

COMMUNICATIONS

ATPL(A)
2025

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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
Distress calls/messages/traffic	Mayday, Notfälle, SAR (Search and Rescue)
Urgency messages (incl. medical transport signal)	Pan-Pan, Ambulanzflüge
Communications for Direction Finding	Funkpeilung / Standortbestimmung
Flight Safety messages	Anweisungen von ATC, Verkehrswarnungen, Notams
Meteorological messages	SIGMET, AIRMET, TAF, METAR
Flight Regularity 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)	CONTROL
Approach control (arrival and departure without radar)	APPROACH
Approach control radar arrivals	ARRIVAL
Approach control radar departures	DEPARTURE
Aerodrome control (take-off, landing, CTR)	TOWER
Surface movement control (all airport movement except apron)	GROUND
Radar, in general (enroute services)	RADAR
Precision approach radar (final approach guidance)	PRECISION
Direction-finding station	HOMER
Flight information service	INFORMATION
Clearance delivery (enroute clearance transmission)	DELIVERY
Apron control (guidance on the apron – airport operator)	APRON
Company dispatch (flight regularity messages by airline/operator)	DISPATCH
Aeronautical station	RADIO

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 be 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 **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...
- **Tenerife 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
ACKNOWLEDGE	Confirm you received and understood
AFFIRM	Yes
APPROVED	Permission granted
BREAK	Separation between message parts
BREAK BREAK	Separation between messages to different aircraft
CANCEL	Annul previous clearance
CONFIRM	Please verify (clearance, info, etc.)
CONTACT	Establish radio contact with...
CORRECT	True / Accurate
CORRECTION	There was an error, the correct version is...
DISREGARD	Ignore that message
I SAY AGAIN	I repeat (for clarity/emphasis)
GO AHEAD	Send your message (⚠ not permission to proceed!)
MONITOR	Just listen on this frequency
NEGATIVE	No / Not correct / Not approved
READ BACK	Repeat the message exactly
RECLEARED	Your clearance has changed
REPORT	Give me this information...
ROGER	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
VLF – Very Low Frequency	3 – 30 kHz	Very Long	100 km – 10 km
LF – Low Frequency	30 – 300 kHz	Long	10 km – 1 km
MF – Medium Frequency	300 – 3000 kHz (0.3–3 MHz)	Medium	1 km – 100 m
HF – High Frequency	3 – 30 MHz	Short	100 m – 10 m
VHF – Very High Frequency	30 – 300 MHz	Short	10 m – 1 m
UHF – Ultra High Frequency	300 – 3000 MHz	Ultra Short	1 m – 10 cm
SHF – Super High Frequency	3 – 30 GHz (3000–30 000 MHz)	Super Short	10 cm – 1 cm
EHF – Extremely High Frequency	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.)

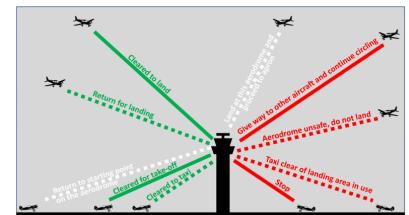
090-04 VOICE COMMUNICATION FAILURE

• 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 government (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 doesn't 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 it's considered that better 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 than 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 $50 \rightarrow 100\text{NM}$ / Power of Transmitter increased Factor of 4. ($P = R^2$)
 - VHF & HF: x4
 - PRIMARY RADAR: x16
- **VHF Transmittion Range (Limits)**
 - Earths Cuvature
 - Line of sight
- **VHF Transmittion Factors**
 - Level Aircraft
 - Terrain Elevation
- **VHF Propagation Characteristics**
 - Partically 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.....Wavelenght.....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 \rightarrow 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) = $1.23 \times \sqrt{H_1} + 1.23 \times \sqrt{H_2}$
 - 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 two 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 given as dots and dashes (- & .)
- **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
9	Unreliable (e.g. dry snow, slush, etc.)	9