



RAW DATA ILS USING MAN THRUST

This item causes concern amongst many. Reason; we don't have a method and we don't get to practice!

The FCTM gives little advice, although the latest version has more tips than before, most of these were already known to experienced Instructors however.

The cases where a Raw Data ILS will be required are generally as follows;

SIMULATOR ASSESSMENTS FOR PILOT SELECTION

LST FOR TYPE RATING

LST FOR ATPL ISSUE

FAILURES THAT KEEP NORMAL LAW

AND

VARIOUS FAILURES THAT MAY OCCUR LEADING TO ALTN /DCT LAW

In the first 3 cases there are no failure conditions present, therefore flap full and NORMAL LAW will be the case.

In the 4 th case flap 3 or 4 may be used.



In the case of failure conditions that induce ALT/DCT law, it is then mandatory to use flap 3 for appr/landing with a plus 10 kt spd increase.

Let us now look at the cases 1 to 4 mentioned above;

Many pilots realise that the thrust adjustments are the one factor that causes difficulty with Raw Data ILS approaches. This is NOT the only cause of high work load however. The second major problem is not knowing when best to configure. For many the desire to configure early is very strong, but this is NOT the best way to manage the changing energy levels that result.

Essentially this Appr requires a strict control of energy against drag, if we understand HOW to manage the Energy of the A/C on this approach we will be able to reduce our workload and have the spare capacity to concentrate on our basic Instrument scan.

What you need for raw data flying is a quick I/F scan and a slow hand!

YOU WILL BE FLYING WITH THE FPV (NO F/D)

With ALL FBW A/C we must remember that the A/C has the ability to WEIGH itself during flight. Not the WT that you insert into the FMGC but the WT computed by the FAC. From this WT the A/C produces GREEN DOT spd-----to many this is seen as “MIN CLEAN SPD”

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please remember this is not a conventional A/C-----this is FBW----green dot is the “the best lift / drag ratio speed----which means that WT is included in the calculation. IT IS NOT MIN CLEAN SPD!

SO---for any FBW A/C we can use GD speed to find a thrust setting that will be FIXED from about 18 NM all the way to touchdown. This will be accurate for 1 or 2 ENG approaches.

(Normally only 2 thrust adjustments will be required---BUT ---thrust may be altered at any time if conditions require it-----just remember the reference----go back to it ASAP)

We will call this REFERENCE THRUST.

So how to find REF THRUST?-----Fly Straight and Level for 20 secs at GD speed CLEAN-----read the NI----SET THE N1 -----DISCONNECT the A/T.

For the A 320 at mid wts---60 to 66 tons this will be about 50 to 54 % on 2 engs

For 1 eng it will be about 68 to 74 %.

Now for those of you thinking that you do not have 20 secs to spare or feeling that some Zealous check pilot will NOT give you the time -----try this----set 52 % and then use the TREND ARROW AND THE THRUST LEVER TO STOP THE TREND ARROW MOVING WHEN FLYING AT GD SPD.

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OK now let us look at how and when to configure the A/C;

17 NM SET FLAP 1

With F1 set now adjust the spd to get back to VFE NEXT -5 for flap 2

Do this by reducing thrust by a numerical value of 10---so 52 becomes 42 %

Now watch the trend arrow----when the trend arrow touches VFE next – 5 -----in this case 195 kts-----replace your 52%---the trend arrow will stop moving and you will be on speed ready to take flap 2.

The next event will be the turn onto the LOC-----many mistakes made here----remember banking more than 25 DEG is a FAIL without a F/D and will also cause you to go through the LOC!

Start the turn when LOC alive---- Bank at 10 to 15 deg and use the ROSE ILS display if available, to help you with the turn on, when established go back to arc display.

Keep the “BIRD” LINED UP with the BLUE LINE! And watch the LOC Diamond.

Once established on the LOC relax and wait!

We want to configure the A/C now in a controlled way----manage the energy!

The technique is to configure with the G/S.

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When you see G/S alive call for Flap 2 AND the GEAR down-----do NOT delay the gear selection as this will control your speed reduction to VFE NEXT F 3 minus 5---keep the thrust constant.

As soon as you see the speed is ok for F 3 call F3----NO thrust change.

You are now approaching the G/S interception point-----remember what you did with a NPA SEL/SEL? You pulled FPA AT .3 NM PRIOR TO DESC! ----WELL do the same for yourself!

The .3 position is when the tip of the G/S diamond just touches the yellow engagement bar! So at this point PUSH the FPV down to engage with the -3 degree position-----this is when there is a 1 mm gap below the belly of the “bird” (the -5 pitch line) and a 1 mm gap above the tail feathers of the “bird” (below the Zero pitch line)

Airbus designed the size of the “BIRD” SYMBOLOGY to be exactly this size!

While you are pushing the “bird” down to – 3 deg-- call flap full. The speed will now slowly decay towards VAPP -----depending on the WT----you may need to adjust the spd to be stable at 1000FT-----if so do this at 1500 ft agl---use the same method as before---take 10 units of thrust off---bring the trend vector down to just above VAPP then replace the thrust back to the reference thrust

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So all you have to do now is make SMALL corrections to pitch and roll to keep the LOC AND G/S centered. Remember below 1000 ft agl CORRECTIONS MUST BE VERY SMALL!

Tolerance is 1/2 dot of LOC AND G/S.

OK ---so what about the Failure cases; Double FMGC FAIL, DOUBLE FCU FAIL----these keep normal law---but ----you will lose A/T. Use the technique described above----especially with double FMGC fail----you will have to tune the ILS using RMP BACK /UP----result---NO DME WITH THE ILS---but you know when to configure because you are using the G/S for your flap selections---in any case---try this ---2 dots on the G/S = 2 nm from the desc point----1 dot on the G/S =1 nm from the desc point.

For failures that go ALT LAW/ DCT LAW WITH GEAR DOWN-----the requirements are to config as follows; F1 F2 F3 GEAR-----the exception being G PLUS B HYD-----here you must take the gear when at 200 kts with F1 -----this is required to control your speed.

Dual RAD ALT fail is a real odd ball----you go from normal law to dct when gear down. Problem is the ECAM TELLING YOU F 3 PLUS 10 KTS does not appear until you put the gear down! Very confusing!----the way to play this one is fly it fully auto using the LOC----1 nm prior to the G/S intercept (1 dot) convert to a raw data hand flown approach! Take the gear only when established on the G/S---use the trend vector to control your thrust in this case.

You can modify the basic technique to achieve a good result if you use the trend vector, with the exception of the G PLUS B HYD, always take the gear down when FULLY established on the G/S



DISCLAIMER: The foregoing is designed to assist PILOTS in their Operation. It is NOT intended to be an Exhaustive list of every possible Scenario. In addition if any of this information is found to be in contradiction with COMPANY SOP or AIRBUS MANUALS then those documents will take precedence.