Using the fuel burn and performance analysis of 14 widebodies previously analysed in Aircraft Commerce, the potential to optimise flight planning parameters to provide lower fuel burns and higher payloads on the same sectors are examined. Sander de Moor, director airline operations efficiency with Aircraft Commerce Consulting, explains the details.

Optimisation techniques in flight planning: how to reduce reserve fuel & raise payloads

More efficient flight planning can be used to save fuel burn and increase payload on payload-limited missions. This article will assess the potential for improvement on certain routes and aircraft and analyse the benefits.

In the analysis of A350-900/-1000 fuel burn and operating performance *(see A350-900/-1000 fuel burn & operating performance analysis, December 2018/January 2019, page 12)*, 14 aircraft were compared on the basis of fuel burn and airspace-access costs per available seat-mile (ASM) on two long- and three ultra-long-range transatlantic sectors, which covered tracked airway distances ranging from 4,330nm to 6,449nm. Combined with average wind components ranging from -29 to -42 knots, these resulted in equivalent still air distances (ESADs) of 5,508 nm to 6,924 nm and flight durations of 9.7 to 14.4 hours.

Three of the five routes were selected for the comparison of aircraft with ultra-long-range performance to show how the mix of 14 aircraft types performs on the sort of routes that have been opened partly because these new aircraft types now make them economically feasible for airlines.

As these routes also introduced payload limitations for some of the aircraft types included in the analysis, when based on our usual conservative planning parameters, we found an opportunity to showcase the payload and revenue possibilities of more efficient and optimised flight planning procedures. These would both reduce fuel upload and burn, and increase allowable payload. These gains are demonstrated in this analysis.

Standard planning

Fuel and operational performance numbers for the aircraft-engine variants were generated by Lufthansa Systems, using its Lido/Flight 4D flightplanning system. The climb, cruise and descent segment results of a flight plan are based on performance specifications (data files) of the airframe-engine combinations as received from the aircraft original equipment manufacturers (OEM).

There are also specific operating philosophies (flight level caps, performance degradation factors, amended performance buffers in planning, padding) as requested by customers.

If not creating an optimised route itself, once a route has been decided, Lido/Flight 4D will plan an optimum vertical profile based on parameters that apply to the aircraft and its operator, achieving the cheapest overall solution for the planned flight by balancing cost of fuel burn, time-related costs and airspace access costs.

For our comparison we applied European Aviation Safety Agency (EASA) flight planning standards and rules in a conservative way. To reflect common practice, an alternate airport was planned (under certain conditions, EASA allows for planning without an alternate).

Contingency fuel was set at the recommended 5% of planned trip fuel (with a minimum amount to be able to hold for five minutes over destination), and final reserve fuel was the normal amount required to hold for 30 minutes at 1,500 feet above ground level (AGL) over the alternate airport at planned gross weight. All very standard and all very costly as we shall demonstrate.

Climb and descent profiles differ per aircraft type of course, and they are loaded into a flight planning system as a set of speeds below and above flight level 100 (FL100) and the crossover altitude. Again, OEM-produced speeds can be amended by individual operators, which will result in different planned indicated airspeeds (IAS) and Mach numbers. Typical examples for an A350-900 aircraft would be a climb profile of (250) 330 kts/Mach 0.85 and a descend profile of Mach 0.85/320 (250) kts, where the 250kts limit is planned below FL100, since this speed limit would normally be applicable.

Cruise mode for all aircraft types and variants on all routes was at fixed-Mach long-range cruise (LRC). Few operators, however, are still operating aircraft in fixed-Mach cruise modes, such as a specific Mach number or LRC. Airlines instead prefer cost index (CI) flying, which applies a more cost-conscious and optimised way of managing flight operational costs. Since CI flying heavily relies on internal operator cost structures and fuel prices, however, no two operators plan and operate flights using the same CI value. This makes a flight-for-flight comparison difficult. LRC mode was selected for this reason, where applicable. CI planning, when done correctly, can optimise flight planning results, as will be shown.

Last, to create the same atmosphere for all aircraft types to operate in, statistically average winds and temperatures were used. For the payload-range evaluation we used a zero-wind, international standard atmosphere (ISA) day to assess the aircraft's payload-carrying capabilities, with one range value for carrying maximum payload, and another for carrying our planned passengers-only payload. For this new

With today's sophisticated predictive and analytical tools available for pre-flight planning, the margin for error and deviations from planned values in atmospheric conditions and traffic complexities have vastly reduced compared to the age when our current planning rules were created. These advancements enable moving from prescriptive planning to performance-based planning for the planned quantities of reserve fuel.

analysis we did not change the atmosphere.

Operationally, it was assumed that all engines would be used for both taxi-out and taxi-in. Taxi times from departure point and at the five destinations were taken from the Lido database, adding 500-1,200lbs of fuel per trip in auxiliary power unit (APU) and taxi fuel burn, depending on aircraft type, season and city pair operated.

Where to optimise

Flight plans are produced by an airline's flight planning or dispatch department, basing fuel planning calculations on parameters as defined in the operations manual. Depending on where the airline is located and under which rules or oversight it operates, the tools and methods with which flight plans are produced vary significantly. The agreed parameters which form the basis of fuel planning and flight plan production and monitoring also vary widely. The International Civil Aviation Organisation (ICAO) sets the fuel planning standards in their standards and recommended practices (SARPs).

Referenced in Annex 6, Part I, the ICAO Flight Planning and Fuel Management Manual (FPFMM) provides operational guidance material for fuel planning and in-flight fuel management. As such, it provides guidance material to civil aviation authorities (CAAs) in the development and implementation of prescriptive regulations and performance-based variations to such regulations. Some CAAs play a larger role than others and influence both ICAO and other CAAs in adopting changes to this guidance.

Our earlier comparison was based on EASA standard parameters, so in this article the same EASA planning environment will be used, except that the full range of optimisations that can be achieved under these rules is examined.

Fuel planning policy

An airline's fuel planning policy will describe the minimum required amount of fuel to be loaded onto the aircraft before a flight. This total amount shall account for the use of aircraft systems and taxiing to a runway, and a calculated minimum amount of fuel to commence a flight based on a range of assumptions and decisions targeted at a safe landing at the planned destination.

The standard breakdown of this minimum legal amount is:

- Trip fuel: TRIP - a realistic amount of fuel required for take-off + climb + cruise + descent + approach + landing at a destination airport.
- Alternate fuel: ALTN - a realistic amount of fuel required for a missed approach procedure + climb + cruise + descent + approach + landing at an alternate airport.
- Contingency fuel: CONT - an amount of fuel equal to a set percentage of TRIP).
- Final Reserve Fuel: FRES - an amount of fuel calculated to equal 30 minutes of flight in a holding pattern at planned landing weight and at 1,500 feet altitude over the alternate airport.

The amounts described for these four elements are the legal minimum, and airlines often use larger amounts in their planning.

The actual amounts of fuel for these four elements are summarised for the 14 aircraft types previously analysed for the London Heathrow (LHR) to Sao Paulo (GRU) route are summarised *(see table, page 36)*.

There may be a need for additional fuel. This is XTRA, which is fuel calculated to make up a shortfall in the standard calculation to cover specific en-route operational scenarios, such as expected holding delays, or fuel added to mitigate the effect of a carried equipment failure, or fuel added by Flight Dispatch to account for a published operational disruptive detail received by NOTAM (notices to airmen) or from other sources. Last, and falling outside of the normal planning parameters, the crew may want to take some additional discretionary fuel.

Approved by its national (or civil) aviation authority, an airline will set and describe all relevant parameters, methods and minimum values for fuel planning in its operations manual, following its national set of rules.

Areas of interest are airport planning minima, describing the required minimum values for weather and operational equipment and how these interact; and fuel planning minima, describing methods of calculation and minimum values for all sub-parts of the required fuel on board. This is where significant gains can be made in reducing the required fuel on board at departure, compared to the values used in the previous analysis.

What can we change?

Apart from doing everything possible to ensure that the aircraft itself is as efficient as possible, paths to fuel burn optimisation generally follow two routes: optimising the planned fuel burn, and optimising the actual fuel burn. While optimising actual fuel burn is also of interest, the scope of this analysis is limited to optimising the planned fuel burn.

Pre-requisites for a programme to optimise planned fuel burn are access to a good flight planning tool, a few years of quality flight operational data, and an organisation willing to implement a more performance-based approach to fuel and flight planning. These will go together with the national authority involved with,

Fuel efficiency to a large degree depends on accurate weight control. All aspects of aircraft weight control should be managed properly and both accurately planning fuel and loading fuel should form part and parcel of that target.

and signing off on, the changes to the operations manual.

The most inefficient and least cost-effective quantity of fuel carried is the reserve fuel, with the fuel planned for and carried to the last segment of the flight. How inefficient? As a rule of thumb, on average it will cost 3% of the carried weight per flight hour in fuel. That is, carrying an additional 1,000lbs of fuel to a destination 10 hours away will cost about 300lbs of fuel. That is, 30lbs of fuel per hour on average for 10 hours. If that required fuel is loaded at the cost of payload then the cost is much higher than the price of fuel and emissions alone.

This means that the obvious aim should be to optimise the amount of reserve fuel carried. Not too much and not too little - just the right amount.

TAXI – taxi fuel

Taxi fuel is fuel planned for and used during the ground phase of the flight, before take-off. Fuel here can be used while running the APU (if installed and/or serviceable) and for ground manoeuvring.

The aim should be to plan just enough fuel for these processes to be completed before taking off without having to use any of the planned contingency fuel. That is, either by using some of the contingency fuel by operating the APU for too long or by taxiing too long, or not having used all of the fuel loaded for the ground phases at the moment of take-off.

To make this a realistic goal, operational data should be used to tailor the planned taxi fuel as much as possible, based on inputs such as historic taxi times driven by gate or terminal, runway-in-use and time-of-day average taxi times.

The aim is to plan for realistically expected taxi times and minimised APU fuel amounts, rather than a standard or fixed fleet-specific amount of fuel. These statistics-derived amounts of taxi fuel should be treated in the same way as statistics-derived contingency fuels: recently observed values should outweigh older data in importance.

Reduced-engine taxi (RET) procedures for departures can be applied as well, where feasible and with the usual caveats.

TRIP – trip fuel

The requirements to arrive at the planned amount of TRIP fuel are clearly described and will have to cover a range of eventualities. Optimisation of this amount is driven by accuracy in predicting:

- The overall weight of the aircraft at take-off.
- A realistic departure with the correct distance of the expected standard instrument departure (SID).
- Realistic FLs and step-climbs.
- An optimised top of descent (the actual in-between fixed waypoints position).
- Idle power descent to published gates and FLs.
- Early descents where expected or published.
- Correct distance of the expected STAR.
- An accurate performance degradation factor (PDF).

Apart from these requirements, there is not much that can be changed in calculating TRIP fuel. An aircraft's burn cannot be changed, and all that can be done is to approach reality as much as possible in planning.

Cost Index

Operational flight costs break down into the cost of burning fuel and overflying countries ('airspace access costs') and time-related costs of operating the aircraft. This last value is roughly made up of crew and maintenance cost components. Since the time-related and fixed costs of operating aircraft are highly airline-specific, we normally exclude them from our evaluations. Only the fuel burn and en-route costs are included, and are based on LRC cruise speed profiles.

CI-managed flight operations do, however, provide an opportunity to burn fuel in a more cost-optimised way than operating with a fixed-Mach cruise schedule, with long-sector savings in the 1-2% range, depending on atmospheric conditions and current fuel prices, and examples of much higher savings documented. The CI functionality in the aircraft's Flight Management Computer (FMC) takes into consideration headwind or tailwind components, and slows down or speeds up the aircraft as required to maximise realised nautical ground miles (NGM) per burned unit of fuel. In fixed-Mach cruise modes, like LRC, the aircraft operates at the same Mach number regardless of headwind or tailwind, so it cannot optimise the realised NGM per burned unit of fuel.

In general, CI-managed flight means that the aircraft cruises at slower speeds than under LRC in zero-wind conditions. Such ECON speeds fall between maximum range cruise (MRC) and the 1% less efficient LRC. Depending on widebody aircraft type, LRC can be seen as equivalent to CI values of 80-150 used in the aircraft's FMC. Normal CI values at current fuel prices would be 50-80, depending on aircraft type and its time-related costs.

In addition to better balancing flight operational cost, CI-managed operations also introduce a better capability to manage the recovery from delays by introducing estimated delay costs into the CI formula (the cost balancing equation).

This ensures that money is spent correctly in recovering delays where possible. Airlines still operating with fixed Mach regimes should introduce a

With today's aircraft being leaps ahead of efficiency compared to the generations past, all aspects of fuel efficiency still remain a top priority in reducing the amount of wasted fuel and unnecessarily created emissions. With competing airlines all moving to latest-generation aircraft, the initial efficiency advantage is short-lived, retuning the competitive balance to the lowest-cost operator.

CI-managed operation. If aircraft do not have a CI functionality or capability in the flight management computer (FMC), a solution should be sourced in the Flight Operations IT market. Real-life efficiencies generated by the use of such tools start at 1% of fuel burn, and can be used to justify the acquisition of a connected EFB solution for a fleet of aircraft.

CONT – contingency fuel

In its basic form, EASA contingency fuel is set at 5% of planned TRIP fuel. This 5% is a straight copy-paste from the ICAO SARPs, and has not changed much over time. In addition, this amount of contingency fuel is normally protected fuel. This means that it is carried, but some is actually burned as part of the TRIP fuel because of the 3% per hour factor. The requirement to protect CONT is to still have the CONT fuel in tanks when landing at destination (provided that the flight followed the plan).

Recognising that planning technology and supporting data and information systems have made huge strides in the past 20 years, EASA provides three other options to select reducing amounts of CONT fuel.

Two of these are straightforward and involve selecting: the more economic of either 3% of planned TRIP fuel in combination with a nominated en-route alternate (ERA), or an amount of 20 minutes of average cruise fuel consumption. Depending on the value used to base the 20-minute amount on (beginning of cruise, mid- or average cruise burn or top of descent), the 20-minute option will result in a lower amount of CONT than the 3% TRIP + ERA option on flights of 11 hours or more.

The third option available under EASA regulations in establishing a CONT fuel calculation method is the Statistical CONT fuel option. Here the CONT fuel amount on the flight plan is derived from a large historical dataset of flight operational statistics, where the method of establishing the correct amount of fuel is driven by a range of different inputs towards a more performance-based methodology in flight planning. In developing such a policy, an operator may decide to separate CONT requirements into route-specific en-route and terminal requirements (with separate inputs focused on weather and traffic), planning the required amounts of fuel for where it might be needed.

Before a CAA will allow an airline or operator to use these three additional options, a certain methodology in managing and using flight operational data will have to be demonstrated. Compared to using the standard 5% contingency fuel option, however, there is the potential to achieve huge savings, especially on the longer sectors, as will be shown.

ALTN – alternate fuel

ALTN fuel is normally planned for and carried to satisfy the need to divert to a different airport should landing at the destination airport not be possible due to weather, traffic or other issues. ALTN fuel is inefficient. Just like any other weight on the aircraft, fuel is burned to carry ALTN fuel to destination. It will then normally only be used in case of a diversion or while manoeuvring over the destination once a crew has committed to landing at the destination airport. It is rarely used, however, so it is worth limiting the amount planned and carried.

Just like TRIP fuel above, optimisation of this amount is driven by accuracy in getting all parameters of this mini-flight correct. These parameters are: predicting the overall weight of the aircraft at the point of diversion, a realistically planned departure to the alternate with the correct distance of the expected SID, realistic tracked distance and cruise level, an optimised top of descent, and descent to the expected arrival procedure. Apart from this accuracy, the chosen alternate airport should be located as close to the destination airport as possible, while still meeting flight/mission requirements. The planned cruise mode should be set to CI=0 (or MRC if operated on a Mach speed), resulting in a lower amount of fuel planned for the ALTN requirement.

A variation on this theme is a reduced contingency fuel procedure. This is where the amount of CONT is brought down to about 1% of TRIP fuel. This is similar to the technique of re-clearance flight planning. In such a scenario, a flight is planned to only have or use any CONT fuel during the flight from a decision point (DP). It only makes sense to use this technique in the last hour of the flight. From here, the remaining fuel on board to both destination airport and planned en-route alternate airport would be enough to include 5% of CONT fuel. Such a procedure may also include the EASA option to continue without ALTN fuel. Instead, the ALTN fuel requirement is replaced with sufficient fuel to hold over the destination airport for 15 minutes if the required planning conditions for this procedure are met.

Depending on the sector being planned and the operational philosophy of the airline, a DP operation can be developed where both destination airport and alternate airport can safely be reached from a DP along the planned track. The DP then functions as a Go No-Go point. Once passed, an aircraft will be committed to arriving at the chosen airport. Needless to say, this sort of planning relies heavily on a continued risk assessment and safety margins in arrival conditions at both airports (weather, traffic, facilities). Such procedures can be useful when planning flights to remote or isolated airports or where suitable airports are few and far between.

FRES - final reserve fuel

The final reserve or holding fuel is defined as an amount of fuel which allows a turbine-powered aircraft to fly a holding pattern over an airport at a height of 1,500 feet at the planned gross weight or all up weight of the aircraft (zero fuel weight (ZFW) plus fuel remaining (FR) for 30 minutes. This fuel is the most inefficiently used fuel, since it will only be used in abnormal circumstances.

The only way to optimise this amount of fuel in planning is to minimise the overall weight of the aircraft at that point. This can be achieved by accurately establishing the planned ZFW during planning of the flight. This really shows the value of accurate planning.

An over-estimated ZFW has an impact on a range of fuel calculations. FRES fuel will be more than needed, in turn increasing ALTN fuel, and in turn increasing TRIP and CONT fuels. The aircraft will be heavier at take-off, the amount of thrust deration will be lower, which in turn will cost a little more in engine life and associated costs, and so on. In the end, the aircraft will land with more fuel in the tanks than it really needed, and both fuel and money will have been wasted in carrying it to destination.

The overall aim is to minimise reserve fuels without risking the integrity of the planned operation. Many factors play a role and sometimes applying such policies may result in an unplanned diversion. Such a diversion should be accepted, decided upon and executed properly without resulting in knee-jerk reactions, like establishing minimum fuel thresholds or padding amounts in planning. The overall picture is cost savings.

Bringing it all together

As in the A350-900/-1000 fuel burn and operating performance analysis, a group of 14 aircraft-engine combinations was compared on the basis of fuel burn on flights lasting from 9.7 to 14.4 hours using a very conservative fuel planning methodology.

The new generation aircraft evaluated were the 787-8, 787-9, 787-10, A350-900 and A350-1000. These were compared to the A330-200, A330-300, 777-200ER, 777-300ER and 747-400. We also included a few engine and cabin layout options as well for some aircraft types.

With such long flights, not all aircraft were able to complete their mission with a full passenger payload and had to leave seats empty in lieu of fuel. This was either as a result of reaching a maximum operational weight limit (exchanging payload weight for fuel weight), or by reaching full tank capacity.

Obvious victims of this were the older generation of aircraft, with the A330-300 starting to reach its payload-range limits first, followed by the A330-200 and then the 747-400 in a higher seat density version. Interestingly, the only latest-generation aircraft to suffer a payload drop was the A350-900 on the longest sector: the 6,450nm from London Heathrow (LHR) to Santiago de Chile (SCL). This reduction was only three seats of the 318 seats on sale.

The 787-10 with GEnx-1B74/75 engines came very close to losing payload, with 1,100lbs extra of useful payload over and above the full passenger payload. Not having access to fleet dry operating weight (DOW) data, the DOW

SINGLE-ROUTE OVERVIEW OF ACHIEVED RESULTS WHEN APPLYING THE DESCRIBED CHANGES IN FUEL PLANNING POLICY

	Taxi out lbs	Altn lbs	Hold lbs	Cont old lbs	Cont new lbs	Trip old lbs	Trip new lbs	Take-off old lbs	Take-off new lbs	Taxi in lbs	Burn old lbs	Burn new lbs	Fuel saving lbs
LHR-GRU: Tracked distance 5,155nm													
A330-200 RR	882	6,956	4,867	7,349	4,334	146,990	144,480	167,044	164,533	882	148,754	146,243	2,510
787-8 GE	1,176	6,210	4,175	5,905	3,483	118,106	116,113	135,572	133,579	1,176	120,458	118,465	1,993
787-8 RR	1,176	6,244	4,375	6,139	3,621	122,775	120,704	140,709	138,638	1,176	125,127	123,055	2,071
A330-300 RR	1,102	7,109	4,972	7,630	4,500	152,607	150,002	173,420	170,816	1,102	154,812	152,207	2,605
787-9 GE	1,176	6,420	4,198	6,267	3,697	125,331	123,224	143,392	141,285	1,176	127,683	125,576	2,107
777-200ER	1,470	7,748	5,659	8,447	4,938	168,931	166,088	192,255	189,411	1,470	171,870	169,027	2,843
A350-900	1,323	7,156	5,026	7,270	4,288	145,393	142,949	166,168	163,724	1,323	148,039	145,594	2,444
787-10 GE	1,176	6,605	4,649	6,815	4,021	136,304	134,026	155,549	153,271	1,176	138,656	136,378	2,278
787-10 RR	1,176	6,723	4,753	6,954	4,103	139,088	136,762	158,649	156,368	1,176	141,440	139,114	2,326
777-300ER	1,470	9,894	6,500	9,851	5,812	197,012	193,718	224,727	221,432	1,470	199,951	196,657	3,294
747-400 3cl	1,984	13,633	9,002	13,127	7,745	262,534	258,167	300,280	295,913	1,984	266,502	262,136	4,367
747-400 2cl	1,984	14,003	9,315	13,618	8,035	272,350	267,828	311,270	306,748	1,984	276,318	271,796	4,522
A350-1000 (327)	1,470	8,118	5,759	8,310	4,902	116,197	163,411	189,854	187,068	1,470	169,136	166,351	2,786
A350-1000 (367)	1,470	8,206	5,859	8,454	4,988	169,087	166,256	193,256	193,076	190,245	172,026	169,196	2,831
Average													**3,402**

of each type may have been overestimated, which in turn would have led to a payload limitation.

In any case, lowering the amount of planned fuel for these flights will directly increase the available payload where required, or at least simply mean a lower flight burn for those cases where the planned payload was already at a full passenger payload. This then raises the question of exactly how much fuel burn and therefore upload can be saved by applying the above-mentioned planning optimisations?

One way of expressing operational efficiency is to look at the KPI of planned arrival fuel; the amount of fuel still in tanks at the moment of landing, and then expressed in minutes of holding time over destination in order to have a KPI that is not aircraft type-limited. Whether an aircraft burns five or eight tonnes per hour, the number of minutes of holding time will be the same for both aircraft types, but the absolute amounts of fuel in tanks will be different. In addition, and to further make this KPI usable, the number can be corrected for distance to ALTN, since a longer distance to the ALTN will increase the amount of fuel that has to be in the tanks over the destination.

LHR-GRU example

Selecting the 5,150nm London Heathrow, UK (LHR) to Sao Paulo, Brazil (GRU) flight, when simply looking at fuel in tanks over destination, the previously used planning numbers resulted in average arrival fuels that were equal to 111-116 minutes' holding time over destination for all aircraft types. That is just about two hours of holding time, and about equal to the rule of Isolated Aerodrome Reserves (IAR). This number would of course include the CONT fuel which is not planned to be used during the flight, since it is only carried on board to accommodate unexpected events.

When we apply some of the methods discussed to optimise the amount of planned fuel, we can introduce relevant CI values (which differ per aircraft type because the individual time-related costs differ). This will save a conservatively estimated 1.0 % of TRIP fuel, an average of 1,659 lbs. Applying the EASA 3% + ERA methodology in establishing CONT fuel means a 2% lower amount of CONT fuel to be carried, on average some 3,318lbs less, which in turn will save 0.7% of TRIP fuel.

This way, a total of 1.7 % of TRIP fuel is saved, an average of 3,402lbs for the range of aircraft discussed *(see table, this page)*. The resulting reduction in our KPI of planned arrival fuel is an average of 17 minutes, meaning a new average KPI value of 96 minutes of holding time over destination.

Further savings

This is a good start, but the best-in-class airlines manage to plan with an arrival fuel of 75 minutes holding fuel.

A close-by alternate airport helps of course, but the entire fuel policy of such an airline has been tailored to route-specific considerations on the one hand, and very well developed fuel planning guidelines and statistical data on the other. In addition, flight crews and flight dispatchers are well trained in the use of the available tools and fully understand the roles and responsibilities that come with planning and executing flight operations on such small operational margins.

On this sector of 11.5 hours flight time, every extra pound of weight really counts. The EASA 20 minutes of cruise consumption results in lower amounts of CONT fuel than the 3% + ERA method. Applying the 20 minutes CONT fuel will lower the CONT fuel amount by an average of 131lbs, resulting in a slightly lower TRIP fuel requirement. On longer sectors this advantage only increases, so the 20-minute CONT option would be the favourite. There is no rule against not using a different method to satisfy the CONT fuel requirement.

More impact would be achieved by introducing the reduced contingency fuel (RCF) procedure where the actual amount of CONT fuel planned can be as low as 0.7-1.0% of TRIP fuel. The savings here would be double that of the 5% to 3% reduction case, achieving a 4% reduction in CONT fuel and a combined 2.4% reduction in planned TRIP fuel. The RCF procedure is not much favoured by many flight operations departments or regulators.

A widebody aircraft will operate 200+ of these long-haul flights every year. The projected savings from making these simple but significant changes in the fuel planning policy will run into $110,000-250,000 per aircraft, per year at current fuel prices. When the reduced fuel requirement leads to an increase in payload that can realistically be used (sold), not only has operational cost been lowered, but additional revenue is also generated. AC