

Airbus Series Vol.2

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Frequently Asked Questions

Fuel Planning

The fuel planner has been improved (since Volume 2 SP1) and is now quite accurate. Nevertheless, you should be aware that the fuel planner consumption computation is based on the following hypothesis:

- standard atmosphere
- clear weather
- no ATC constraint and no traffic
- no step climb
- no step descent (managed descent with idle thrust)
- direct waypoint to waypoint route

When you know this, you can understand the fuel planner information should be modified before you start your flight. The fuel quantity suggested by the fuel planner should be increased if you expect strong winds, especially headwinds (the wind is sometimes very strong at high altitude). So watch the weather forecast before taking off. You should also increase the fuel quantity if you fly with the FS-based ATC because it often directs you to very long approaches instead of the direct approach usually programmed in the FMGC. This is also necessary because the FS ATC often asks you to make several steps in the descent, which prevents you to use idle thrust during the whole descent, thus consuming more fuel.

The route reserve (5% of the trip fuel by default) is dedicated to this usage, so you can change the fuel quantity for the route reserve, or the percentage. Also note that if you are on a big airport, taxiing to the runway may burn more than 200 kg of fuel, which is the default taxi fuel quantity. Increase it if necessary. You are the pilot, and your experience will help you in determining the optimal fuel quantity for your flights.

Developer's Advice:

In order to correctly plan a flight, start FS and load your aircraft. Before starting the engines, program the flight in the MCDU without entering the fuel information. When the route is fully programmed, with the cruise altitude, all the waypoints and the SID/STAR, read the total flight distance on the MCDU.

Then run the fuel planner and enter the flight distance, the cruising altitude (in feet) and the zero fuel weight (ZFW). Make sure the ZFW is good, and make sure it is the same as the one you enter in the MCDU. The fuel planner provides the total fuel quantity and the fuel quantity for each tank, in percentage and in kg/lbs. My suggestion is that you read the percentage value here.

Then switch back to FS, open the fuel loader, and enter the exact percentage values you got from the fuel planner. I noticed this is the best way to get an accurate fuel quantity. If you enter a fuel quantity in gallons or pounds, FS sometimes rounds it to another value.

Validate the fuel load and look at the fuel on board (FOB) value displayed on the E/WD. There might be a discrepancy between the value you read and the total fuel

value suggested by the fuel planner. This is because of conversions between unit systems and rounding, but you should worry about this. I noticed the difference is usually less than 1%, so it does not impact the flight.

If you planned your flight properly, you will arrive at destination for enough fuel for a possible go-around, everything will be fine. Have a safe flight...

Managed Descent

Reminder

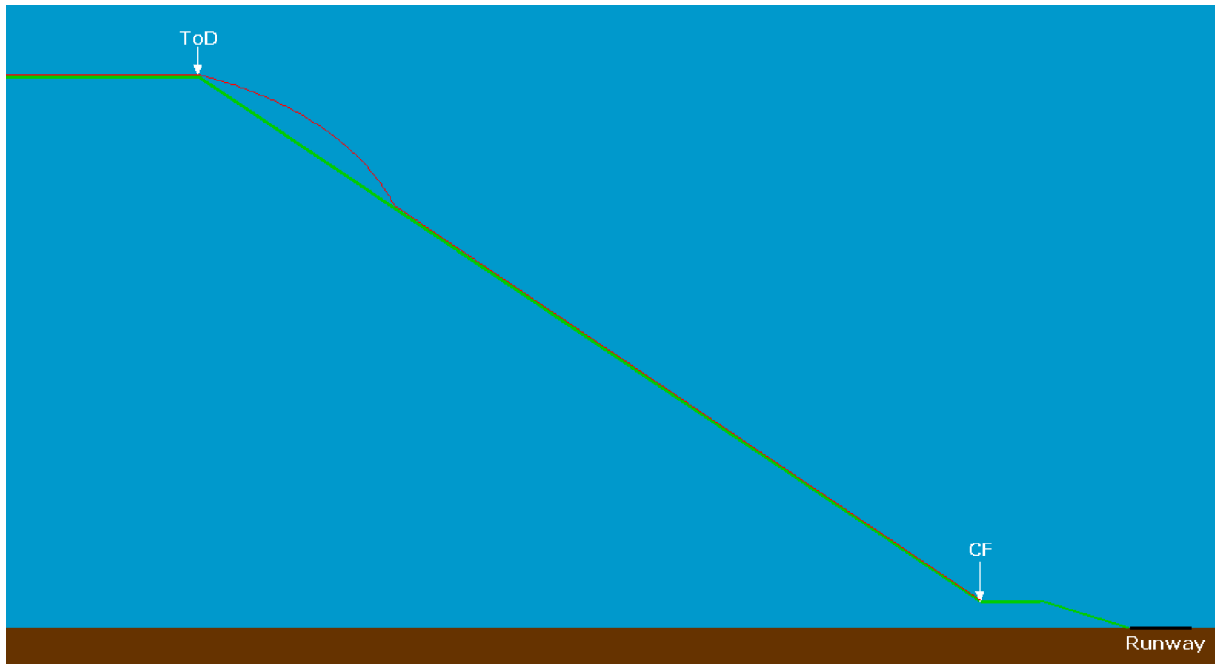
The managed descent is a descent mode that allows the aircraft to descend from the cruise altitude to 2000 feet AGL on idle thrust. It is the most economic possible descent because the aircraft does not use the engines, it only uses its weight to descend. The FMGC computes the location of the top of descent (ToD) point at which you should engage the descent in managed mode. During a managed descent, the aircraft speed can vary from -20 to +20 knots around the descent speed. A magenta circle on the PFD shows the vertical deviation (VDEV) next to the altitude tape, and the PROG page on the MCDU continuously shows the VDEV value (see the aircraft documentation for more information.)

How to use it?

The managed descent mode provides the perfect descent profile if you live in a perfect world with no ATC constraint and no traffic. But we do not live in a perfect world... In reality, the ATC usually asks you to descend with several steps. For example, you are cruising at FL330 and begin your descent, the ATC clears you to descend to FL210. When FL210 is reached, the aircraft levels off and uses the engines to maintain this altitude. Later you can be cleared to a lower altitude and descend again on idle thrust until this altitude is reached, etc...

The following images illustrate several descent situations. On these images, the green line represents the computed descent profile, and the red line shows the aircraft vertical trajectory. The ToD and the CF are the Top of Descent point and Course Fix computed by the FMGC.

The first image shows the ideal descent path. You may expect to have your aircraft following the green line accurately, but in the real world, the aircraft takes some time to physically engage the descent and it needs to increase the standard rate of descent to intercept the computed profile. As soon as this is done, it follows this path until it reaches the CF or the altitude entered in the FCU. This kind of "perfect" descent can be done if you have no ATC constraint.

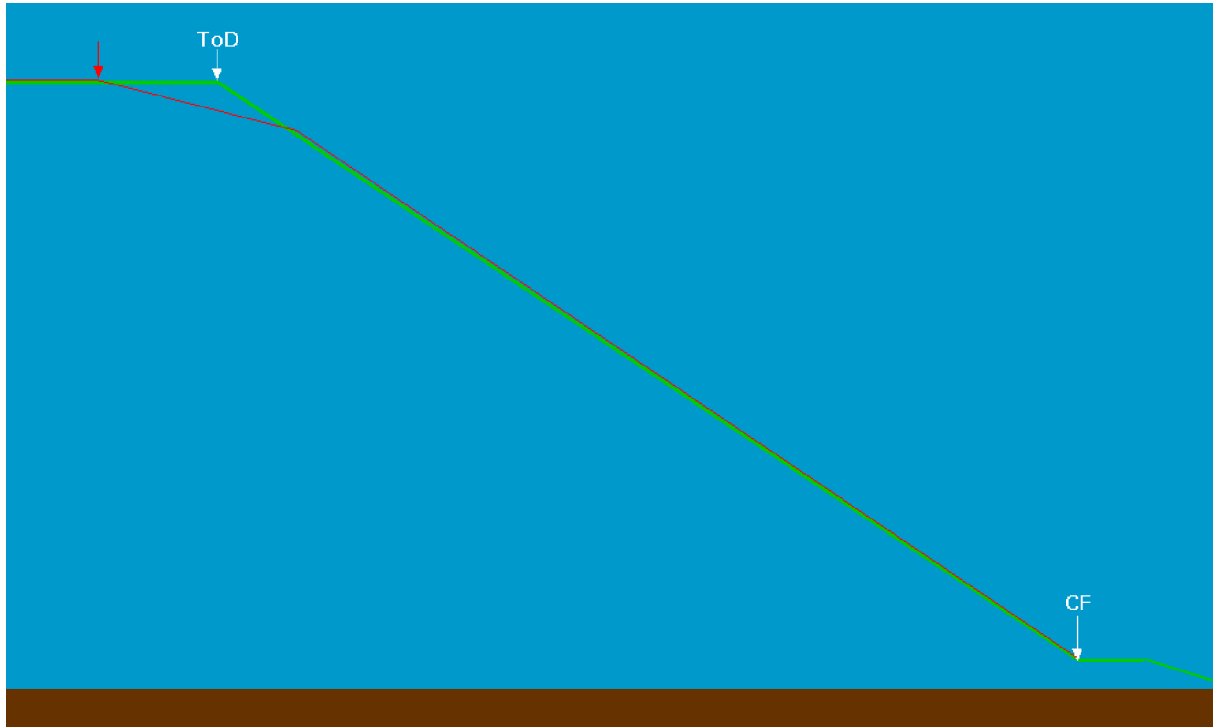


The following image shows such a descent in flight. It has been taken when the aircraft was passing the KBUNK waypoint. You can see on the PFD the magenta circle is perfectly centred, which means the descent profile is perfectly followed. On the ND, you can see we are just passing KBUNK, and the PFD altitude shows 15860 feet. On the MCDU screen, you can see this is exactly the value of the altitude computed by the FMGC.



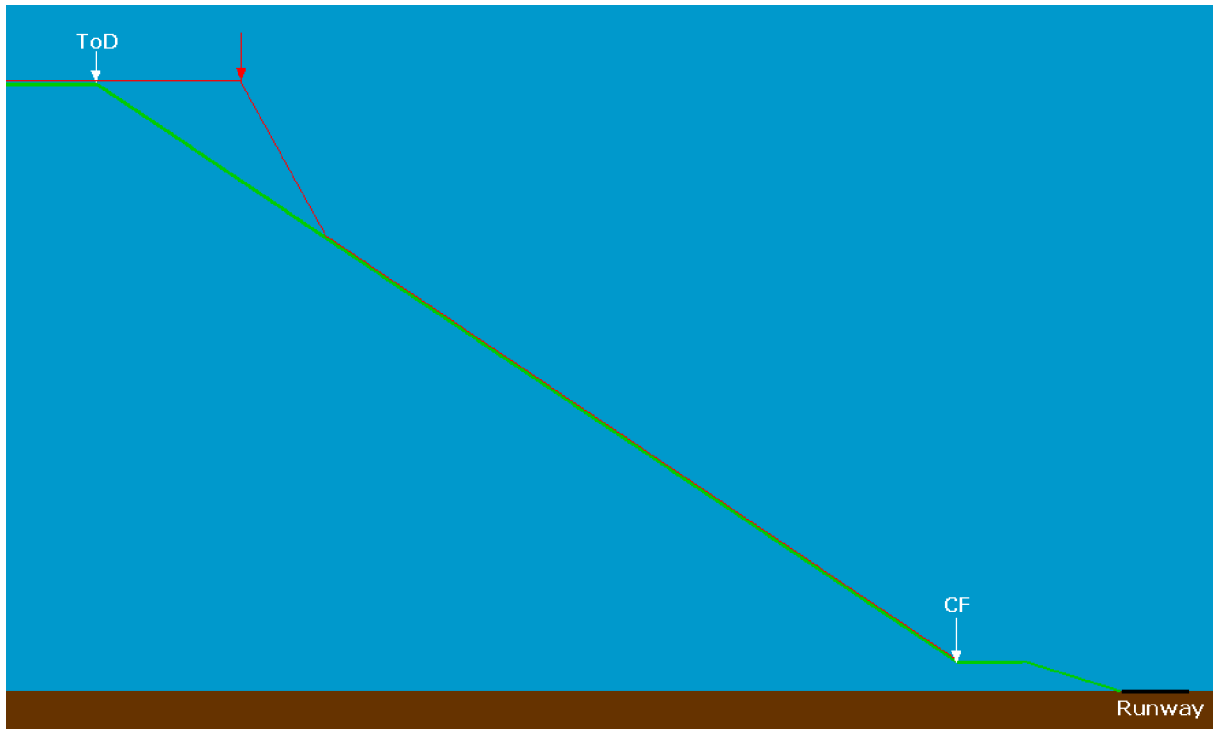
If you fly with air traffic control (FS ATC or network flight), the ATC will often clear you for descent before or after the computed ToD point.

If you start descending before the ToD, the aircraft will gently engage the descent at a low rate of descent until it intercepts the computed profile, as shown on the following image (the red arrow shows the point where the descent is initiated.)



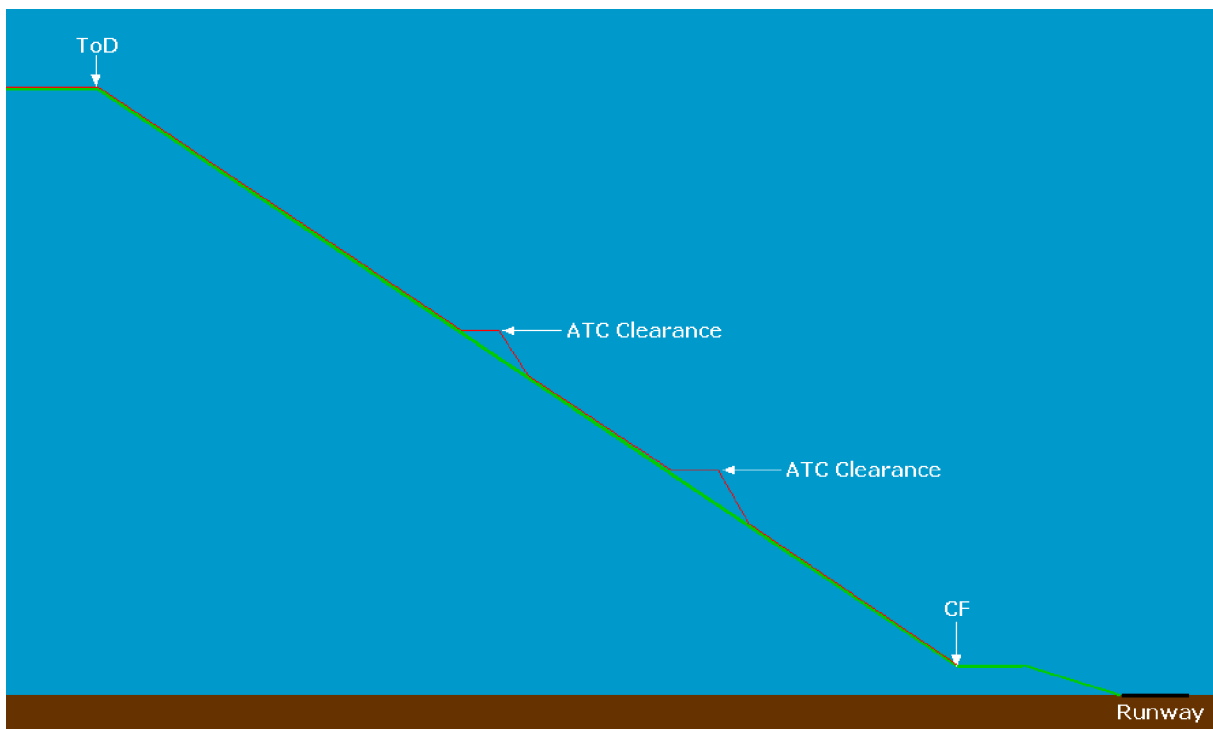
If the low descent part is too long, the aircraft may use some engine thrust to maintain the minimal speed authorized during the managed descent. This makes the descent less economic than the “perfect” managed descent and may impact the quality of the fuel prediction computed by the FMGC.

On the other hand, if the ATC allows you to start the descent after the ToD, the aircraft will take a high rate of descent (limited by the maximum speed authorized in managed descent) in order to intercept the computed profile, as shown on the following image:



If you start the descent too far after the computed ToD, you might have to extend the spoilers to let the aircraft increase the rate of descent without exceeding the maximum speed. In the worst case, the aircraft can not intercept the computed profile, and you have to choose another strategy for the descent, using the V/S mode or open descent.

The last possible case is a step descent. As you are at cruising altitude, the ATC clears you for a lower altitude, at which the aircraft levels off until you get another clearance from the ATC.

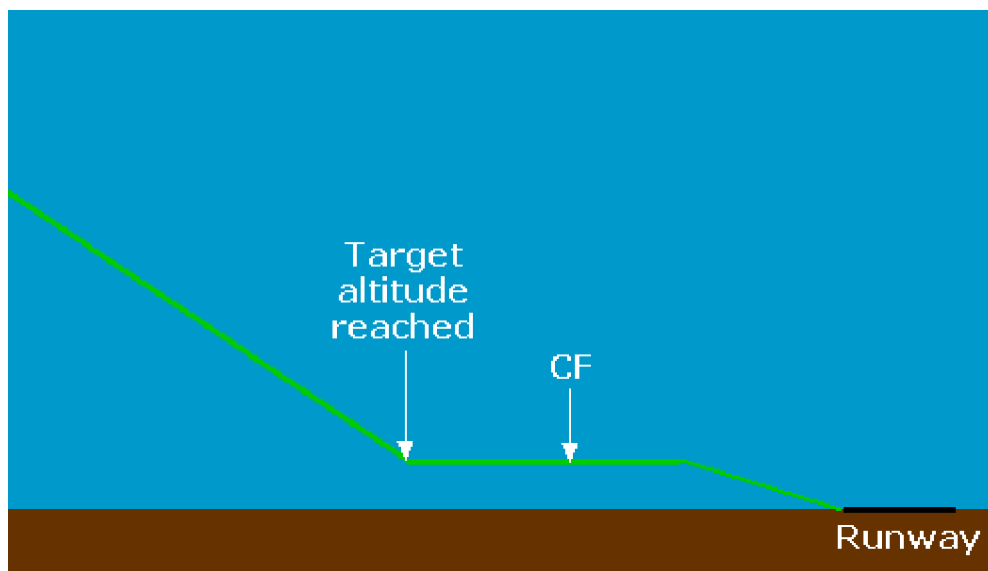


Each time you level off, the aircraft does not follow the computed profile anymore. As soon as you get a clearance to descend again, the aircraft “dives” to intercept the profile again. This can result in high descent rate, depending on the altitude.

You should be very careful when using managed descent mode. You must be aware that if the aircraft is above the computed profile, it may take a high rate of descent to intercept it. This is why you should be cautious and avoid using this mode at low altitude.

Aircraft too slippery

It is true, the Airbus aircrafts are very slippery, and it is realistic. Aerodynamics engineering have worked hard to make the wings so efficient, so do not be amazed if the aircrafts are efficient in flying, even with low engine power. This is why the actual descent profile is computed in order to provide a good distance to let the aircraft slow down and come smoothly to the landing configuration by extending flaps and gears. The final part of the computed descent profile looks like this:



You can see that the target altitude is reached before the CF, providing you 5 to 10 NM of flat flight that allows the aircraft to slow down, and allows the pilot to extend flaps and gears at the correct speeds.

Developer's Advice:

If the ATC permits, descend to an altitude that is approximately 3000 feet above the ground level (AGL). If you use the managed descent mode, you should reach this altitude 5 to 10 NM before the course fix (CF). From this point, the aircraft flies at constant altitude on a distance that will make it slow down. If you use managed speed, the aircraft first uses the Green Dot speed as the target speed. Then you can extend the flaps progressively, and the target speed will be S, F, and Vapp for the final approach. You should arrive to the CF point with flaps 2 and gears extended, or you can be in full landing configuration (flaps full and gears extended) if you prefer. This is the pilot choice.