Fuel Policy – Safety & Consistency

ECA emphasizes the need to have and adhere to a safe and consistent fuel policy, which complies with the following recommendations as a minimum. Developments in the regulatory framework and trends in operational practices influence fuel policies.

New regulations are moving towards a performance/risk based approach. While a performance based approach can provide efficiency improvements, when based on proper performance indicators and data assessment, safety must always be paramount and shall be assured for present and future operations. New regulations must aim to achieve an equal or better level of safety. Any performance based framework has to be established on clear and well defined boundaries, assuring a robust fuel policy and a minimum level of safety.

It should be recognized that high risk/ low probability scenarios will be difficult to address in a safety assessment. Data and insight in probable accident and incident scenarios will be sparse. The severity and especially the probability of a low fuel scenario is difficult to assess and may be prone to underestimation. These limitations must be taken into account in any performance based approach to fuel policy.

This document provides general recommendations regarding fuel policy, an overview of the different fuel phases of flight and further fuel related issues for commercial air transport operation.

1. General recommendations

The Commander has the final authority on the required block fuel for the flight, notwithstanding the methods used to calculate the minimum required fuel for a given flight.

The operator is responsible for providing an environment – based on Just Culture principles – where the Commander's authority can be effectively exercised, without undue pressure or economic performance targets.

The operator is responsible to provide the flight crew with all relevant and up-to-date flight operational information essential for a responsible and well-balanced fuel decision, compliant with the operator's Operations Manual and State regulations.

A robust and successful fuel policy demands adequate oversight by authorities. Fuel policy adequacy and adherence must not and cannot be based only on random checks, but shall be primarily based on data monitoring, occurrence reporting and safety performance indicators (SPI) within the industry.

A fuel policy shall be appropriate for the types of operation performed.

The operator shall establish a fuel planning and in-flight re-planning policy to ensure a sufficient amount of usable fuel is carried to allow for deviations from the planned operation and to complete the planned flight safely. The operator shall ensure that fuel planning is based upon current aircraft specific data derived from a fuel consumption monitoring system or if not available data provided by the aircraft manufacturer.

European Cockpit Association AISBL

Rue du Commerce 20-22, 1000 Brussels, Belgium I T +32 2 705 32 93 I F +32 2 705 08 77 I eca@eurocockpit.be I www.eurocockpit.be

The flight plan shall be based on a routing with the longest departure and arrival routes that could be expected, including diversion routing (i.e. the distance according to the worst-case routing: the longest way from the Missed Approach Point to the alternate).

The trip fuel must take into account the operating conditions at the planning phase: current meteorological reports or a combination of current reports and forecasts, air traffic services procedures, restrictions and anticipated delays and the effects of deferred maintenance items and/or configuration deviations.

Some arrival routings contain a STAR with a linear holding pattern such as a published arc or extended downwind. Trip fuel shall be carried that covers the complete routing, even if the expected routing to be flown is shorter.

A fuel policy shall not only be based on an individual flight operating in predictable conditions. It must take into account, amongst others, congested airspace where multiple aircraft divert at the same time, for example due to weather conditions or aerodrome closure. The ripple effect of multiple diversions at the same time shall be reflected in a fuel policy. In other words, a possible bottleneck must be determined and accounted for. As such, it is the commander's prerogative to take into account the factors that he/she deems necessary in his/her judgement

Operators shall not compile nor publish rankings showing the *individual* pilots in terms of the amount of extra fuel carried. Any form of ranking and use made thereof must be de-identified in nature and governed by Just Culture principles.

In order to assist the crew to prepare a flight in the safest manner, operators are encouraged to raise attention where typical routes need more fuel than planned due to unexpected / hidden threats and propose to the commander to add fuel to mitigate eventual risks. Operators shall make best use of the data available to them via the multiple reporting and monitoring channels.

The operator should record fuel consumption statistics and publish them on the flight plan (e.g. flight percentages showing historical deviation of fuel planned vs. fuel used for a particular stretch for a minimum period of two years for e.g. 90%, 95% and 99% percentiles including numbers of flights). The declaration of different fuel consumption for all possible departure and arrival routings (transitions included) on the OFP is an appropriate means to increase the conformability of the fuel planning. This will assist the flight crew with the fuel making decision in the planning phase.

2. Fuel Phases

Flight crews shall ensure that the pre-flight calculation of fuel required for a given flight includes:

Taxi Fuel

Taxi fuel is the fuel used prior to take-off and must include pre-start APU consumption, engine start and taxi fuel. It shall not be less than the amount expected to be used prior to take-off. Taxi fuel is usually a fixed quantity for average taxi duration. Local operating conditions at the departure aerodrome shall be taken into consideration and the taxi fuel adjusted accordingly. These conditions shall include at least average taxi time, any known ground delays, expected runway combinations, NOTAM's, meteorological conditions, air traffic services procedures (e.g. LVP, CDM) delays and any anticipated de-icing delays.

Trip Fuel / Fuel to Destination

The Trip fuel is the required fuel quantity from brake release on take-off at the departure aerodrome to the landing touchdown at the destination aerodrome. This quantity includes the fuel required for: take-off, climb to cruise level, flight in level cruise including any planned step climb or step descent, flight from the beginning of descent to the beginning of approach, approach, landing at the destination.

Trip fuel must be adjusted to account for any additional fuel that would be required for known ATS restrictions that would result in delayed climb to or early descent from planned cruising altitude.

Contingency Fuel

Contingency fuel is carried to account for additional enroute fuel consumption caused by unforeseen factors such as wind, routing changes or ATM restrictions. In general terms, the minimum contingency fuel is the greater of 5% of the trip fuel or 5 minutes holding consumption at 1500' above destination airfield elevation computed based on calculated arrival weight. However, some regulators, with special approval, allow reduction to 3% of trip fuel with use of enroute alternates or to specific time increments depending upon demonstrated performance criteria capabilities from the Operator. The Commander may consider refueling should any delay result in the consumption of contingency fuel before take-off. Contingency fuel shall not be planned as a substitute for taxi fuel as defined above.

Contingency fuel required as a result of ETOPS restrictions must not be confused with contingency fuel described in this context.

Alternate Fuel

Alternate fuel is the amount of fuel required from the missed approach point at the destination aerodrome until landing at the alternate aerodrome. It takes into account the required fuel for: missed approach at the destination airport, the longest route from the furthest Missed Approach Point, the cruise and descent at alternate aerodrome according to an expected airway/route, transition (to prevent the possible bottleneck situation in case of airport closure), approach at alternate, and landing at the alternate aerodrome.

When two alternates are required by the Authority, alternate fuel must be sufficient to proceed to the alternate which requires the greater amount of fuel.

Normally a flight shall be planned with an alternate aerodrome. Planning with no alternate shall be restricted to exceptional circumstances.

Provided all three following conditions are fulfilled, it is allowed to plan without destination alternate:

1. It is only allowed to plan without destination alternate, if the flight cannot be planned with all traffic load and alternate fuel. In this rare case, no alternate flight planning can be executed subject to the Commander’s decision; and
2. The duration of the planned flight from take-off to landing or, in the event of in-flight replanning, the remaining flying time to destination does not exceed 2 hours; and
3. Two separate runways are usable at the destination aerodrome, and the appropriate weather reports and/or forecasts for the destination aerodrome indicate that for the period from 1 hour before until 1 hour after the expected time of arrival at the destination aerodrome, the ceiling will be at least 2 000 ft (600 m) or the circling height +500 ft (150 m), whichever is greater, the ground visibility will be at least 5 km, and no thunderstorms or shower activities are present or expected in the vicinity of the aerodrome

Alternate Aerodromes must be adequate, which means they have the necessary RFF and ATC services and facilities available, meet aircraft performance requirements and are operational at the expected time of use.

Final Reserve Fuel / Fixed Reserve Fuel / Holding Fuel

Final reserve fuel is the minimum fuel required to fly for 45 minutes[1] at 1,500 feet above the alternate aerodrome or, if an alternate is not required, at the destination aerodrome at holding speed in ISA conditions. If the flight is planned without alternate, the final reserve fuel should be no less than 60 minutes holding fuel.

Reserve Fuel / Minimum Diversion Fuel

Reserve fuel or Minimum Diversion fuel is the sum of Alternate fuel plus Final Reserve fuel. Minimum diversion fuel does not imply that a diversion must be initiated. Depending on operational circumstances committing to the destination is also an option.

Additional Fuel

Additional fuel is fuel which is added to comply with a specific regulatory or company requirement. Examples include fuel for technical deficiencies such as engine failure or loss of pressurization, ETOPS fuel, fuel required for a remote or island destination where no alternate is available.

Extra Fuel

Extra fuel is fuel added at the discretion of the Commander. The Commander must consider the viability of the planned route and alternates, and consider whether any statistical contingency is valid to the particular conditions on the day.

Block Fuel / Total Fuel on Board

Block fuel is the total fuel required for the flight and is the sum of the Taxi fuel, Trip fuel, Contingency fuel, Alternate fuel, Final Reserve fuel, Additional fuel and Extra fuel.

3. Further fuel related issues

Declaring of the Fuel State to ATC (Minimum fuel & Mayday fuel)

When a flight anticipates a condition of landing with less than the planned reserve fuel or urgency/distress, coordination should take place between the flight crew and ATC. ATC must proactively inform the flight crew on expected approach time and track distance to touchdown.

The Commander shall advise ATC of a minimum fuel state when he/she has committed to land at a specific aerodrome and calculates that any change to the existing clearance to that aerodrome may result in landing with less than the planned final reserve fuel.

ATC is not required to provide any form of priority handling as a result of a minimum fuel declaration. Operators must not plan in advance to use this ‘priority handling’ procedure.

The Commander shall declare a situation of fuel emergency by broadcasting a mayday call as soon as the calculated usable fuel predicted upon landing is less than the planned final reserve fuel.

Declaration of fuel emergency is an explicit statement that priority handling by ATC is both required and expected. It provides an immediate and clear understanding of the nature of the emergency both to ATC and to other flights operating on the same frequency.

[1] Technical University of Munich study: “*Risk Analysis of the EASA Minimum Fuel Requirements. Considering the ACARE-defined Safety Target*” (2016); currently awaiting publication in a scientific journal. This study specifically supports 45 minutes for Final Reserve Fuel.

The declaration of minimum fuel or fuel Mayday shall be submitted to a reporting system.

Fuel Safety Performance Indicators

Safety Performance Indicators (SPI) shall be developed in order to address the possible issues with upcoming fuel variations and IFS (Individual Fuel Policies). SPI's help to establish a baseline safety performance involving the collection of historical data. The safety performance outcome of an operator is then measured against this baseline safety performance. Fuel SPI's are vital for authority oversight of operator fuel policies.

Predictability of delays

Air traffic control is required to inform the flight crew on the prevailing traffic and operational conditions, as well as expected time delay and track miles to be flown. This enables the flight crew to make a timely decision on the best course of action.

Isolated aerodromes

In the dispatch phase a flight planned to an isolated aerodrome is covered by a Reduced Contingency Fuel and a Predetermined Point procedure (RCF/PDP). The operational conduct of a flight to an isolated aerodrome requires continuous monitoring and updating of a Point of No Return (PNR), based on inflight alterations due to actual encountered conditions.

Fuel monitoring program

The operator shall have a program established to monitor aircraft in-service deterioration in cruise fuel burn performance and include in the fuel supply calculations sufficient fuel to compensate for any such deterioration. If there is no data available for such a program the fuel supply shall be increased by 5% of the trip fuel to account for deterioration in cruise fuel burn performance.

Protected additional fuel

An operator may protect voluntarily or based on operational requirements (e.g. in-flight re-planning) some or all of the additional fuel to be on board at the destination aerodrome. This requires an increase in the trip fuel. In other words, if an operator chooses to protect additional fuel to the destination then the trip fuel will need to be adjusted upward to account for the extra weight.

Refueling with one engine running

As a general rule, refueling with one engine running shall be avoided.

If operators chose to authorise refueling on one engine, they should adhere to the following:

- Refueling on one engine shall only be performed in exceptional and unforeseen circumstances. In such cases written approval from the Director of Operations or equivalent is required.
- Detailed procedures for refueling on one engine shall be available and strictly adhered to.
- These procedures shall be based on a comprehensive risk analysis by the operators Flight Safety Department.
- All involved personnel, including ground crews shall be thoroughly briefed prior to commencing refueling operations.
- Passengers shall not be on-board during refueling with one engine running.

*** * ***

24 May 2017