

## BASIC COUNCILS FOR FLIGHT SIMULATION ON THE NET

Version 3

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### PREFACE

This is the third version of a document I prepared in early 2001 to assist new controllers in their duties in the simulated environment concerning communication procedures on the net.

When it was released, we rapidly realised about the need of something similar for pilots, as while controllers in VATSIM must succeed several tests to be allowed to control, pilots do not. Many of these, when starting to fly online, do not have yet read almost anything about the procedures to follow. If this is the case, their ignorance may reduce the enjoyment of the others on range and also sometimes may cause damage to the other members to some extent.

During this period of a year, Spanish-speaking controllers and pilots have largely used the "old" version 2 of this document (available only in Spanish). This new version has been renewed, enlarged and improving the latter versions to suit pilots' needs and the English part was thought to assist the members of DC-3 Airways to succeed their first flights on VATSIM. We hope that it be useful either for controllers and pilots as well.

Since I begun with this hobby about four years ago, I studied initially the several SATCO manuals, later the VATSIM manuals and all other documents I found in the net referring to Air Traffic Control. This paper you have in your hands have been compiled from the above mentioned texts, also from the great work of Rafael Povedano's "Manual de Radio-comunicación para Pilotos" (Radio Communication Handbook for Pilots) (the only available version is in Spanish and can be found at <http://www.airhispania.com/>) and also from the master lessons of my teacher, Ramón Sainz de Vicuña, real life ATC instructor. I strongly recommend you to read the several ATC manuals available at the Training Department of VATSIM Europe (<http://vatsim-eur.org/default1.htm>), for example.

Also, it is recommendable to get from FLIGHTSIM.COM (<http://www.flightsim.com>) in its OP-ED section are the articles "How not to drive an ATC crazy" by Roger Curtiss and "How not to drive a virtual pilot crazy" by Rick Attfield.

### DISTRIBUTION OF THE AIRSPACE DEPENDING ON THE CONTROL FACILITY

When no Letter of Agreement exist between to contiguous facilities, the distribution of their airspace and their respective functions uses to be done in the following manner:

**Deliveries (DEL):** It is in charge of checking the flight plans (from now on written as FP) and requires its amending if it contains something wrong. It issues the departure clearance, which includes a destination airport, Standard Instrumental Departure (SID), runway and Squawk Code (abbreviated as SSR or Sq). Usually this facility only exists in large airports and it is the first facility to contact when on departure.

**Ground (GND or GMC):** It handles all traffic in the area of the terminals, fingers, platform and taxiways until the holding point of the runways. It also handles traffic on arrivals when vacating active runway and gives taxiing route to the parking area.

**Tower (TWR):** Its boundaries are usually limited to a cylinder of about 10 nautical miles in diameter centred in the airport and a few thousand feet above it. It clears aircraft to enter the active runway for departure and authorises the taking off. On arrivals, it accepts the Instrumental Flight Rules (IFR) aircraft from Approach when they are established on the localizer (LLZ) or with runway insight for Visual Flight Rules (VFR) aircraft. On arrivals, it also clears the aircraft to land.

**Approach / Departures (APP/DEP):** This facility may be found separated or as a single one depending on the traffic load. When acting as approach it provides vectors to arriving traffic until the aircraft is established on localizer, for IFR traffic, or runway insight, for VFR traffic. When acting as Departure, it vectors, if necessary, those aircraft without charts or ensures traffic sequencing for those following a SID. Its airspace is usually a cylinder of 30 nautical miles in diameter and between 5000 feet and FL120, centred in the airport.

**Centre or Radar or Control (CTR):** It cares of the flight phase known as “enroute” between the departure and approach facilities or the neighbouring centre facilities when a flight crosses more that one of those. It does specially care on traffic separation for those aircraft following the same airway.

Those pilots logging in the network should know the four digits ICAO code of the departure and arrival airports and contact the correct ATC from the “ATC Directory” of the SquawkBox menu. The pilot should contact the ATC in his airport following the sequence explained above, beginning from the top and contacting the following facility if the former is not connected. If the pilot is already flying, he should normally follow the reverse sequence to contact an ATC. Thus, when departing, we will initially try to contact Deliveries and, if it does not exist, try with Ground or Tower or Approach or finally Centre. If on flight, the pilot should try to contact the closest CTR facility towards which he is flying.

#### **PILOT'S MANDATORY READ-BACKS**

All instructions or messages given by an ATC to a pilot and including any of the following concepts, must be acknowledged by the pilot:

- Runway
- Heading
- Speed
- Flight Levels
- Instrumental Departures or Arrivals (SID, STAR)
- Altimeter values (QNH)
- Transponder
- Frequencies

However, winds, for example, do not need to be acknowledged.

In any case, an if on doubt, it is preferable to read-back the message rather than being exposed to the ATC requirement to do so (ATC trend to rapidly become angry).

## INITIAL ESTABLISHMENT OF COMMUNICATIONS

Normally, the aircraft must start communications.

- 1) Aircraft: "Barcelona Approach, good day, KLM 1234"  
 ATC: "KLM 1234, Barcelona Approach, good day, go ahead"
- 2) ATC: "KLM 1234, good day, Barcelona Approach "  
 Aircraft: "Barcelona Approach, good day, KLM 1234, go ahead"

## COMMUNICATION REQUIREMENTS:

In its first call, the aircraft **MUST ALWAYS** report its position, ATIS copied, his clearance and request.

Keep in mind that many pilots use to prepare their flight plan without a connection and, when this is established, the FP must be resent in order to reach all ATC in range. Otherwise, the ATC has one or more SSR 1200 codes (transponder code 1200) (7000 in Europe) and he does not know who is talking to him or wherever it is.

Example of contact on flight:

- Pilot: "Barcelona Approach, good morning, with information LIMA, cleared to runway heading and 3000 feet, requesting clearance for GARBI 1C departure, EC-LDC".
- ATC (Departures): "EC-LDC, good morning, LIMA correct, radar contact, cleared to GARBI intersection, c/m (climb and maintain) FL130"

Example of contact on land:

- Pilot: "Barcelona Deliveries, good morning, at gate B with information LIMA requesting IFR clearance to LEPA as filed, EC-LDC"
- ATC (Delivery): "EC-LDC, good morning, LIMA correct, radar contact, FP received and approved. Report ready to copy departure clearance"

## APPROACH VECTORS:

Approach vectors are given, obviously, by Approach.

Besides other details that the controller learns with time and, mostly, reading the manuals, issuing vectors of more than 60° is not recommended to avoid closed turns at slow speed. The final vector to intercept the localizer should not exceed 30°.

Also the ATC must clearly indicate to the pilot when is the latter is being brought to the Transition Level and when he is descended below it. Above or in the Transition Level, the aircraft must have the altimeter set to standard pressure (1013.2 Mb or 29.92 inches) while the altimeter must be set to local arrival pressure when crossing below the Transition Level on descents.

The ATC may take advantage of the published Radar Minimums to descend the aircraft while keeping a safe clearance above obstacles to intercept the glide slope at a reasonable distance of the airport, depending on the aircraft category. As a general rule, the ATC will descend an aircraft to about 3000 feet AGL (Above Ground Level) at about 15 miles from the threshold.

Example:

Pilot	Barcelona Approach, good day, EC-LDC with info LIMA, 30 miles inbound VILGA, FL 120, requesting clearance for approach to Barcelona, EC-LDC
ATC (Approach):	EC-LDC, good day, LIMA correct, radar contact, cleared to VILGA 1T arrival to runway 25. Descend and maintain FL70, Transition Level
Pilot:	Rgr. Cleared to VILGA 1T arrival to runway 25. Descend and maintain FL70, Transition Level. EC-LDC
ATC (APP):	EC-LDC, your read-back is correct
Pilot:	Approach, we are 5 miles inbound VILGA, maintaining FL70, EC-LDC
ATC (APP):	EC-LDC, rgr. Leave VILGA on R212 GRN (Radial 212 Girona VOR), initial vector for ILS runway 25. D/M (descend and maintain) 5000 feet, radar minimum. Q1015, slow 230 KIAS, maximum
Pilot:	Rgr. Leave VILGA on R212 GRN, initial vector for ILS runway 25. D/M 5000 feet, radar minimum, Q1015, slow 230 KIAS, maximum. EC-LDC
ATC (APP):	EC-LDC, read-back correct
ATC (APP):	EC-LDC, T/L (turn left) heading 340°, descend to 3000 feet
Pilot:	Rgr. T/L hdg 340°, descend 3000 feet, EC-LDC
ATC (APP):	EC-LDC, T/L hdg 280°, final vector to LLZ rwy 25, D/M 2300', slow 180 KIAS
Pilot:	T/L hdg 280°, D/M 2300', slow 180 KIAS. EC-LDC
ATC (APP):	EC-LDC your read-back is correct. Cleared to LLZ (localizer) runway 25, report established
Pilot:	Cleared LLZ rwy 25, will report established, EC-LDC
Pilot:	Established on LLZ rwy 25, EC-LDC
ATC (APP):	EC-LDC rgr. Contact TWR on 118.100. Good day
Pilot:	Will call TWR on 118.100. Thanks and good day. EC-LDC

## TRANSITION ALTITUDE AND TRANSITION LEVEL

The TRANSITION ALTITUDE is usually set to countries or large regions. In Spain it is at 6,000 feet (except for Granada airport where it is higher because of its topography) while in the USA it is at 18,000 feet. Its value is normally published in the airport charts.

This means that for departing aircraft, the altimeter must be set to the local pressure of the departure airport until crossing the Transition Altitude when climbing. Below the Transition Altitude, the altitudes are said in feet. Once the Transition Altitude is crossed when climbing, the altimeter must be set to the standard pressure of 1,013.2 Mb or 29.92 inches. Then, above the Transition Altitude, we always refer to Flight Levels.

On arrivals, Flight Levels are used above Transition Level, this depends on the atmospheric pressure of the arrival airport and is calculated by the ATC and abstracted in the following table:

For a local QNH lower than 1,000 Mb, the Transition Level is set to FL 080

For a local QNH between 1,000 and 1,013 Mb, the Transition Level is set to FL 075

For a local QNH between 1,013 and 1,032 Mb, the Transition Level is set to FL 070

For a local QNH higher than 1,032 Mb, the Transition Level is set to FL 065

Once crossed the Transition Level when descending, the pilot will set the altimeter to the pressure of the destination airport, which will be given by the ATC when instructing the aircraft to descend below the Transition Level. From that moment on, the altitudes must be said in feet.

## DIRECTION AND SEPARATION BETWEEN FLIGHT LEVELS

Airways are usually published for Low Levels (below FL290) and High Levels (above FL290). Those charts display whether for a certain airway it must be flown even or odd flight level and if there is a Minimum En-route Altitude (MEA).

When not in an airway or if an airway has no preferential flight levels, those will be assigned by the ATC or chosen by the pilot using the following rule:

Flying toward the EAST, flight levels should be ODD.

Flying toward the WEST, flight levels should be EVEN.

Low Levels following the same direction are separated by 2000 feet and are:

Low Level Odd: 070, 090, 110, 130, 150, 170, 190, 210, 230, 250, 270 and 290.

Low Level Even: 080, 100, 120, 140, 160, 180, 200, 220, 240, 260 and 280.

High Levels following the same direction are separated by 4000 feet and are:

High Level Odd: 330, 370, 410, 450 and so on.

High Level Even: 310, 350, 390, 430 and so on.

However, in High Level Airways, this situation changed since January 2002, at least in Europe where the RVSM (Radar Vertical Separation Minima) has been implemented.

In this situation, and depending on the equipment of the aircraft, this may be cleared to a flight level with only 2000 feet from the closer same-direction flight level. For further details on RVSM check VATSIM web page (<http://www.vatsim.net/>).

Thus, the High Flight Levels when the aircraft is RVSM equipped are:

High Level Odd: 310, 330, 350, 370, 390 and so on.

High Level Even: 300, 320, 340, 360, 380 and so on.

The airspace from FL460 and higher is NOT CONTROLLED.

#### **SPECIAL SSR (transponder) CODES:**

The SSR codes are given by the ATC and their figures used to depend normally on the departure airport. Now, in Europe, this is being changed and Eurocontrol issues all codes for European traffic. However, there are a few SSR codes, which should be kept in mind, either to be assigned by the ATC or to be set by the pilot in case of necessity.

These special SSR codes are:

0000	unconfident transponder
7500	hijack
7600	radio failure
7700	emergency
7760 a 7776	transponder test on land

#### **SUGGESTIONS FOR A PROPER USE OF THE TRANSPONDER:**

1. When a pilot is ready to fly online, the transponder should preferably be set to STAND BY before connecting, mostly if he has not yet filed a FP. By doing this, only a "v" or "/" sign will appear on the ATC screen, depending on the SSR set by the pilot, without any other aircraft data. Then is time to file the FP and, when we believe that it is correct, set the transponder to mode CHARLIE by unchecking the "Squawk Standby" on the SquawkBox menu.
2. ATC should avoid aircraft in their airspace without a SSR code and better if this agrees with the codes for his airport, even though it may only be a question of aesthetics. Personally, when looking at the radar screen, it is very disappointing to see VFR codes for IFR flights or IFR flights with the VFR box checked in their FP, when a valid ATC is on duty.
3. SSR codes not only can be assigned by the ATC. If necessary, the pilot can set his transponder code to any of the above mentioned special codes to transmit a particular situation to the ATC. For example: there may be a busy facility, in terms of communication, and a pilot may suffer an engine failure and may want to declare emergency but the radio channel is collapsed. In this case, the pilot may set his SSR code to 7700 and the word EMERG will immediately appear in the ATC screen under that aircraft. Then, the ATC will stop all other communications and will request our pilot to confirm the emergency.

**A FULL EXAMPLE:**

To illustrate a full flight, following you will find an example where our pilot contacts all possible facilities between the departure and arrival airports.

For this, we will be departing from Barcelona (LEBL) and flying to Palma de Mallorca (LEPA). Our aircraft is a small jet. Due to the little distance between Barcelona and Palma, the maximum allowed is FL170 (as it is in real life).

In this example, we will assume that our pilot is fully equipped with SID (Departure) and STAR (Arrival) charts.

Our proposed FP is:

Dep.: LEBL	Arr.: LEPA	Alt.: LFMP	FL170
Route:	LEBL-(SID GARBI)-GARBI-TOLSO-(STAR TOLSO)-LISAS-POS-MUROS-LEPA		

So, we place our aircraft at Terminal B (domestic flights), for example, with engines off. Then, we open SquawkBox menu and check "Transponder Stand by". We log in the network, we file the above FP filling correctly the remaining boxes (if needed) and then uncheck "Transponder Stand by". Then, I do normally "Resend FP" and "Update weather" to be sure that any ATC in range receives my FP and that I am having the latest weather conditions. Then, we open the "ATC directory" and double click on LEBL\_DEL or (most likely) LEBL\_V\_DEL (the "V" is to clearly state that he is "voice" equipped").

In this case, we assume that all possible facilities are on duty. So here we go:

Pilot:	Barcelona Deliveries, good day, at finger 12 of Terminal B, with info ALPHA. IFR FP to Palma de Mallorca requesting departure clearance. EC-LDC
ATC (DEL):	EC-LDC, good day. Info ALPHA is correct. Your FP is received and approved. Report ready to copy departure clearance
Pilot:	We are ready to copy departure clearance. EC-LDC
ATC (DEL):	EC-LDC you are cleared to Palma de Mallorca, Departure GARBI 1C, runway 20, Squawk 3243
Pilot:	Cleared to Palma de Mallorca, Departure GARBI 1C, runway 20, Squawk 3243. EC-LDC
ATC (DEL):	EC-LDC, your read-back is correct. When ready contact Ground on 121.700. Good day
Pilot:	Will contact GND on 121.700 when ready. Thanks and good day. EC-LDC
Pilot:	Barcelona Ground, good day. EC-LDC, with info GOLF, at finger 12 of Terminal B, cleared to Palma de Mallorca, request Start Up (SU) and Push Back (PB). EC-LDC

Normally, the ground controller is placed at the Tower, so he normally has visual contact with aircraft on ground and on radar as well. At this moment, the pilot can also give detail on the type of aircraft to facilitate the visual identification.

ATC (GND): EC-LDC, good day, info GOLF is correct, you are in visual contact. SU and PB is approved. Temperature is 18° C, dew-point is 12° C. Report when ready to taxi

Pilot: SU and PB is approved. Temperature copied. Will call ready to taxi. EC-LDC

Pilot: We are ready to taxi. EC-LDC

ATC (GND): Taxi to runway 20 via taxiway ALPHA and QUEBEC and hold short (H/S). Q1014

Pilot: Taxiing via ALPHA and QUEBEC to rwy 20 and h/s. Q1014. EC-LDC

During his taxi, the aircraft may have to cross any other runway. In such case, the pilot does not need to ask for permission to cross it unless explicitly requested by the ATC. However, you may find an ATC who does not know this rule and may call you for crossing a runway without permission. In such situation, you should kindly inform him about the regulations above explained.

Pilot: Holding short rwy 20. EC-LDC

ATC (GND): Rgr. EC-LDC contact Tower on 118.100. Good day

Pilot: Contacting TWR on 118.100. Good day. EC-LDC

Pilot: Barcelona Tower. Good day. With info TANGO. Holding short rwy 20. EC-LDC

ATC (TWR): EC-LDC, good day. TANGO correct. Radar contact. When airborne, climb and maintain (C/M) 4000' and heading (HDG) 210°. Cleared to line up and hold rwy 20

Pilot: When airborne, c/m 4000' on hdg 210°. Cleared to line up and hold rwy 20. EC-LDC

Pilot: Holding rwy 20 and ready for departure. EC-LDC

ATC (TWR): Winds 212 at 15 knots. Cleared to take off (T/O) rwy 20

Pilot: Cleared to T/O rwy 20. Winds copied. EC-LDC

Pilot: Airborne, climbing to 4000' on hdg 210°. EC-LDC

ATC (TWR): EC-LDC, contact Departures on 124.700. Good day

Pilot: Contact Departures on 124.700. Good day. EC-LDC

Pilot: Departures, good day. With info DELTA passing 3000' to 4000' on hdg 210°, as cleared. EC-LDC



ATC (DEP): EC-LDC, good day, DELTA correct, radar contact. Proceed on GARBI 1C, C/M FL130. Maintain max 250 KIAS

Pilot: Proceed on GARBI 1C departure. C/M FL130. Maximum 250 KIAS. Wilco. EC-LDC

The word "roger" (RGR) means you have understood the message. The word "wilco" means you have understood and will accomplish the instruction received.

Pilot: Reaching FL130 on GARBI 1C departure. EC-LDC

ATC (DEP): Rgr. EC-LDC contact Control (or Radar) on 132.570. Good day

Pilot: Contacting CTR on 132.570. Thanks and good day. EC-LDC

Pilot: Control, good day. With info CHARLIE. At FL130 and reaching GARBI.

ATC (CTR): EC-LDC. Good day. Info CHARLIE correct, radar contact. C/M FL170. No speed restrictions. After GARBI proceed as filed. Report 25 miles inbound TOLSO. Expect rwy 24L at Palma

Pilot: Rgr. C/M FL170 without speed restrictions and after GARBI as filed. Will report 25 miles inbound TOLSO. Expecting rwy 24L at Palma, thanks. EC-LDC

Pilot: At 25 miles inbound TOLSO and FL170. EC-LDC

ATC (CTR): EC-LDC, rgr. Contact Palma Approach on 119.400. Good day

Pilot: Contacting Palma Approach on 119.400. Thanks and good day. EC-LDC

Pilot: Approach, with info ALPHA, FL170, 20 miles inbound TOLSO to Palma as final destination. EC-LDC

ATC (APP): EC-LDC, good day. ALPHA correct, radar contact. Maintain FL170 and proceed via TOLSO 1P arrival to rwy 24L

Pilot: Maintain FL170 and proceed via TOLSO 1P. Wilco. EC-LDC

Pilot: Approaching LORES, request initial descent. EC-LDC

ATC (APP): EC-LDC, D/M FL070, Transition Level. Slow 250 KIAS

Pilot: D/M FL070, Transition Level. Slow 250 KIAS. EC-LDC

Pilot: On R188 outbound POS VOR, FL070, 250 KIAS. EC-LDC

ATC (APP): EC-LDC, rgr. Slow 210 KIAS, D/M 3000', Q1015. Cleared to Localizer (LLZ) rwy 24L. Report established.

Pilot: Slow 210 KIAS, D/M 3000', Q1015. Cleared to LLZ rwy 24L. Will call established. EC-LDC

Pilot: Established on LLZ rwy 24L. EC-LDC

ATC (APP): EC-LDC, slow 180 KIAS, contact Tower on 118.30. Good day

Pilot: Slow 180 and contacting TWR on 118.30. Thanks and good day. EC-LDC

Pilot: Tower, good day. With info UNIFORM. Established on LLZ rwy 24L. EC-LDC

ATC (TWR): EC-LDC, good day, UNIFORM correct, radar contact. Cleared ILS approach. Slow 160 KIAS. Report on Outer Marker (OM)

Pilot: Cleared ILS approach, slow 160 KIAS. Will report OM. EC-LDC

Pilot: On OM. EC-LDC

ATC (TWR): Cleared to land rwy 24L. Winds 235/15

Pilot: Cleared to land rwy 24L. Winds copied. EC-LDC

Pilot: Rwy cleared via HOTEL. EC-LDC

ATC (TWR): EC-LDC contact GND on 121.900. Good day

Pilot: Contacting GND on 121.900. Good day. EC-LDC

Pilot: Ground, good day. With info INDIA, vacating rwy 24L via HOTEL. EC-LDC

ATC (GND): EC-LDC, good day. INDIA correct, visual contact. Taxi to Terminal 2, finger 7 via taxiway ROMEO and SIERRA

Pilot: Via ROMEO and SIERRA to finger 7 at Terminal 2. EC-LDC

Pilot: At finger 7, Terminal 2. Engines off. Request closing FP and frequency change. EC-LDC

ATC: EC-LDC, welcome to Palma. FP closed and frequency change is approved. Have a nice day

Pilot: FP closed and frequency change is approved. Thank you sir. Have a nice day. EC-LDC

That's all! Quite simple, isn't it?

This would be a typical flight passing through all possible facilities. We will find several variations to this, but basically it is the same as most phraseology is repetitive.

You may find the situation when a pilot does not have charts and then he will not be so rapidly cleared to a SID or STAR as the ATC will vector him through the fixes. In this case, the pilot should clearly state that condition in the REMARKS box of his FP stating, for example: "NO CHARTS ON BOARD". When no charts on board, it is also recommended to remind it to the ATC when receiving the clearance saying, for example: "NO CHARTS ON BOARD AND REQUESTING DEPARTURE VECTORS". On arrivals, we may say: "NO CHARTS ON BOARD. REQUESTING ARRIVAL VECTORS". By doing this, our pilot would be vectored by the DEP on departures and APP on arrivals.

## **FINAL WORDS**

When you do not yet feel comfortable when flying online or using phraseology, I do strongly recommend you to type "NEWBIE" in the REMARKS box of your FP. This will immediately be seen by the ATC who will be by far much more flexible with your mistakes and will also normally teach you about how to proceed explaining why he does something or what you should do.

Every one of us has started once and needs time to learn, practice and become familiar with this simulation. However, it is expected from all users to do their best to improve their skills and thus contribute to the common enjoyment of this hobby. I mean that you may be a very bad pilot when landing, but that is not a problem except for your while you behave and proceed as a pilot should do. Your little skills when landing may only be bad for the others if you land, for example, on the parking aircraft waiting on the platform.

I hope this pages be useful to the reader; this will be the only reward for the hours spent by the writer. Undoubtedly, this paper may be better and any suggestion will be very welcome to [solraig@arrakis.es](mailto:solraig@arrakis.es) so next version may be improved.

Hope you enjoy this hobby as much as I do and hope to see you around Barcelona FIR.

Lluís del Cerro

Sitges, April, 12<sup>th</sup>, 2002