to)**
  - Tropospheric Conditions & Attenuation as result atmospheric absorption
- **Air-to-Air Message**
  - Best: Between to aircraft close & high
- **Wavelength (approach)**
  - VOR, VHF, 5m
- **Blocked Frequency ("Click")**
  - Transmission station sending signal, carrier wave NOT modulated
- **Extended Ranges (experienced by VHF as a result of)**
  - Super refraction
- **Cold Air (Mass Moist)**
  - Signal Attenuation Increase, Reducing Comm. Range
- **Affect Quality Signals received**
  - Difference polarity between transmitter & receiver
- **Fading**
  - Two Radio Waves from Same Transmitter reach receiver different paths at same time (difference between signals), this changes in signal strength

## 090-07 - OTHER COMMUNICATION (33Q.)

### 090-07 - OTHER COMMUNICATION

- **Morse Code Range**
  - Consists of 2 to 3 Letters and are gives as dots and dashes (- & .)Elevation of Transmitter
- **Range & Quality Radio Transmissions**
  - Affected by Transmitter Power & Air Density
- **SNOWTAM**

Friction Coefficient	Braking Action	Runway Condition Code (RWYCC)
0.40 and above	Good	5
0.39 – 0.36	Medium / Good	4
0.35 – 0.30	Medium	3
0.29 – 0.26	Medium / Poor	2
0.25 and below	Poor	1
<b>9</b>	Unreliable (e.g. dry snow, slush, etc.)	9