Commercial pressure

by Captain Dirk De Winter

When speaking of commercial pressure in aviation there is no topic more sensitive than fuel!

Part-OPS for fixed wing commercial operations specifies that every operator must establish a company fuel policy on the minimum amount of fuel which must be on board before the departure of a flight.

The "basic procedure" has little extra margin. In the textbook scenario, the aircraft arrives at the destination airport and makes an approach, does not acquire the required visual reference at the applicable decision altitude, executes a go-around and continues to the specified alternate airport where it can hold for a maximum of 30 minutes before making an approach and landing. After landing it is permitted to be towed to the terminal because taxi-in fuel is not included. In practice, most flights land at their destination with the alternate and final reserve fuel and possibly the contingency fuel still in their tanks so they are a long way from this 'bottom line'.

In their daily operations, flight crew are guided in their calculations by the company operational flight plan (OFP). In many larger airlines using modern aircraft, this OFP is specific to the flight and derived from a database with all the possible permutations of departure, en route, arrival and diversion which could apply. In others, the OFP is still the type that every airline once used, generic to the route in all conditions rather than tailored to a specific flights.

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is has over 11,000 hours flying time over the last 22 years. He started as a cadet pilot with SABENA in 1987 flying Boeing and Airbus aircraft. Before starting his flying career Dirk obtained an academic Master degree in Electronic Engineering at the University of Brussels. Since January 2009 Dirk has been working part-time in EUROCONTROL Agency.


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OFP ROUTE:
-EGKK/08R F390 SAM3P SAM UN621 BASIK UZ150 NOVAN UN864 DELOG/F330
 UN864 NEA/F270 UN864 ORBIS ORBIS1Z LEMD/18R
-DIST 733-
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Figure 1 : OFP for landing 18R

Carrying around unused fuel comes at a cost; it means increased weights so increased fuel consumption. This is why airlines promote the uplift of this OFP planned fuel unless needed for safety reasons.

So why do crews sometimes take more fuel then required by the OFP?

Is it the confidence in the OFP fuel calculations themselves? Most airlines which generate flight-specific OFPs have aircraft and engine performance monitoring programmes which allow the fuel calculations to be adjusted to the particular aircraft being used.

Is it the selected routing in the OFP? Flight specific OFPs are prepared in advance based on available weather forecasts. These will determine judgements on likely runway direction for departure and arrival and may influence the choice of the destination alternate.

Let's take for example the flight of a single aisle jet flying from London Gatwick to Madrid Barajas. The OFP has a departure from Gatwick on runway 08R, a cruise at flight level 390 and an approach and landing at Barajas on runway 18R. On that basis, the minimum block fuel is calculated as 6907kg.

TAXI	220	(0.22)
TRIP	4074	1.50
CONT 5%	204	0.06
ALTN	1405	0.35
FINRES	1004	0.30
ADDNL	0	0.00
TOTAL	6907	3.01

Figure 2 : fuel planning for landing 18R

What if the weather conditions change and a different landing direction is required at Barajas? Example 2 shows the same flight plan for an arrival to runway 32L. Note that there is a 400kg increase in the minimum required fuel because of a longer arrival routing (300kg) and a slightly longer routing to the alternate (75kg).

On the day of operation the flight crew needs to carefully check the validity of the expected routing during their preflight planning. Is there any prospect of the arrival runway being different to the one assumed? In that case, the flight would be 400kg short? To cope with unexpected events during the flight the "basic procedure" requires the inclusion of contingency fuel defined as 5% of the trip fuel. In the first

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flight plan this was only 204kg. While this is enough to cover the possibility of a lower cruise level (+39kg if limited to FL370 or +110kg if limited to FL350) it's not enough to cover the runway change shown in this example.

Is it the OFP selection of the destination alternate? If a diversion is unlikely, the closest possible suitable airport will usually be used to obtain the obvious fuel savings. If diversion is probable, a suitable commercial alternate may be selected which will minimise the operational consequences of a diversion – for example facilitate easy transfer of the passengers by bus.

Diversions are rare – a 'top 3' European airline reported only 0.17% of its flights diverted in 2012. But when they happen they are likely to bring a high workload for the flight crew who areoften very familiar with the destination routing and approach but may well be less so with the alternate arrival procedures. Additional communications with Company Ops and Cabin Crew will be needed and PAs must be made to inform the passengers of their situation. Effective task sharing by the crew is essential in order to maintain situational awareness and ensure sound decision-making is not prejudiced by time pressure.

So, a Captain may decide to uplift fuel in excess of the OFP minimum if they have any doubts about its appropriateness for their flight. They will usually have to provide a short explanation on the flight paperwork as to their reasoning for the decision.

What about the cost of carrying extra fuel? According to figure 5, increasing the take off weight on this flight by 1000kg would increase the trip fuel by 79kg. If low visibility procedures (LVPs) are expected to prevail at the destination, a Captain may typically decide to take this much extra to give 30 minutes of extra "thinking time".

However, it is easy to see why airlines are keen to minimise extra fuel. Whilst the routine carriage of 400kg extra fuel which would provide 10 minutes more "thinking time" or enough fuel for a go-around and a second approach would only increase trip fuel per flight by 30kg, the effect on the 'top 3' European airline quoted earlier would be around an extra 30,000kg of fuel a day.

So this subject, and the responsibility for the fuel loading decision, is another of the reasons why Captains get their four stripes! Diversions and significant routing changes are unusual and they can usually be foreseen before departure provided that the airline assists by providing an accurate and up to date OFP, accurate weather forecasts, easily-applied corrections and sufficient time to prepare the flight and assess any exceptional challenges that the crew can expect. And we should not forget about those operators who still use generic OFPs, because in these cases, the decision about fuel loading is potentially rather more complex than it is for those discussed here, who are fortunate enough to have complete clarity on what their minimum fuel load will do for them.

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OFP ROUTE:
-EGKK/08R F390 SAM3P SAM UN621 BASIK UZ150 NOVAN UN864 DELOG/F330
 UN864 ORBIS ORBIS1C LEMD/32L
-DIST 778-
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Figure 3 : OFP for landing 32L

TAXI	220	(0.22)
TRIP	4377	1.58
CONT 5%	219	0.06
ALTN	1480	0.35
FINRES	1005	0.30
ADDNL	0	0.00
TOTAL	7301	3.09

Figure 4 : fuel planning for landing 32L

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TOW CORR     +1000 PLN BLK  +79 / -1000 PLN BLK -79
2000 BELOW           TRIP  +39 / TIME   1.51
4000 BELOW           TRIP +110 / TIME   1.53
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Figure 5 : fuel corrections for weight or altitude