European Union Aviation Safety Agency

SAFETY MATERIAL

RMT.0573 'Fuel procedures and planning'

SPT.0097

'Promotion of the new European provisions on fuel/energy planning and management'

DRAFT FUEL IMPLEMENTATION MANUAL

V0.2

together 4safety

In collaboration with

AESA AGENCIA ESTATAL DE SEGURIDAD AÉREA

EDITION RECORD

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REFERENCES

Reg. (EU) 965/2012	COMMISSION REGULATION (EU) No 965/2012 of 5 October 2012 laying down technical requirements and administrative procedures related to air operations pursuant to Regulation (EC) No 216/2008 of the European Parliament and of the Council.
Reg. (EU) 2021/1296	COMMISSION IMPLEMENTING REGULATION (EU) 2021/1296 of 4 August 2021 amending and correcting Regulation (EU) No 965/2012 as regards the requirements for fuel/energy planning and management, and as regards requirements on support programmes and psychological assessment of flight crew, as well as testing of psychoactive substances.
ED Decision 2022/005/R	*Fuel/energy planning and management — fuel/energy schemes*

LIST OF ACRONYMS

AFM	*Aircraft Flight Manual*
AMC	*Acceptable Mean of Compliance*
AOC	*Air Operator Certificate*
APU	*Auxiliary Power Unit*
ATS	*Air Traffic Services*
CAT	*Commercial Air Transport*
ELA2	*European Light Aircraft*
ERA	*En-Route Aerodrome*
GM	*Guidance Material*
GNSS	*Global Navigation Satellite System*
HEMS	*Helicopter Emergency Medical Service*
HOFO	*Helicopter Offshore Operations*
MCTOM	*Maximum Certified Take-Off Mass*
MEL	*Minimum Equipment List*
NCC	*Non-Commercial with Complex motor-powered aircraft*
NCO	*Non-Commercial with Other than complex motor-powered aircraft*
NOTAM	*Notice To Airmen*
OFP	*Operational Flight Plan*
OM	*Operations Manual*
PBN	*Performance Based Navigation*
RCF	*Reduced Contingency Fuel*
RFFS	*Rescue and Fire Fighting Services*
SCF	*Statistical Contingency Fuel*
SPO	*Specialised Operations*

CONTENTS

DISCLAIMER

The Agency has prepared this document to provide stakeholders with an easy-to-read publication. This document is part of the safety material documentation published by EASA. The document provides some of the best practices in the industry to implement Fuel and Flight Planning policy and **does not** form part of the EASA regulatory system (there is no need to comply with this document). This document is for information only. The Agency accepts no liability for damage of any kind resulting from the risks inherent in the use of this document.

1. OBJECT AND SCOPE

The objective of this manual is to support operators and authorities in the application of fuel/energy schemes by complying with EASA regulation.

This document is EASA Safety Promotion Material (SP), thus not part of the formal regulatory system. It is to be considered as support and guidance for the implementation of Fuel/energy schemes.

The content of the manual will be expanded in future editions to become a living document to address common questions and items of the EASA rulemaking structure necessary for clarification.

2. STRUCTURE OF THE MANUAL

Chapters 1 through 4 form the foundation of the manual and provide the context for the expanded guidance in the succeeding chapters. Chapters 5 through 6 are for CAT aeroplanes, they follow the structure of AIR OPS CAT.OP.MPA.180 to CAT.OP.MPA 185 closely and provide detailed guidance to the relevant AMCs and GMs. Chapter 6 contains tables summarizing the key points of the new regulations and shows some concrete examples of how the new rules should be applied. Chapter 7 includes answers to FAQ, frequently Asked Questions.

3. DEFINITIONS

Explanations of the definitions contained in 'Annex I (Definitions for terms used in Annexes II to VIII) to the Air OPS Regulation':

Alternate aerodrome (8c) and adequate aerodrome (4)

The definition of an 'alternate aerodrome' follows the general structure of the ICAO definition. The 'adequate aerodrome' definition is maintained as it is a well-understood concept by European pilots and flight operations officers (FOOs). In addition, the EDTO documentation, once incorporated into the rules, will also refer to 'adequate aerodromes'.

Aerodrome selection policy (CAT.OP.MPA 182): The operator must ensure that the aircraft has an aerodrome available where it will be able to make a safe landing. The aerodrome selection policy does not form part of the fuel/energy scheme for AOC helicopters, nor for NCC/SPO.

'Current fuel/energy scheme' (31a)

This new definition (31a) introduces a concept mostly used when operators wish to shift from one approved fuel/energy scheme to another. GM1 CAT.OP.MPA.180 explains the concept, which should be mostly used in the context of individual fuel/energy schemes or basic fuel/energy schemes with variations.

'Flight following'(49d); 'flight monitoring' (49e); 'flight watch'(50b)

These definitions were taken from ICAO Doc 9976. The definition of 'flight following' is slightly broadened to include alternate aerodromes whereas the ICAO definition covers only the destination aerodrome. These definitions complete the introduction of the operational control concept, and they are included in a new set of rules. These rules require operators that apply a basic fuel/energy scheme with variations or an individual fuel/energy scheme to use these tools to maintain constant communication between the operations control center (OCC) on the ground and the operating flight crew. Specific requirements are summarized in chapter 4.5 table 1.

‘Flight time’ (50a)

This definition is based on ICAO Annex 1, Part I and Annex 6, Part III. The purpose of introducing this definition is to make it applicable to all possible scenarios in the Air OPS Regulation except for flight time limitations as Subpart FTL of Part-ORO has its own definition of flight time (ORO.FTL.105). Therefore, a definition of flight time for the rest of the Air OPS Regulation was needed to avoid confusion with the ORO.FTL definition of flight time. The new definition includes taxi.

‘Safe landing’ (104a)

The term ‘safe landing’ is currently used in European regulations and in ICAO documentation. This term is now used more broadly, particularly in some of the most sensitive requirements, such as those related to FRF. Therefore, it was necessary to create a definition even though ICAO Annex 6, Part I does not include one. The European definition is, to a considerable extent, harmonized with the ICAO understanding of the term; however, it considers the fuel quantity, which ICAO does not.

FLIGHT MONITORING AND FLIGHT WATCH — RELEVANT SAFETY INFORMATION’ (GM28 Annex I ‘Definitions)

This new GM provides a list of elements that can affect flight safety and are also considered important for the communication between flight operations officers (FOOs) and operating flight crew.

‘Relevant safety information’ is a term used in the definition of ‘flight monitoring’.

As flight monitoring is a capability required by operators that use a basic fuel/energy scheme with variations or an individual fuel/energy scheme, such operators have to ensure that they have communication capabilities to exchange timely information between the operations control centre (OCC) on the ground and the in-flight operating flight crew.

It is likely that the examples provided in this GM may not 100 % fit all operators. Therefore, they may decide to eliminate the non-applicable elements, whereas other operators may decide to enhance this list with elements they consider relevant for the specificity of their fuel/energy scheme.

This GM is harmonised with ICAO Doc 9976 and is similar to the Transport Canada Civil Aviation (TCCA) provisions for flight following/flight watch as well as to the Federal Aviation Administration (FAA) provisions[1]. The term used in the FAA Code of Federal Regulations (CFR) 121.628 is ‘inoperable instruments or equipment’ whereas this GM uses ‘aircraft technical failure’ (new point (a)), which is also applicable to in-flight fuel management. The wording takes into account a possible equipment/system failure, which increases the likelihood of the OCC supporting the flight crew in dealing with such a technical failure. As automatic live

[1] See FAA CFR 2012, Title 14, Vol 3, Part 121, Subpart U, as well as Section 121.535 ‘Responsibility for operational control’.

data communication becomes more and more current, this task could be accomplished with no major difficulties.

FUEL/ENERGY SCHEME (see the concept in chapter 3 of this document). The selected combination of a Fuel planning policy, an aerodrome selection policy and an in-flight fuel management policy (entirely prescriptive or partially performance based) is called the operator's Fuel/energy scheme. It must be approved by its Authority.

FUEL/ENERGY' (GM29 Annex I 'Definitions)

This GM explains the reason for replacing the term 'fuel' with 'fuel/energy' in the Air OPS IRs, where appropriate. The change allows new technologies for aircraft propulsion that are based on other sources or types of energy than hydrocarbon-based fuel to fit in the Air OPS IRs for the operation of such aircraft.

'Fuel/energy en route alternate (fuel ERA) aerodrome' (GM30 Annex I Definitions for terms used in Annexes II to VIII)

A different definition of 'fuel ERA aerodrome' has replaced the current one. Additional fuel rules were introduced into the definition of 'fuel ERA aerodrome' to limit the need for increased planning minima at the normal ERA aerodrome. With the new rules, the weather minima are only required for the fuel ERA aerodrome, and all other ERA aerodromes have to meet only the requirements for an adequate aerodrome.

This new GM exemplifies the cases where a fuel ERA aerodrome could be used:

— 'fuel ERA aerodrome critical scenario';

— 'fuel ERA aerodrome 3 %' (contingency fuel in the context of a basic fuel/energy scheme with variations); and

— 'fuel ERA aerodrome point of no return (PNR)' to determine the PNR in the context of isolated aerodromes.

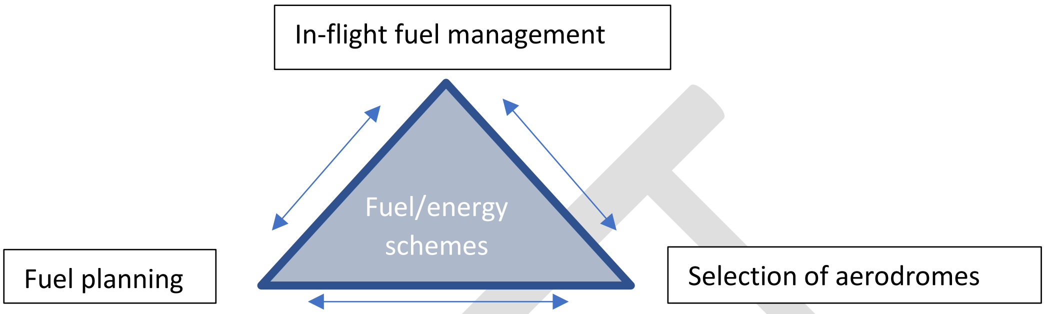
Remark: the ERA stipulated in CAT.POL.A.215 for engine failure should only be considered as a Fuel ERA aerodrome critical scenario if it generates additional fuel.

For the purpose of ICAO Annex 6 Attachment F regarding RFFS, the Fuel ERA should be treated as a normal ERA.

4. CONCEPT OF FUEL/ENERGY SCHEME (IR CAT.OP.MPA.180)

The concept of 'fuel/energy scheme'

The fuel/energy scheme concept emphasizes the crucial interplay between fuel planning, aerodrome selection, and in-flight fuel management.



ICAO guidance mandates the interdependence of preflight fuel calculations (fuel planning) and aerodrome selection; alternate aerodromes must be considered in fuel planning, and vice versa (ICAO Annex 6, Part I SARPS 4.3.4.4 and 4.3.6.6).

While ICAO doesn't explicitly link in-flight fuel management to these preflight activities, EASA, recognizing the critical nature of in-flight decision-making, integrates it into the fuel/energy scheme.

This scheme acknowledges that even the best preflight planning and aerodrome selection are insufficient without effective in-flight fuel management. Poor fuel planning or aerodrome selection can be mitigated by skilful in-flight adjustments, while conversely, excellent planning can be undone by poor in-flight management.

The fuel/energy scheme, therefore, mandates a holistic approach, requiring operators to consider all three elements as interconnected parts of a single system.

Fuel planning isn't simply about calculating the minimum fuel required for a given flight; it's a dynamic process that considers potential diversions, weather conditions, and other operational factors. This, in turn, directly influences aerodrome selection. Suitable alternate aerodromes with sufficient runway length, appropriate navigational aids, and available services must be identified and factored into the fuel calculations. Finally, in-flight fuel management is not just about monitoring fuel consumption. It involves continuously assessing the actual versus planned fuel usage, considering any changes in weather or routing, and making real-time decisions regarding fuel requirements. Therefore, the initial fuel planning and aerodrome selection provide the framework, but in-flight fuel management is the ongoing process of adapting to actual conditions and ensuring a safe landing.

This integrated approach, requiring competent authority approval, allows for customized fuel planning, aerodrome selection, and in-flight fuel management policies, provided they meet specific safety objectives.

The scheme is implemented through implementing rules, acceptable means of compliance (AMCs) offering varying levels of customization, and guidance material (GM), aligning with ICAO SARPs and guidance (Doc 9976 'Flight Planning and Fuel Management (FPFM) Manual' (1st Edition, 2015).

5. CAT OPERATORS – AEROPLANES.

5.1. Fuel/energy scheme (IR CAT.OP.MPA.180)

All operators holding an AOC currently possess an approved fuel policy. Due to the application of the Regulation (EU) 2021/1296, this concept is updated and extended to the fuel/energy scheme, prior approval is required.

The requirements are performance-based to improve energy efficiency. They distinguish fuel/energy planning, aerodrome selection and in-flight fuel/energy management.

The fuel/energy scheme requirements described in this chapter are for aeroplanes. The helicopter fuel/energy schemes are specific (see chapters TBD).

The fuel/energy scheme for commercial air transport with aeroplanes is divided into three types depending on the capability of the operation. They are based on safety and operational data and allow capable operators to adapt the safety targets through general and particular analysis:

- The **basic fuel/energy scheme** derives from a large-scale analysis of safety and operational data from previous performance and experience of the industry, applying scientific principles. The basic fuel/energy scheme shall ensure, in this order, a safe, effective, and efficient operation of the aircraft.
- The **basic fuel/energy scheme with variations**, which is the basic scheme just mentioned, but introducing variations to it, which enhance its efficiency by requiring certain mitigation measures. The operator should demonstrate compliance with the specific mitigations but doesn't need to provide a safety risk assessment to its Authority. The approval will be granted because the safety of the published variations has long been confirmed.
- The **individual fuel/energy scheme** which derives from a comparative analysis of the operator's safety and operational data, applying scientific principles. The analysis is used to establish a scheme with a higher or equivalent level of safety to that of the fuel/energy scheme previously approved. It will ensure, in this order, a safe, effective, and efficient operation of the aircraft.
- To grant approval for a fuel/energy scheme, the competent authority will evaluate compliance of the three policies established by the operator into which these schemes are divided, together with the processes to support their implementation and continuous monitoring:
- The **fuel/energy planning and in-flight replanning policy** ensures that the aeroplane has enough fuel for a safe landing.
- The **aerodrome selection policy** must ensure the availability of an aerodrome for a safe landing.
- The **in-flight fuel/energy management policy** includes verification of the amount of fuel available for the rest of the flight and how this is managed to accomplish a safe landing.

For an individual fuel/energy scheme to be approved, the operator must demonstrate that the level of operational safety attained is at least as high as in the previously approved scheme.

Operators that intend to apply individual fuel/energy schemes must establish an operational safety plan with risk control and mitigation, by defining a series of indicators that need to be monitored prior approval and thereafter, together with statistical data for a period of at least two years, always provided that a significant number of flights are included.

5.2. Fuel/energy planning and in-flight replanning policy (IR CAT.OP.MPA.181)

The procedures developed from this policy must be included in the Operations Manual.

This must include procedures, in the event of in-flight re-planning, for calculating the fuel required to file, in-flight, a new regulatory flight plan.

The calculations to determine how much fuel is needed should be based on the data from a tail specific consumption monitoring system, or alternatively, but only for basic fuel schemes, from data provided by the manufacturer. Consumption monitoring systems should collect data automatically whenever possible.

5.2.1. *Basic* Fuel/energy planning policy

Following concepts have changed in respect to previous regulation:

- **Contingency**: the basic scheme includes as contingency fuel/energy 5% of the trip fuel or 5 minutes at holding speed at 1500ft, whichever is higher.
- **Destination Alternate Fuel**: AMC1 CAT.OP.MPA.181 lists all the flight segments which should be added together to calculate the destination alternate fuel. The expression "Destination Alternate Fuel" is also used on a flight planned with no destination alternate aerodrome. It means then the 15 minutes of holding time required at planning stage by this type of flight plan.
- **Final Reserve Fuel/Energy - CAT.OP.MPA.181 §(c)(5)**: The new version of point (c)(5) covers now also aircraft that use energy for propulsion other than fuel. The proposed rule is neutral and explains the safety target of the FRF. The AMCs develop implementing solutions for each individual means of propulsion.
    - **AMC 1 CAT.OP.MPA 181 (c)(5)**- Final Reserve Fuel – Sufficient fuel for another approach.

      This new AMC specifies in more detailed manner the purpose of the FRF. It describes what the final reserve is intended for without providing values in fuel/energy quantities or flight time.
    - **AMC 2 CAT.OP.MPA 181 (c)(5)**- Final Reserve Fuel Hydro carbons

      This new AMC contains the text of the previous point (c)(5) of point CAT.OP.MPA.181 and refers to fuel only. The wording was slightly changed to reflect the applicability to traditional hydrocarbons-based fuel. This wording should cover fossil fuels as well as new Sustainable aviation fuels, including generation 1 and 2. The FRF time-of-flight values are unchanged for hydrocarbon-fuelled aircraft.

1. Additional Fuel - AMC1 CAT.OP.MPA.181 §(f)

The "additional fuel" concept is meant to protect against two scenarios:

- Engine failure, ~~and~~ or
- Loss of pressurization

The operator should calculate the sum of:

- The fuel required from Departure to the most critical point along the route +
- the fuel required to proceed from there to the nearest ERA aerodrome in the most demanding of the two scenarios in terms of fuel (the diversion route used to calculate the fuel consumption is a great circle) +
- 15 minutes holding fuel at 1 500 ft (450 m) above the aerodrome

The total amount required for the flight is the higher of:

1. The total fuel calculated for the flight without considering the critical scenario,
2. The total fuel to permit the critical scenario

If N°2 is higher than N°1, the difference becomes the Additional fuel

If diversion to this ERA needs additional fuel, it becomes a Fuel ERA critical scenario and requires weather above planning minima.

If an OFP needs additional fuel, it means that, in the worst scenario, the aircraft could arrive at the Fuel ERA critical scenario with 15 minutes of fuel/energy remaining.

- **AMC 1 CAT.OP.MPA 181 §(f) - Most Critical Point**

  The specific point along the route for which the diversion procedure required towards the nearest (weather permissible???) ERA (based on a great circle route) has the least margin in terms of fuel. The most critical point can be assumed to be the most fuel demanding ETP (Equal Time Point) along the route.

2. Extra Fuel - AMC1 CAT.OP.MPA.181 §(g)

the definition of Extra Fuel has changed, with a new concept being introduced. This is fuel/energy to take into account anticipated delays or specific operational constraints known at planning stage. Any information known at the planning stage that may increase the fuel/energy needed for the nominal flight plan must be taken into account by adding the necessary extra fuel. Examples of reasons to add extra fuel could be:

- Expected holding (based on statistics or via Notam)
- Exceptionally long approach procedures

- Extreme weather
- known early descent
- Risk of extended track miles due to known ATC procedures,
- …

Note: if the operator uses statistical contingency fuel, there may be less need for extra fuel as the statistics will reflect most anticipated delays and operational constraints.

Extra fuel is generally proposed by the Operational Control Center (OCC) whereas discretionary fuel is decided by the commander.

3. **Discretionary Fuel - AMC1 CAT.OP.MPA.181 §(h)**

Discretionary Fuel is a new name for an existing concept. It is fuel/energy carried at the sole discretion of the commander. This is what was formerly called extra fuel. It should neither be encouraged nor discouraged by the operator.

- **GM1 CAT.OP.MPA.181:** several aspects of fuel/energy planning are set out and clarified in this GM, they should be reviewed by the operator.

  ZFW last minute change: GM1 CAT.OP.MPA.181 §(d) states that Operators should take into account the impact of the last minute increase to ZFW in the fuel planning calculations. CAT.OP.MPA.260 states that "The commander shall only commence a flight […], when satisfied that the aircraft carries at least the planned amount of usable fuel/energy and oil to safely complete the flight, taking into account the expected operating conditions". To help with this, most of the flight planning systems provide the amount of extra fuel consumption for every 1000 kg of ZFW increment in every OFP. However, this kind of procedure should be restricted in the OM to a maximum value of the ZFW variation beyond which a new operational flight plan should be calculated, in a similar way that the LMC in the weight and balance. In any case, it is the commanders responsibility to ensure enough fuel has been uplodaded even after a last minute ZFW increase. The use of contingency fuel is not allowed to compensate a last minute increase of ZFW (while discretionary fuel can be used if the commander so decides).

5.2.2. Fuel/energy planning policy with variations

Operators envisaging any of the following concepts in their fuel planning policy shall be considered to be using the basic scheme with variations:

- Statistical calculation for taxi fuel, AMC5 CAT.OP.MPA.181.
- Contingency fuel of 3% of the trip fuel with a fuel en route alternate (Fuel ERA), AMC6 CAT.OP.MPA.181 point (c) and AMC7 CAT.OP.MPA.181
- an amount of fuel sufficient for 20-minute flying time based upon the planned trip fuel consumption, AMC6 CAT.OP.MPA.181 point (c);

- a calculation of statistical contingency fuel (SCF), AMC6 CAT.OP.MPA.181 point (c) and GM2 CAT.OP.MPA.181
- reduced contingency fuel (RCF), AMC6 CAT.OP.MPA.181 point (d).
- isolated aerodrome. Note that in order to have all the requirements for isolated aerodrome operations in the same place, fuel requirements are in AMC7 CAT.OP.MPA.182

5.2.2.1. Statistical Contingency Fuel – detailed explanation.

Operators must verify the text in AMC6 CAT.OP.MPA.181 and meet the safety target of GM2 CAT.OP.MPA.181.

There are different types of Contingency Fuel from which one must legally be carried. In any case the Contingency fuel value can never be less than 5 minutes holding fuel at 1500 feet, clean, at the planned landing weight:

The Contingency Fuel values are 5% of trip fuel when using the basic fuel/energy scheme, or 3% of trip fuel (with a Fuel ERA), 20- minutes fuel or Statistical Contingency Fuel when using the basic fuel/energy scheme with variations. 5%, 3% and 20-minutes Contingency Fuel can be allocated to a flight when no statistical data has been calculated or is available.

These fuel values are allocated as Contingency Fuel and as such, the purpose of such fuel is for unforeseen circumstances. These unforeseen circumstances may be for a variety of reasons, such as longer taxi-out time, flight planned levels not flown and/or an early descent given by ATC.

With improvements in computer flight planning and metrological forecasting, other factors, most obviously airborne holding, now tend to dominate the variation in actual fuel usage compared to the planned fuel on the OFP. It is often suggested that operators should make specific allowances for anticipated airborne holding delays, but efforts to predict them, especially at the dispatch time may be difficult. SCF allows a more accurate analysis of required contingency fuel than the prescriptive method. It is based on past experience and requires reliable data analysis and continuous monitoring of fuel consumption data. As it is based on past experience, an unpredictable component remains but much smaller than with prescribed contingency fuel.

5.2.2.1.1. Evaluation of use case for operators:

SCF is calculated for a specific city-pair and aircraft type. Prior to obtaining the approval for statistical fuel method by the competent authority, a continuous 2-year operation is required during which statistical contingency fuel (SCF) data is recorded. Collected number of flights shall be statistically significant and regularly spread over the observation period. When considering appropriate percentiles, specific route segment specialties, runway availabilities, seasonality, time of the day, etc. should be considered and a safety risk assessment shall be done. Common practice (but not exhaustive) are values of 90%/95%/99%. Normally an operator will choose to define the same standard percentiles for all SCF flights.

After obtaining the approval, the operator should continuously monitor the fuel consumption and ensure a statistically relevant number of flights is available in the relevant observation period to update the required contingency fuel for that city pair/aeroplane combination.

The decision to use SCF for specific city pair/aeroplane combination could consider availability of intermediate landing possibilities throughout the flight, reliability of weather forecasts and accuracy of weather information for enroute, destination and alternate aerodromes.

5.2.2.1.2. Coverage:

The central concept of SCF is 'coverage'. This is the percentage of flights which burn less than their planned fuel. A coverage of 95% means that 95% of flights in the past, landed with all their Destination Alternate and Final Reserve Fuel intact.

As coverage rises, so does the required fuel, but disproportionately – the difference between 95% and 99% coverage is not 4% fuel, but an amount which depends on the variability of the fuel consumption on the route in question. 100% coverage would imply that there was no flight using the Destination Alternate Fuel.

The coverage does not represent a fixed amount of fuel; A route with high variation will require more SCF to 'cover' it than one where there is little variation in usage. For example, the ABC321 has a high variation in the amount of trip fuel used per flight (sometimes it uses a lot more than the trip amount, sometimes it uses a lot less than the trip amount). For this flight, the amount of SCF required to 'cover 95% flights is a large amount of fuel (2593kg).

However, the ABC123 has very little variation in the amount of fuel used per flight (it generally uses only a little bit more or less than the trip amount). Therefore, for this flight, the amount of SCF required to 'cover' 95% flights is only a small amount of fuel (1334kg).

Figure 1. Shows how the fuel burn compares with the plan for these two flights. The less variable the fuel burn is for a flight the closer the line will be to the horizontal 'zero deviation' line. So here we can see the less variable ABC123 (orange line) is less steep than the more variable ABC321 (blue line). From this we can see that the 95% 'coverage' for each route corresponds to the two very different fuel amounts.

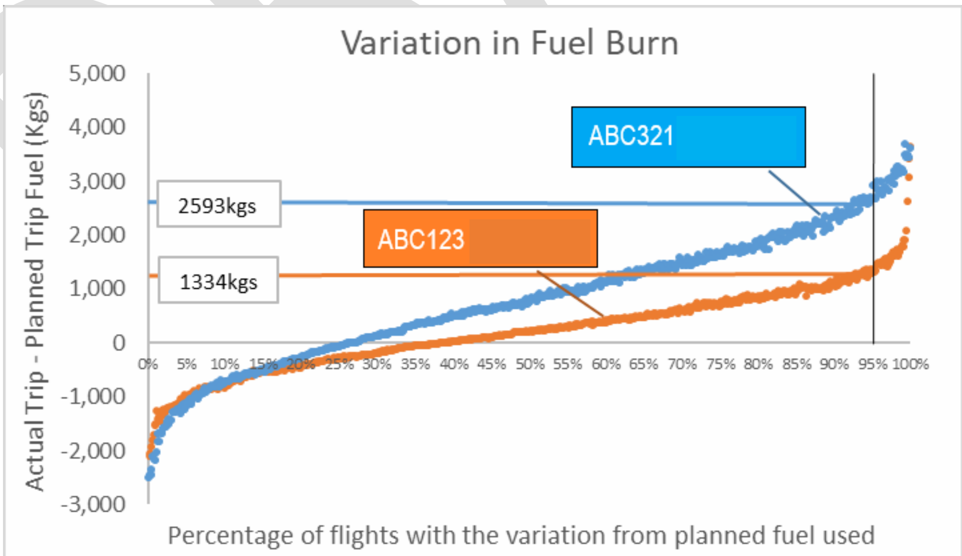


Figure 1 - Coverage

5.2.2.1.3. Discretionary Fuel and SCF:

With a SCF value of 95% allocated on the OFP, the crew at the planning stage could ask themselves if they are one of the flights, that require more fuel for the mission.

The key here, is deciding when the limit of normal operation has been reached. Forecast low visibility operations or high winds at the destination, would be obvious examples of when Discretionary Fuel would be entirely appropriate! The benefit of SCF, however, is that it takes much of the guesswork out of the Discretionary Fuel decision, as most of the unknowns have been considered.

Remember, the statistical value is only that – a statistic. It will therefore include common variations to the OFP, such as early descents issued by ATC (and not flight plannable) or extended track miles regularly flown on the flight, but not the specific weather conditions on the day, especially if extreme.

Another point to consider is the major difference between SCF and the 3%, 5% and 20 - minutes contingency values (as described above). These values have no science behind them, hence being legally required for 'unforeseen' circumstances. SCF on the other hand has a more scientific/performance- based approach attributed to it. Therefore, when using SCF, you should expect to statistically burn some or all of this fuel during the flight.

This could be in the climb, cruise or descent phase of flight. This point is important to consider when doing an in-flight fuel check. The crew should not be alarmed if the calculated arrival fuel does not contain all of the contingency value.

The other important point to consider is the SCF value relates to the amount of fuel (kgs) statistically required, not time. The time value on the OFP is just a calculated conversion of the fuel (kg) value allocated. Seeing a SCF time of 20 mins fuel does not mean a 20-minute delay at destination, it simply means that the amount of fuel statistically allocated equates to 20 minutes of flying time.

One important issue for operational use of SCF is therefore the training of involved operational personnel and crews to ensure proper understanding of the statistical concept and tools provided to interpret the historical data broken down to their flight.

5.2.2.1.4. How SCF is calculated:

Trip Fuel deviation in percentage of trip fuel are calculated by subtracting the planned Trip Fuel from the actual Trip Fuel burn. The Trip Fuel deviations are corrected to account for take-off weight differences from plan (either due to last minute payload changes or carriage of Discretionary Fuel) and for aircraft performance (FMS) factors.

The Trip Fuel deviations can then be normalized to account for the influence of route distance.

Trip Fuel deviations are grouped by aircraft type and city pair. These deviations may then be further grouped by arrival time and by season. Until a statistically significant number of flights is obtained, the prescribed contingency method is used [3%, 5% or 20 mins] (typically this happens when a new route is introduced to a fleet type).

Each Trip Fuel deviation may be weighted based on how recent the trip was, with the more recent flights given a higher weighting than older flights. This means that recent flight data has a much bigger influence on the calculation than data from flights two years ago (see figure 2 below).

To use the resulting trip fuel deviation percentage value for flight planning, this is then transferred to a fuel amount in kg in the flight plan.

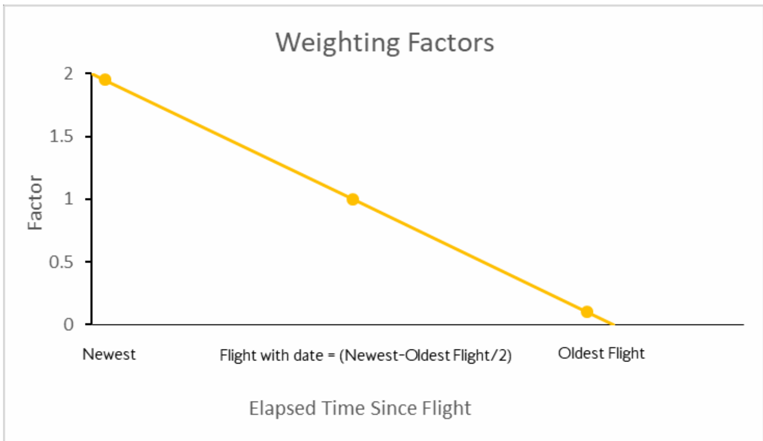


Figure 2 - Weighting

The trip fuel deviations are normally distributed and the mean and standard deviation of each group of Trip Fuel deviation is calculated. *Figure 3* shows a graphical representation with the 95th percentiles highlighted. Providing such a graphical presentation to the operational personnel and crews could be good practice depending on the capabilities of the operator. The height and the statistical dispersion (width) of the curve can help to interpret SCF.

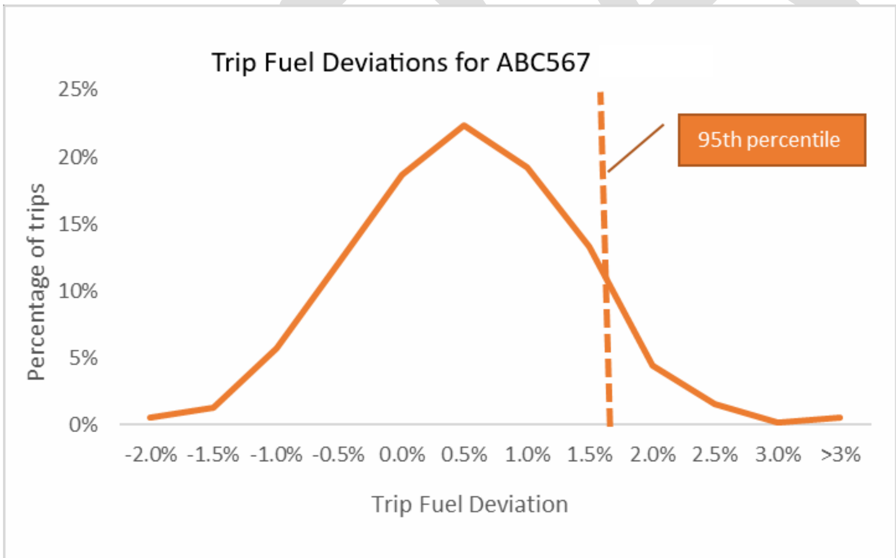


Figure 3. 95th percentile

Remember, the SCF value can never be less than 5 minutes holding fuel at 1500 feet, clean, at the planned landing weight.

5.2.2.2. RCF (Reduced Contingency Fuel) variation – detailed explanation.

AIR OPS Reference: AMC6 CAT.OP.MPA.181 (d), AMC2 CAT.OP.MPA.185 (a), CAT.OP.MPA.245 and 246

5.2.2.2.1. Explanation

RCF (Reduced Contingency Fuel) is a prescriptive variation based on planning with a Decision Point (DP) defined as a waypoint in the Operational Flight Plan (OFP). It allows for the reduction of contingency fuel by adding it only to the trip fuel from the decision point to DEST 1.

Principle:

- **DEST 1**: The intended final destination.
- **DEST 2**: An aerodrome where refueling is possible.

RCF modifies the standard fuel calculation for a flight to DEST 1 by applying a reduced contingency fuel requirement. Instead of carrying standard contingency fuel for the entire flight, only 5% (minimum) of the trip fuel from the DP to DEST 1 is added as contingency fuel.

To ensure safety, the operator must also verify that the fuel on board is sufficient for a standard flight to DEST 2 via the DP, with standard contingency fuel applied from departure to DEST 2.

Continuing towards DEST 1 after the Decision Point is only permitted if the remaining fuel on board at the decision point is at least:

- Trip fuel from the decision point to DEST 1 +
- 5% contingency fuel of the trip fuel from the DP to DEST 1 +
- DEST 1 ALT fuel +
- Final Reserve Fuel (FRF) +
- Additional Fuel, if needed +
- Extra fuel, if needed +
- Discretionary fuel, if required by the commander

If the required amount of fuel is still on board when reaching the decision point, the flight continues to DEST 1. Otherwise, the aircraft diverts to DEST 2 for refueling.

Benefits and Considerations:

The RCF variation allows you to avoid carrying contingency fuel from Departure to the decision point on the flight to DEST 1. . Safety is maintained because the flight to DEST 2 always incorporates standard contingency fuel from departure to destination. There is only a financial risk if the aircraft is forced to divert to DEST 2.

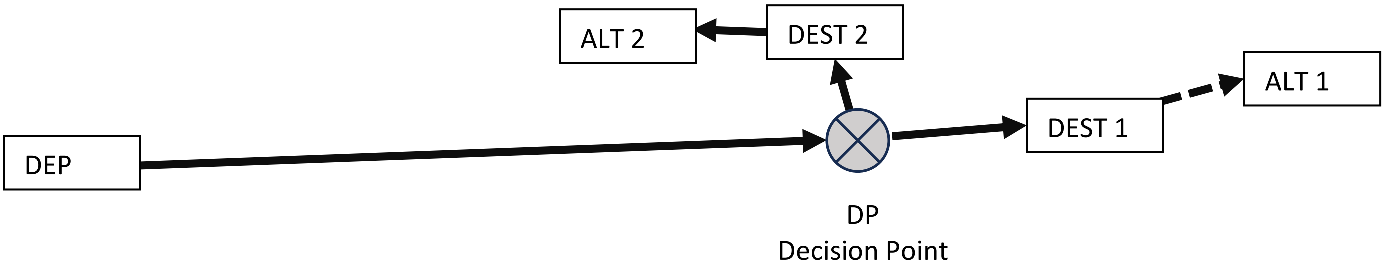
Notes:

1. ***DEST 1 Alternate Exemption:*** *It is also possible to plan an RCF flight to DEST 1 without a Destination 1 Alternate if the no alternate conditions are fulfilled during preflight planning. This scenario permits planning DEST 1 with no ALT on a long-haul flight provided the DP is less than 4 hours from DEST 1 and conditions of AMC2 CAT.OP.MPA.182 are still fulfilled when approaching the Decision Point.*
2. ***In-flight replanning:*** *(activating a new but fully compliant flight plan) is always permitted and can allow you to stay on the safe side. For instance, if the RCF ATS flight plan was filed with a Destination 1 alternate aerodrome but the remaining fuel approaching the decision point is less than required to continue towards DEST 1, the flight crew may do an in-flight replanning to DEST 1 without a*

destination 1 alternate aerodrome provided that the decision point is less than 4 hours from DEST 1 and the conditions of AMC2 CAT.OP.MPA.182 are fulfilled.

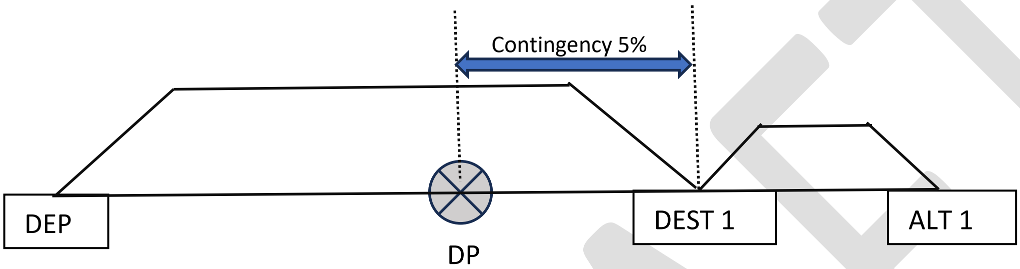
3. ***ATC Notification:*** *ATC should be informed at the planning stage. The ATC flight plan should include a "DEST 2" in the applicable AFP field.*

5.2.2.2.2. Figure 1 – RCF Reduced Contingency Fuel



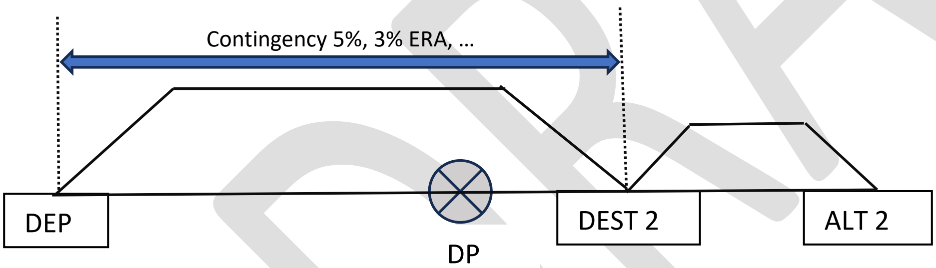
Fuel calculation

T1 = Fuel for flight to DEST 1



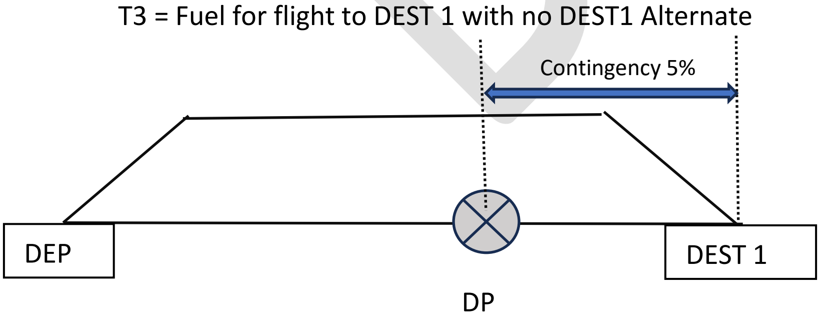
T1 = sum of
- Trip DEP to DEST 1 via DP +
- Contingency 5% from DP to DEST 1 (≥5min) +
- DEST 1 ALT FUEL +
- FRF +
- Additional if needed +
- Extra if needed +
- Discretionary

T2 = Fuel for flight to DEST2



T2 = sum of
- Trip DEP to DEST 2 via DP +
- Contingency from DEP to DEST 2 (≥5min) +
- DEST 2 ALT FUEL +
- FRF +
- Additional if needed +
- Extra if needed +
- Discretionary

T3 = Fuel for flight to DEST 1 with no DEST1 Alternate



T3 = sum of
- Trip DEP to DEST 1 via DP +
- Contingency 5% from DP to DEST 1 (≥5min) +
- FRF +
- DEST ALT FUEL (15min)
- Additional if needed +
- Extra if needed +
- Discretionary

The Total amount of fuel on board shall be:

- for an RCF flight with a DEST 1 Alternate, the highest of T1 or T2
- for an RCF flight with no DEST 1 Alternate, the highest of T3 or T2

5.2.3. Performance based adaptation of the Fuel/Energy planning policy in an Individual Fuel/Energy scheme

An Individual Fuel/energy scheme is specific to an Operator and needs an approval from its Authority. It is not possible to define an Individual Fuel/energy scheme in this Manual.

In order to explain the process that could allow an operator to obtain an approval, an example is given below showing how the Fuel/Energy planning policy could be adapted to the needs of an operator through an individual fuel scheme.

This example is not "EASA approved" and cannot be approved as such for an operator by its Authority. It is up to the operator to define its individual fuel/energy scheme and get it approved by its Authority provided that a risk assessment demonstrates an equivalent level of safety compared to the previous fuel/energy scheme used by the operator.

Example N°1 of what could be an Individual Fuel/energy scheme regarding planning policy.

Individual Fuel/energy scheme for filing a flight plan back to a base of the operator with reduced Destination alternate fuel.

After undertaking a specific safety risk assessment and being authorized by the relevant authority, an operator could be approved to produce a flight plan for a flight returning to an airline base, with a reduced Destination Alternate Fuel/Energy quantity, providing certain conditions are satisfied.

For example, Destination Alternate Fuel/Energy could be planned from the IAF (Hold) at the airline base, directly to the Destination Alternate Aerodrome.

Destination Alternate Fuel normally consists of fuel required for:

- Complete missed approach procedure from the DA/H or MDA/H at Destination;
- Direct segment from the end of the missed approach procedure to the end of the flight planned SID;
- Climb, Cruise, Descent and Approach (including STAR, if published) to touchdown at the selected Destination Alternate aerodrome.

In this proposal;

Destination Alternate Fuel would not include the missed approach and would only consist of fuel required for:

- Climb from the IAF – Cruise - Descent and Approach (including STAR, if published) to touchdown at the selected Destination Alternate aerodrome.

The order of magnitude of the fuel savings could be around:

- for an A320 type aircraft up to 900kgs fuel (2835kgs CO_2) and
- for a B777, up to1800kgs fuel (5670kgs CO_2).

This reduced destination alternate fuel should be properly calculated in the OFP used by the flight crew. It should no be less than 15 min holding time at 1500ft.

The decision to divert from the IAF holding pattern directly to the Destination Alternate Aerodrome or to commit to Destination Aerodrome, should be based on an operational exchange between the operator's OPS Control Center and the local ATC. The result of this exchange should be transmitted to the flight crew for their final decision.

Conditions which should be satisfied would be:

1. Destination should be an airline operational base,
2. Operator's flight monitoring capacity able to establish direct contact between OPS control and the aerodrome ATC.
3. Communications between aircraft and OCC are fully operational,
4. All aircraft approach capabilities are fully operational,
5. No low visibility conditions or no thunderstorms to be considered according to AMC3 CAT.OP.MPA.182 table 1 (at destination) at flight planning stage.
6. Statistical Contingency Fuel active on flight,
7. Specific SPIs need to be developed and monitored.
8. Decision process to be included in the crew training
9. Approach briefing to be adapted including critical fuel figures.

Comparison of the decision process applicable by the aircrew when approaching destination:

<u>Individual fuel scheme</u>: Reduced DEST ALT Fuel is 5 tons , FRF 4 t, Approach fuel from IAF to Threshold 2t (included in the trip fuel), *<u>Missed approach 2t</u>*

The Aircraft arrives at IAF with 5+4+2t= 11t. Two options are possible:

1. If the operator's Flight watch or ATC asks the aircraft to divert, it commits to the Dest ALT aerodrome but arrives with FRF +2t for a Safe landing. (he could even use the 2T approach fuel over the IAF to wait a bit longer before diverting)
2. If approach at Dest is possible, it starts the approach but is immediately committed to Dest as diversion to Dest Alt aerodrome is no longer possible. It performs a safe landing at destination. But he can use the 5t (Dest Alt Fuel)for a go-around and another approach or for extending the hold before starting the approach.

<u>Basic fuel scheme</u>: DEST ALT Fuel is 7 tons (Reduced DEST ALT Fuel + Missed approach 2t), FRF 4t, Approach fuel from IAF to Threshold 2t.

The Aircraft arrives at IAF with 7+4+2t= 13t. *(It carries 2t more to the IAF than the Individual Fuel Scheme)* Two options are possible:

1. If Flight watch or ATC asks the aircraft to divert, it commits to the Dest ALT aerodrome but arrives with FRF +4t for a safe(r) landing.
2. If approach at Dest is possible, he starts the approach and can fly a missed approach and still have two safe landing options: commit to Dest or to Dest ALT aerodrome and land there with FRF.

Conclusion: this individual fuel scheme does not allow for an approach at destination before diverting and requires an early decision to commit to Dest or Dest ALT. But this decision is facilitated by the reliability of the situation, awareness thanks to the mitigations put in place.

5.3. Aerodrome selection policy (IR CAT.OP.MPA.182)

The procedures developed from this policy must be included in the Operations Manual.

The aerodrome selection policy included in a basic fuel/energy scheme shall principally address:

- The aerodromes that the operator should select and verify at planning stage to ensure that there is a reasonable certainty that:
  - two safe-landing options are available during normal operation *(except for the isolated aerodrome),*
  - one safe-landing option remains available if the flight does not unfold as planned.
- The criteria required for these aerodromes, especially how the weather forecast shall be interpreted and how margins shall be introduced at planning stage to take into account the inaccuracies of these forecasts.
- The limitation of the use of PBN.

~~the following points. The description shall be consistent with the text of the requirement CAT.OP.MPA.182, together with its AMCs and GMs:~~

- ~~The conditions determining whether an aerodrome is selectable as alternate for take-off or landing; the cases in which flying without an alternate is permitted.~~
- ~~The mandatory requirement, for which alternates to be included in the ATS flight plan for instrument flights, as stipulated in AMC1 CAT.OP.MPA.175 (a).~~
- ~~How weather forecasts should be applied in terms of the use made of the aerodrome.~~
- ~~What “reaching the destination” is understood to mean.~~
- ~~What the safety margins applied with respect to meteorological conditions are, at the destination, take-off alternate, destination alternate and fuel ERAs aerodromes.~~
- ~~What the meteorological minima at destination aerodromes are, in terms of the type of approach made.~~
- ~~The limitation of the PBN if based on GNSS, or if there are operational credits.~~
- ~~Confirmation that the aerodrome selected for landing possesses the equipment necessary for instrument approaches.~~

5.3.1. Basic aerodrome selection policy.

5.3.1.1. OEI, One Engine Inoperative, considerations.

CAT.OP.MPA.182 (f) states that navigation and landing should be possible in the event of loss of capability. One engine failure can lead to a loss of capability.

AMC5 CAT.OP.MPA.182 (c) requires that "any limitations related to OEI operations should be taken into account except for the Destination aerodrome". This is detailed as follows:

For the destination aerodrome, AMC5 CAT.OP.MPA.182 (a) applies to the all-engine operating minima.

For the take-off alternate aerodrome AMC5 CAT.OP.MPA.182 (a) applies to the OEI operating minima.

For all other planning aerodromes, the operator should use as planning minima the higher of:

- planning minima resulting from AMC6, 8 and 9 CAT.OP.MPA.182 (based on all-engine operative operating minima), or
- OEI operating minima

Note : the margins in table 2 of AMC6 applied to the all engine operative operating minima result in weather conditions that exceed the OEI operating minima. This is not always true for AMC 8 and 9, therefore the operator should verify the "higher of" (see note 2 in AMC8 and AMC9).

Detailed explanation of how to calculate planning minima is described in Chapter 6 of this Manual in Table 3 Planning minima and Table 3bis.

5.3.1.2. The limitation of PBN operations.

GM1 CAT.OP.MPA.182 (f) was amended to consider the new risk of GNSS jamming or spoofing.

Since the introduction of GNSS navigation, the vulnerability of this navigation means has become obvious, resulting in regions where GNSS jamming or spoofing is experienced by civil aviation. This means that RNAV based final approaches in such areas become unsafe or impossible. Additionally, some aircraft types, when they encounter jamming/spoofing enroute towards their destination, lose the GNSS guidance for the rest of the flight, including the approach.

AMC1 CAT.OP.MPA.182(f) protects against this risk in a general matter, by mandating a conventional approach either at destination or at the destination alternate aerodrome. But GM1 CAT.OP.MPA.182 (f) allows to rely solely on GNSS at the take-off alternate, the relevant ERAs at planning stage and for a destination aerodrome with no alternate. Considering the new situation, the GM is extended with new subpoint (b). When GNSS spoofing or jamming is known and/or reported in an area, all aircraft should rely on conventional final approaches in this area. Aircraft having a known probability of losing their GNSS capability and being unable to regain it even after leaving an affected airspace, should rely on conventional backup navigation and approach means within and after leaving these areas.

5.3.2. Aerodrome selection policy with variations

Operators considering any of the following concepts in aerodrome selection will be considered to be using the basic scheme with variations:

- File an IFR flight with "no destination alternate", AMC2 CAT.OP.MPA.182.
- Flying to an isolated destination, AMC7 CAT.OP.MPA.182. In addition, isolated aerodromes used as destinations must be approved by the competent authority.
- Using planning minima with reduced margins, AMC8 CAT.OP.MPA.182 and AMC9 CAT.OP.MPA.182.

5.3.2.1. **No destination alternate** - AMC2 CAT.OP.MPA.182

The provision to fly an IFR flight with "no destination alternate" moved from 'basic fuel/energy scheme' to 'basic fuel/energy scheme with variations' in 2023 through the ED Decision 2023/007/R. This variation does not require fuel consumption monitoring system or flight monitoring capability in the operator control centre. This variation is based on specific mitigation measures:

1- Extension of the flight: The 6 hours limitation is a mitigation which tries to ensure that the planned MET will be what occurs in the approach to the destination aerodrome, (e.g. TAFORS are more reliable the shorter the prediction is). The reason to further limit the in-flight replanning to 4 hours is because the access to the MET information is less in an aircraft in flight than on ground, however this is quickly changing as the aircraft in flight become more connected, nevertheless there are other resources that are available on the ground that are more difficult to have access from an aircraft in flight (e.g. a face to face discussion with a flight dispatcher, or access to satellite weather information pictures, etc). In addition this limitation in the flight time will reduce the chances of unexpected changes in the flight plan (e.g. difference in the fuel burned flying many hours in a non-optimum cruise FL, etc).

2- Availability of runways: two separated runways are necessary. Separate runways are defined as:

Definition (107) in Annex I Reg.(EU) 965/2012: 'separate runways' means runways at the same aerodrome that are separate landing surfaces. These runways may overlay or cross in such a way that if one of the runways is blocked, it will not prevent the planned type of operations on the other runway. Each runway shall have a separate approach procedure based on a separate navigation aid.

3- Increased weather minima. The weather should be forecasted close to VFR.

5.3.2.2. **Planning Minima with reduced margins -** AMC8 CAT.OP.MPA.182

During the adoption process of the fuel Regulation, Sweden, Denmark and Norway requested to address an edge case scenario where a number of ILSs at their aerodromes are categorised as Type A instrument approach operation instead of Type B due to high MDA/DA. This usually does not happen in the rest of Europe as the system minima for an ILS is 200 ft can be used for the MDA. To address this issue, EASA worked together with the NCAs from Sweden, Denmark and Norway to develop a new basic fuel/energy scheme with variations. The basic fuel/energy scheme with variations in AMC8 CAT.OP.MPA.182 proposes something intermediate of what is included in AMC6 CAT.OP.MPA.182 for basic fuel/energy schemes and AMC9 CAT.OP.MPA.182 for basic fuel/energy schemes with variations to take advantage of the quality of the approach aid.

Note: planning minima resulting from AMC8 or AMC9 tables are not approved for an isolated aerodrome nor for an EDTO ERA.

5.3.3. Performance based adaptation of the Aerodrome selection policy in an Individual Fuel/Energy scheme

An Individual Fuel/energy scheme is specific to an Operator and needs an approval from its Authority. It is not possible to define an Individual Fuel/energy scheme in this Manual.

In order to explain the process that could allow an operator to obtain an approval, an example of what could be an Individual Fuel/energy scheme for the aerodrome selection policy, is given below.

This example is not "EASA approved" and cannot be approved as such for an operator by its Authority. It is up to the operator to define its individual fuel/energy scheme and get it approved by its Authority provided that a risk assessment demonstrates an equivalent level of safety compared to the previous fuel/energy scheme used by the operator.

5.3.3.1. Example of what could be an Individual Fuel/energy scheme amending the basic aerodrome selection policy.

Individual Fuel/energy scheme for filing a flight plan with no destination alternate, taking advantage of the aircraft navigation equipment.

Based on the results of a specific safety risk assessment conducted by an experienced operator which demonstrates how an equivalent level of safety (compared to his current fuel/energy scheme) will be maintained, the State of this operator could approve an Individual Fuel/energy scheme allowing to file flight plans with no destination alternate aerodrome with less restrictive meteorological conditions and not limited by the maximum 6 hours flight time. Approval would be depending on the aircraft navigation equipment, the destination airport facilities, the reliability of the weather forecasts and the assistance that the operator's Ops Control Center can provide to the aircraft.

For example, the safety risk assessment would be based on the following data recorded during the previous 2 years of operations with the existing fuel/energy scheme:

- Number of diversions to the filed alternate (including discontinuations of flights with enroute diversions)
- Number of flights filed with no alternate,
- Number of flights calling Minimum fuel
- Number of flights landed with less than FRF
- Number of flights using more than planned contingency fuel + discretionary
- Number of reports filed by crew related to fuel and flight planning
- Number of flights returning to stand for refueling before take-off
- …

The specific requirements could be:

a. Unchanged requirements (CAT.OP.MPA.181 (c)(4)(ii), AMC2 CAT.OP.MPA.182)

(1) when a flight is operated with no destination alternate aerodrome, Destination Alternate fuel/energy shall be the amount of fuel/energy required to hold at the destination aerodrome, while enabling the aeroplane to perform a safe landing, and to allow for deviations from the planned operation; as a minimum, this amount shall be 15-minute fuel/energy at holding speed at 1 500ft (450 m) above the aerodrome elevation in standard conditions, calculated according to the estimated aeroplane mass on arrival at the destination aerodrome; and

(2) two separate runways are usable at the destination aerodrome;

b. New requirements specific to this individual fuel scheme:

(1) The destination aerodrome has straight-in approaches available for each runway end and no circling approach is planned;

(2) The 6 hours limitation is no longer applicable, but the weather forecast should cover the period from take-off to ETA + 6 hours;

(3) the appropriate weather reports and/or weather forecasts indicate that for the period from 1 hour before to 1 hour after the expected time of arrival,

i. the ceiling is at least 1 000 ft (300 m),

ii. the ground visibility is at least 2000 m,

iii. No thunderstorms reported or forecasted within ETA +/- 1h,

iv. Expected runway status permits a safe landing, according CAT.POL.A.225/230/235 .

(4) Destination Alternate fuel permits a missed approach and a new approach (Dest Alternate Fuel ≥ 15 min as per CAT.OP.MPA.181);

(5) As a minimum, the operator should:

i. hold an approval for low-visibility approach operations and the actual aircraft is capable of performing low visibility approaches,

ii. hold an approval for RNP approach operations (at least LNAV/VNAV) if RNP approaches are considered + no jamming or spoofing reported,

iii. use a suitable computerized flight-planning system,

iv. have established an operational control system that includes at least flight monitoring,

v. deliver relevant training to pilots and Ops Control personnel,

vi. Decide what safety indicators are representative and set realistic alert levels.

5.4. In-flight fuel/energy management policy (IR CAT.OP.MPA.185)

The procedures developed from this policy must be included in the Operations Manual.

The in-flight fuel/energy management procedures shall be consistent with the text of the requirement in CAT.OP.MPA.185, together with its AMCs and GMs.

In the context of fuel planning and management, establishing robust in-flight fuel management procedures is essential. These procedures must be intrinsically linked to flight crew training, ensuring adherence to ORO.GEN.200 (a)(4), which mandates that personnel remain trained and competent in their duties.

The regulations recognize that rigidly adhering to preflight planning can become impossible and potentially unsafe, as unforeseen circumstances may arise during flight. Therefore, the commander holds the responsibility to determine the safest course of action in real-time. Their decisions must always be guided by the paramount aim of ensuring a safe landing. In-flight fuel management policies empower the commander to deviate from the initial flight plan when necessary, maintaining operational stability without jeopardizing safety.

In-fight fuel management policies are not intended to substitute preflight planning or in-flight replanning. Rather, they serve as crucial control mechanisms, ensuring the continuous validation of planning assumptions and the generation of viable alternative options. This ongoing validation is critical for initiating necessary reanalysis and adjustments, ultimately securing the safe completion of each flight."

The operator's in-flight fuel/energy management procedures must prioritize a structured, coordinated escalation process involving Air Traffic Control (ATC) communication and FRF protection as on-board fuel quantities diminish. While each situation is unique and may necessitate intervention at any point, a typical escalation should adhere to a progressive four-step approach, aligning with the rationale of ICAO Doc 9976 as adopted by the EU:

— Step 1: Perform in-flight fuel checks at regular intervals. Record those required.

— Step 2: Request reliable delay information when in-flight fuel checks alert that remaining fuel at Destination may be less than required.

— Step 3: Declare ‘MINIMUM FUEL’ when committed to land at a specific aerodrome and any change in the clearance may result in landing with less than the planned FRF.

— Step 4: Declare “MAYDAY MAYDAY MAYDAY FUEL” when the calculated fuel on landing at the nearest adequate aerodrome will be less than the planned FRF.

Note: further information can be found in ICAO Doc 9976, Chapter 6.10 “Minimum Fuel” and “MAYDAY Fuel” declaration scenarios’.

Concepts used in the in-flight fuel management chapter

Ref : CAT.OP.MPA.185 Point (a)(3) +

GM1 CAT.OP.MPA.185 ENSURING A SAFE LANDING - FINAL RESERVE FUEL PROTECTION+

Annex I Definitions (104a)

- **SAFE LANDING**

A safe landing means, in the context of the fuel/energy policy or fuel/energy schemes, a landing at an adequate aerodrome with no less than the final reserve fuel/energy remaining and in compliance with the applicable operational procedures and aerodrome operating minima.

The amount of usable fuel remaining on board should never be less than the fuel required to proceed to an aerodrome where a safe landing can be made with the planned FRF remaining upon landing.

The term ‘safe landing’ is used to ensure that the commander must always consider the safe landing option first.

CAT.OP.MPA.182 (d) requires that two safe landing options are planned until reaching the destination. If the flight does not unfold as expected the commander must always choose the best course of action so as to keep at least one safe landing option.

The commander must declare a fuel emergency whenever landing cannot be performed without using the FRF. Only after declaring fuel emergency, other landing options may be considered.

GM1 CAT.OP.MPA.185 clarifies that FRF protection during normal operations is applicable to aerodromes that were assessed as ‘adequate aerodromes’ by the operator (see Definitions, point CAT.OP.MPA.105 ‘Use of aerodromes and operating sites’, as well as point (a)(A)(8.1.2) ‘Criteria and responsibilities for determining the adequacy of aerodromes to be used’ of AMC3 ORO.MLR.100 ‘Operations manual — general’).

- **PROTECTION OF THE FINAL RESERVE FUEL**

ICAO Annex 6, Part I, SARP 4.3.7.2. : The pilot-in-command shall continually ensure that the amount of usable fuel remaining on board is not less than the fuel required to proceed to an aerodrome where a safe landing can be made with the planned final reserve fuel remaining upon landing.

The FRF protection is intended to ensure a safe landing at any adequate aerodrome when unforeseen occurrences may not permit safe completion of an operation as originally planned. ~~Guidance on flight planning, including the circumstances that may require re-analysis, adjustment and/or re-planning of the planned operation before take-off or en route, is contained in the Flight Planning and Fuel Management (FPFM) Manual (Doc 9976).’~~

The term ‘safe landing’ is explained in the context of protecting the final reserve fuel both during normal and emergency operations.

Note: the requirement to protect the FRF applies in case of unforeseen occurrences, when it is no longer possible to continue the flight in accordance with the filed flight plan. It should not be used for voluntary derogation from the filed flight plan in order to reach an aerodrome located much further away than the aerodromes selected at the planning stage.

5.4.1. *Basic in-flight fuel management policy.*

5.4.1.1. *In-flight fuel checks (Step 1) + mandatory recording of relevant fuel data*

The actual fuel quantity remaining on board in real time is the most important parameter for in-flight fuel management

- **Mandatory in-flight fuel checks**
  Ref: AMC1 CAT.OP.MPA.185(a)
  The flight crew should carry out in-flight fuel checks at regular intervals.
  For obvious safety reasons (detecting overburn, fuel leak,...) AMC1 CAT.OP.MPA 185 (a), paragraph (a)(1), limits the interval between two in-flight fuel checks to 60 minutes.
  An in-flight fuel check consists of noting the remaining usable fuel and the actual consumption.
  Paragraph (a)(2) explains what the flight crew shall do with these two figures:
    - Compare the actual consumption with the planned consumption which can be read on the OFP (or estimated if the fuel check is done somewhere between two OFP waypoints). This allows the crew to detect whether certain fuel reserves have already been consumed.
    - Verify that the remaining fuel allows to land at Destination with Alternate fuel + FRF still on board (or FRF only if no Alternate required).
    - Determine the fuel expected to be on board upon landing in order to calculate the available holding time and the landing performance.

  Note: it is also recommended adding the remaining fuel + consumption and comparing the result with the off-block fuel to identify any fuel leaks.

  Recording of all of these ”operational” in-flight fuel checks, mentioned above, on the OFP is not required.

- **Mandatory recording of relevant Fuel Data**

Ref : CAT.OP.MPA.185 (a)(4) +

GM1 CAT.OP.MPA.185 +

AMC1 CAT.OP.MPA.185(a)

CAT.OP.MPA.185 (a)(4) states that relevant fuel/energy data shall be recorded.
This requirement enables the competent authority to ensure the safety oversight and to establish the baseline safety performance of the current fuel/energy scheme.
A fuel/energy scheme shall be approved and therefore AMC.CAT.OP.MPA.185(a)§(a)(3)(i) recalls that the relevant fuel data to be recorded by the operator shall be agreed with the competent authority.
GM1 CAT.OP.MPA.185 explains how to comply with the recording requirement of CAT.OP.MPA.185 (a)(4).
Fuel data recording is divided into two parts:

a) Recording of some In-flight fuel checks. The Operator may decide at which regular intervals In-flight fuel checks shall be recorded.

As required in AMC1 CAT.OP.MPA.175(a), paragraph (a)(16), the OFP provides boxes allowing the flight crew to record the actual fuel data at each waypoint. The GM suggests filling the boxes at intervals of maximum 30 minutes for short range flights and 60 minutes for longer flights, but this interval can be extended until overflying the next waypoint if this one is further away than 60 minutes. Note that this does not prevent the aircrew from doing an intermediate fuel check at least every 60 minutes.

b) Recording of at least 6 fuel data figures for each flight, like off-block fuel, etc. (see point (b), GM1 CAT.OP.MPA.185)
Note: on modern aircraft some of these 6 data can be automatically recorded and send to the operator via ACARS but Minimum Fuel or Mayday Fuel declarations need a pilot report.

Recording this data (including fuel remaining upon landing) is necessary for the understanding of the data in the context of the mandatory occurrence reporting. In addition, recording this data is the actual condition for issuing 'minimum fuel' and 'emergency fuel' calls. Such data can be recorded either in the technical log (to be stored for 36 months) or in the flight planning records (to be stored for a much shorter period: 3 months).

Other benefits from collecting relevant fuel data are the following:

— data records are created for further analysis and efficiency increase;

— the proper route cause for fuel starvation occurrences is determined;

— clearer statistics of fuel consumption can be produced; and

— training needs for pilots and ATC can be better assessed.

RG RMT.0573 analysed the relation between the relevant fuel data to be recorded (especially when they are linked to 'minimum fuel' declarations or 'emergency fuel' calls) and the operator's safety management system (SMS), as it is expected that the former should feed the latter. ~~Although from this perspective the requirement could have been inserted in Subpart ORO.GEN just as well, it was decided to keep it where it was initially proposed, i.e. in Subpart CAT.OP.MPA.~~

AMC1 CAT.OP.MPA.185(a) point (a)(3) — 'de-identification of collected data'

Another element identified was that not all air operators consistently apply 'just culture' as a policy. This was a strong argument in favour of adding a clear requirement for the protection of collected fuel data.

GM1 CAT.OP.MPA.185 'Fuel/energy scheme — in-flight fuel/energy management policy — aeroplanes BASIC FUEL/ENERGY SCHEME — RELEVANT FUEL DATA TO BE RECORDED' (new)

This part of the GM is related to point (a)(3) of AMC1 CAT.OP.MPA.185(a).

The condition to record relevant fuel data is introduced into the related AMC1 CAT.OP.MPA.185(a) after repeated feedback was received from the accident and incident investigation boards of several EASA Member States (especially the Spanish ones that investigated the fuel incident of 26 July 2012 in Valencia).

Modern aircraft allow to record the fuel amount just before take-off and just after landing, therefore, the competent authorities are encouraged to request the operators to record these figures. The comparison between off-block fuel and take-off fuel can provide a good indication of taxi fuel calculations and of whether the operator consistently uses contingency fuel for taxi. This practice should be discouraged.

Minimum fuel does not trigger any mandatory occurrence reporting. However, the operator should record the amount of "minimum fuel" declared as this data provides a good safety performance indicator (SPI) of the operator's fuel/energy scheme.

This GM clarifies that it is at the operator's discretion to decide how long the regular intervals for fuel recording should be. It provides examples of regular intervals for long-haul flights and short haul flights.

In addition, the GM provides a list of fuel data that are considered relevant for recording by operators, when applying a basic fuel/energy scheme or a basic fuel/energy scheme with variations.

This list of relevant data to be recorded is linked to the requirement of point CAT.OP.MPA.180 (d) on the baseline SPIs of an operator's current fuel/energy scheme. A similar GM is created for individual fuel/energy schemes (GM2 CAT.OP.MPA.180). While the recording of such data will be useful for operators to determine the robustness and safety of its fuel/energy scheme, this data will also enable operators to move from their current fuel/energy schemes to more performance-based ones, once they have gained the necessary experience and collected the required data.

5.4.1.2. Obtaining delay information from reliable source (Step 2)

Ref: CAT.OP.MPA.185 Point (b)

GM1 CAT.OP.MPA.185 point (c)

AMC1 CAT.OP.MPA.185(a) point (b)(2)(i)

CAT.OP.MPA.185 Point (b) mandates the commander to request delay information from a reliable source when in-flight fuel checks show that remaining fuel on board will not allow the flight to be completed as planned. This is to ensure that the commander has the most relevant information in order to decide the best course of action when the remaining fuel on board is less than planned.

The former IR prescribed that the commander must take into account the prevailing traffic and operational conditions, without specifying how such information should be obtained. The current rules, however, provides the flexibility to collect information through any reliable source and not just the ATC (as required by ICAO Annex 6, Part I, SARP 4.3.7.2.1). Such a reliable source could be contacted, for example, via the operator's system for exercising operational control. This flexibility increases the range of information available to the commander.

The condition to contact the ATC to obtain information on delays remains in point (b)(2)(i) of AMC1 CAT.OP.MPA.185(a). The new point (c) of GM1 CAT.OP.MPA.185 'Fuel/energy scheme — in-flight fuel/energy management policy — aeroplanes BASIC FUEL/ENERGY SCHEME — RELIABLE SOURCE TO OBTAIN DELAY INFORMATION' establishes the criteria that a reliable source of information should meet. It lists several features that a reliable source of information on delays should have.

Air navigation service providers (ANSPs) are considered to have the characteristics of a reliable source, which cannot be replaced by information found on the internet or another similar source.

This does not imply that the flight crew should directly contact the ANSP to obtain information, but that they can receive the information via the operator's OCC.

The answer to the question "when shall the request for delay information be done?" can be found in chapter 8 FAQ.

5.4.1.3. "Minimum Fuel " declaration (Step 3)

Ref: CAT.OP.MPA.185 Point (c)

GM1 CAT.OP.MPA.185 (d)

Procedures must be established for using the "MINIMUM FUEL" declaration with regard to the consumption of final reserve fuel/energy.

Minimum fuel and Mayday Mayday Mayday Fuel are the newly established common phraseologies for use in communicating a potential, impending or imminent low fuel state to ATC.

The IR reflects the changes to ICAO Annex 6 and Doc 4444 'Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM)' with regard to 'minimum fuel'. The use of the minimum fuel declaration improves coordination between flight crew and ATC when anticipating emergency or distress situations.

Notes 1 of ICAO Annex 6, Part I, SARP 4.3.7.2.2 explains the purpose of the 'MINIMUM FUEL' call.

It reads: The declaration of MINIMUM FUEL informs ATC that all planned aerodrome options have been reduced to a specific aerodrome of intended landing and any change to the existing clearance may result in landing with less than planned final reserve fuel. This is not an emergency situation but an indication that an emergency situation is possible should any additional delay occur.

The declaration of minimum fuel should only be used when the two required conditions are met:

1. the flight crew has committed to land at a specific aerodrome (remaining fuel does no longer allow diversion to another aerodrome), and
2. the pilot calculates that any change to the existing clearance to that aerodrome may result in landing with less than planned final reserve fuel.

There are numerous cases where the 'minimum fuel' declaration was wrongly used, as there is a different level of understanding between ATC personnel and pilots as well as among pilots regarding the use of this declaration.

Considering the minimum fuel declaration as an emergency is a misinterpretation of the current regulations by either ATC or pilots. Pilots should not expect any form of priority handling as a result of a minimum fuel declaration. ATC will, however, advise the flight crew of any additional expected delays as well as coordinate when transferring control of the aeroplane to ensure other ATC units are aware of the flight's fuel state.

The 'minimum fuel' declaration is not a safety event per se, operators should not report it but record it internally. For the same purpose of collecting more data to better understand the causes of misuse, the amount of fuel upon landing should be part of the relevant data to be recorded.

GM1 CAT.OP.MPA.185 (d) provides three typical examples of cases where the 'minimum fuel' declaration should be made.

Additional training should be provided to operators and ATC units to clarify the meaning and use of similar messages, such as 'MINIMUM FUEL', 'PAN PAN PAN' and 'MAYDAY MAYDAY MAYDAY FUEL'. EASA will provide further support on this topic through safety promotion activities.

5.4.1.4. "MAYDAY MAYDAY MAYDAY FUEL" declaration. (Step 4)

Ref: CAT.OP.MPA.185 Point (d)

GM1 CAT.OP.MPA.185 (b) and (k)

The IR reflects the changes to ICAO Annex 6 and Doc 4444 'PANS-ATM' with regard to situations of fuel emergency. Use of the standard call 'MAYDAY MAYDAY MAYDAY FUEL' promotes safety as it provides an immediate and clear understanding of the nature of the emergency both to ATC and the commanders of other flights operating on the same frequency.

The text of point (d) stems from ICAO Annex 6, Part I, SARP 4.3.7.2.3:

'The pilot-in-command shall declare a situation of fuel emergency by broadcasting MAYDAY MAYDAY MAYDAY FUEL, when the calculated usable fuel predicted to be available upon landing at the nearest aerodrome where a safe landing can be made is less than the planned final reserve fuel.'

GM1 CAT.OP.MPA.185 (k) clarifies that FRF protection during normal operations is applicable to aerodromes that were assessed as 'adequate aerodromes' by the operator (see Definitions, point CAT.OP.MPA.105 'Use of aerodromes and operating sites', as well as point (a)(A)(8.1.2) 'Criteria and responsibilities for determining the adequacy of aerodromes to be used' of AMC3 ORO.MLR.100 'Operations manual — general').

Exercising other last-ditch landing options (e.g. military aerodromes, closed runways, 'emergency' aerodromes) is subject to the emergency declaration 'MAYDAY MAYDAY MAYDAY FUEL'. In such a case, the commander 'may deviate from rules, operational procedures and methods in the interest of safety', as stated in point CAT.GEN.MPA.105 (b).

5.4.2. In-flight fuel management policy with variations.

An in-flight fuel/energy management policy including reduced contingency fuel (RCF) or flights to isolated destinations require approval for basic fuel/energy scheme with variations.

AMC2 CAT.OP.MPA.185(a) 'Fuel/energy scheme — in-flight fuel/energy management policy — aeroplanes BASIC FUEL/ENERGY SCHEME WITH VARIATIONS — PROCEDURES FOR IN-FLIGHT FUEL MANAGEMENT' (new)

This AMC2 CAT.OP.MPA.185(a) is created to include the additional procedures applicable to a basic fuel/energy scheme with variations.

The Decision Point of a RCF flight plan and the Point of no Return to an isolated aerodrome shall be determined by a computerized flight planning system which provides the fuel required to continue beyond these two points (AMC6 CAT.OP.MPA.181 (d)(3) and AMC7 CAT.OP.MPA.182 (b))

~~Point (b) 'calculation of the PNR for flights on isolated aerodromes'~~

~~This calculation is done by the computerised planning system (a basic fuel/energy scheme with variations requires flight monitoring and flight watch capabilities from the operator) and not manually, the formulae to calculate the PNR could be included in future safety promotion material, and not in a GM.~~

5.4.3. Performance based adaptation of the In-flight fuel management policy in an Individual Fuel/Energy scheme

An Individual Fuel/energy scheme is specific to an Operator and needs an approval from its Authority. It is not possible to define an Individual Fuel/energy scheme in this Manual.

In order to explain the process that could allow an operator to obtain an approval, an example of what could be an Individual Fuel/energy scheme applied to the in-flight fuel management policy, is given below.

~~AMC3 CAT.OP.MPA.185 'Fuel/energy scheme — in-flight fuel/energy management policy — aeroplanes INDIVIDUAL FUEL/ENERGY SCHEME — COMMITTING TO LAND AT A SPECIFIC AERODROME'~~

~~This AMC is created to raise awareness and encourage the operator's operations control centre (OCC) structure to be proactive in furnishing the relevant information to the cockpit when the commander has to decide to commit to land at a specific aerodrome. It is related to the concept of 'reaching the destination' when relevant information from the OCC is decisive for the commander's commitment to land at a specific aerodrome.~~

Individual Fuel/energy scheme for allowing use of in-flight fuel management policy at the decision point of an RCF flight.

(a) An individual fuel scheme could amend the RCF variation and allow use of the in-flight fuel management policy regarding the actions at the decision point. Based on a risk assessment and the established mitigating measures, it would increase the options.

(b) As a minimum, the operator should:

(1) use a suitable computerized flight-planning system;

(2) have established an operational control system that includes flight monitoring.

(3) OPS control should have direct communication means with Dest 1 and 2 aerodrome's ATC.

(4) the Decision Point is at less than X hours from Dest 1.

(c) In addition to AMC1 CAT.OP.MPA.185(a) and in the context of point (d) of AMC6 CAT.OP.MPA.181, if the RCF procedure is used on a flight to proceed to destination 1 aerodrome, and the in-flight fuel check at the decision point shows that the usable fuel expected to remain upon landing at the destination 1 aerodrome is less than:

(1) contingency fuel that is equal to 5 % of the trip fuel from the decision point to destination 1 aerodrome +

(2) destination 1 alternate fuel +

(3) FRF,

the commander should apply the in-flight fuel management policy and proceed according AMC1 CAT.OP.MPA.185(a) letter (b).

Rational: the RCF basic with variation procedure is prescriptive and leaves no choice when reaching the decision point with less than the required fuel. This individual fuel scheme, on the contrary, would allow to consider two options:

1. Apply the RCF procedure and divert to DEST 2, or
2. Cancel the RCF procedure and apply standard In-flight fuel management:
   - If only the 5% contingency fuel is partially or totally missing, the fuel check will show that Dest 1 can still be reached with DEST ALT FUEL + FRF. On a basic flight (no RCF) it means step 1 of the in-flight fuel management policy and the aircraft is allowed to continue towards DEST 1.
   - If the fuel check shows that the aircraft would arrive at Dest 1 with less than DEST ALT FUEL + FRF, it means step 2 of the in-flight fuel management policy. The mitigations specific to this individual scheme will ensure that the flight crew get reliable delay and overall situation awareness allowing them to decide whether it's still possible to continue and commit to Dest 1 or divert to make a safe landing somewhere else. The key point in the decision that the crew must make is the reasonable certainty that the aircraft will be able to land at destination N°1 or not. The equivalent level of safety ensured by this individual fuel scheme relies on the mandatory triple communication established between local ATC, the operator's OPS Control Center which has a global understanding of the situation and the flight crew who checks the remaining fuel on board an decides.

6. SUMMARY TABLES

The tables below have been developed to facilitate operational use of the concepts related to fuel/energy schemes.

6.1. Table 1 - Basic fuel/energy scheme

Basic Fuel/energy scheme		
Fuel Type	**Requirements**	**Reference**
Taxi Fuel		AMC1 CAT.OP.MPA.181 (a)

Trip Fuel	*Except mandatory approval by the Authority, no specific requirement*	AMC1 CAT.OP.MPA.181 (b)
Contingency Fuel		AMC1 CAT.OP.MPA.181 (c)
Alternate Fuel		AMC1 CAT.OP.MPA.181 (d)
Final Reserve Fuel		AMC1 CAT.OP.MPA.181 (e)
Additional Fuel		AMC1 CAT.OP.MPA.181 (f)
Extra Fuel		AMC1 CAT.OP.MPA.181 (g)
Discretionary Fuel		AMC1 CAT.OP.MPA.181 (h)

6.2. Table 2 - Basic fuel/energy schemes with variations

	Variation	Requirements	Reference
Fuel Quantities Variations	**Taxi Fuel**		CAT.OP.MPA.181 (a)
	Taxi fuel variation (use of statistical taxi out fuel)	• Taxi fuel statistic data	AMC5 CAT.OP.MPA.181
	Contingency fuel		CAT.OP.MPA.181 (c)
	Contingency Fuel equal to 3% of Trip Fuel + a Fuel ERA	• fuel consumption monitoring system for individual aeroplanes • Fuel ERA (located appropriately) • Not less than 5 min at 1500ft	AMC6 CAT.OP.MPA.181 AMC7 CAT.OP.MPA.181
	Contingency Fuel equal to 20-minute flying time based upon the planned trip fuel consumption	• fuel consumption monitoring system for individual aeroplanes • Not less than 5 min at 1500ft	AMC6 CAT.OP.MPA.181
	Statistical Contingency Fuel variation	• fuel consumption monitoring system for individual aeroplanes • 2 years of recording of statistical contingency fuel data. • Statistical analysis per city pair/aeroplane combination • Not less than 5 min at 1500ft	AMC6 CAT.OP.MPA.181 GM2 CAT.OP.MPA.181
	RCF, Reduced Contingency Fuel variation	• fuel consumption monitoring system for individual aeroplanes • decision point	AMC6 CAT.OP.MPA.181 (d) AMC2 CAT.OP.MPA.185 (a)
Aerodrome Selection Variations	**Aerodrome Selection Policy**		CAT.OP.MPA.182
	No Destination Alternate Aerodrome variation	• flight time ≤ 6h (or ≤ 4h if in-flight replanning) • 2 separate runways • ± 1h ceiling ≥ 2000ft or circling + 500ft whichever is higher, Vis ≥ 5 km • FRF + 15 min holding at 1500ft	CAT.OP.MPA.181 AMC2 CAT.OP.MPA.182

	Isolated aerodrome variation	• For turbine-engined aeroplanes = 2 hours with normal cruise consumption above the destination aerodrome, including the FRF. • for aeroplanes with reciprocating engines = 45 minutes plus 15 % of the flying time planned for cruising, including FRF or for 2 hours, whichever is less. • Fuel ERA PNR aerodrome • computerised flight-planning system calculating the PNR on the OFP	AMC7 CAT.OP.MPA.182 GM2 CAT.OP.MPA.182
Planning Minima Variations	Planning minima variation N°1 (AMC8 CAT.OP.MPA.182 table 3)	• suitable computerised flight-planning system • operational control system that includes flight monitoring • planned flight time from take off to landing ≤ 6h (or ≤ 4h if in-flight replanning) • minimum flight crew of two pilots • not allowed for an isolated aerodrome or an EDTO ERA	AMC8 CAT.OP.MPA.182 GM3 CAT.OP.MPA.182 GM4 CAT.OP.MPA.182 AMC1 CAT.OP.MPA.182(f) GM1 CAT.OP.MPA.182(f)
	Planning minima variation N°2 (AMC9 CAT.OP.MPA.182 table 4)	• suitable computerised flight-planning system • approval for low-visibility approach operations • operational control system that includes flight monitoring • not allowed for an isolated aerodrome or an EDTO ERA	AMC9 CAT.OP.MPA.182 GM3 CAT.OP.MPA.182 GM4 CAT.OP.MPA.182 AMC1 CAT.OP.MPA.182(f) GM1 CAT.OP.MPA.182(f)

6.3. Table 3 and 3bis – Planning minima

“Planning minima” apply only at planning stage, on ground, before the commencement of the flight or in flight in case of an in-flight replanning. After commencement of the flight, one of the conditions for a safe landing is compliance with the “operating minima”.

CAT.OP.MPA.182 (e) states that “the operator shall provide appropriate safety margins to flight planning to take into account a possible deterioration of the available forecast meteorological conditions at the estimated time of landing.” These safety margins, which shall be added to the operating minima, are detailed in the tables of AMC 6, 8 and 9 of CAT.OP.MPA.182.

These margins must be added to the relevant operating minima (all engine operative) of the expected landing runway.

The selection process of the operating minima used to enter into the planning minima tables needs to proceed via following steps:

1. Performance:

   Compliance with CAT.POL.A.230 Landing – dry runways and CAT.POL.A.235 Landing – wet and contaminated runways is mandatory.

   Paragraph (e) 2 of these two IRs reads “land on the runway most likely to be assigned, considering the probable wind speed and direction, the ground-handling characteristics of the aeroplane and other conditions such as landing aids and terrain”.

   Wind limitations, including crosswind and gusts, should be applied taking into account the runway condition (dry, wet, contaminated). See table 1 AMC3.CAT.OP.MPA.182.

   This can forbid calculating planning minima for a given runway.

   Compliance with paragraph (e) 2 determines in most cases the maximum permissible landing mass and, therefore, also the runway to use for planning minima calculation.

2. Actual availability of the runway:

   Notam, Infrastructure, possibility to exit, backtrack...

3. Weather forecast:

   Once the runway is selected, the planning minima will be calculated by adding the margins to the approach with the lowest operating minima approved for the aircraft. This is the meaning of “usable DA/H or MDA/H” and “usable RVR or VIS” at the bottom of the tables in AMC 8 and 9.

The aerodrome can be selected as Destination alternate aerodrome, fuel ERA aerodrome, EDTO ERA, isolated destination aerodrome, if the weather forecast (during a period in accordance with AMC3 CAT.OP.MPA.182 table 1) is above or equal to the resulting planning minima, ceiling (cloud base or vertical visibility) and RVR/VIS.

Note 1: table 3, AMC 8 CAT.OP.MPA.182 and table 4 AMC 9 CAT.OP.MPA.182 can only be used for calculating Destination alternate aerodrome and fuel ERA aerodrome planning minima. They are not approved for Isolated aerodrome and EDTO ERA.

Note 2: AMC1 CAT.OP.MPA.182(f) restricts the use of approaches based on GNSS or the use of operational credits to one only aerodrome, either Destination or Alternate but not at both. This is to protect against a failure that would affect the possibility of a safe landing at the two aerodromes.

Table 3 Planning Minima summary

Aerodrome	Planning minima	Remarks	Reference
Take off Alternate	-1h/+1h Required VIS/RVR + for a type A or a circling operation, ceiling at or above MDH.	Limitations related to OEI operations should be taken into account.	AMC5 CAT.OP.MPA.182 CAT.OP.MPA.110
Destination	-1h/+1h Required VIS/RVR + for a type A or a circling operation, ceiling at or above MDH.	All engine operative operating minima	AMC5 CAT.OP.MPA.182 CAT.OP.MPA.110
Destination Alternate aerodrome	-1h/+1h Basic: operating minima + increments as per AMC6 CAT.OP.MPA.182		AMC6 CAT.OP.MPA.182
	-1h/+1h Basic with variation: operating minima + increments as per AMC8 CAT.OP.MPA.182	Duration of flight ≤ 6 h (≤ 4 h if in flight replanning) + Specific requirements+ Verify OEI operating minima	AMC8 CAT.OP.MPA.182
	-1h/+1h Basic with variation: operating minima + increments as per AMC9 CAT.OP.MPA.182	Specific requirements+ Verify OEI operating minima	AMC9 CAT.OP.MPA.182
Destination with no Destination Alternate aerodrome	-1h/+1h ceiling ≥ 2 000 ft (600 m) or the circling height + 500 ft (150 m), whichever is greater, ground visibility ≥ 5 km.	Duration of flight ≤ 6 h (≤ 4 h if in flight replanning) two separate runways. (rmk: Basic fuel/energy scheme with variation)	AMC2 CAT.OP.MPA.182

Isolated Destination aerodrome	-1h/+1h operating minima + increment as per AMC6 CAT.OP.MPA.182 Use of AMC 8 and 9 not authorized		AMC6 CAT.OP.MPA.182
Fuel ERA	Operating minima + increments as per AMC6 CAT.OP.MPA.182		AMC6 CAT.OP.MPA.182
	Basic with variation: operating minima + increments as per AMC8 CAT.OP.MPA.182	Duration of flight ≤ 6 h (≤ 4 h if in flight replanning)+ Specific requirements+ Verify OEI operating minima	AMC8 CAT.OP.MPA.182
	Basic with variation: operating minima + increments as per AMC9 CAT.OP.MPA.182	Specific requirements+ Verify OEI operating minima	AMC9 CAT.OP.MPA.182
EDTO ERA	From earliest ETA to ETA + 1h operating minima + increments as per AMC6 CAT.OP.MPA.182	Limitations related to OEI operations are already taken into account in this table.	AMC6 CAT.OP.MPA.182
	Variation based on AMC 8 and 9 not authorized		

Note: Crosswind planning minima: see Table 1 of AMC3 CAT.OP.MPA.182
Wind limitations should be applied taking into account the runway condition (dry, wet, contaminated).

Table 3bis One Engine Inoperative considerations regarding Planning Minima

Applicable planning minima based on type of operation for
Destination aerodrome and Take-off alternate

Selected aerodrome	Weather conditions should be at or above	Planning Minima calculation based on type of operation
Destination aerodrome	Operating minima	Normal operation (all-engine operation)
Take-off alternate	OEI Operating minima	OEI operation

Applicable planning minima based on type of operation for **Destination alternate aerodrome, Fuel ERA aerodrome, EDTO ERA aerodrome, Isolated destination aerodrome.**

Selected aerodrome	AMC6 Basic	AMC8 and AMC9 Variations	Weather conditions should be at or above		Planning Minima calculation based on type of operation
			AMC6	AMC8 or AMC9	
Destination alternate aerodrome	☑	☑	planning minima (all-engine operation)	The higher of: • planning minima (all-engine operation), or • OEI operating minima	Normal operation (all-engine operation)
Fuel ERA aerodrome	☑	☑			
EDTO ERA aerodrome	☑	X			
Isolated destination aerodrome	☑	X			

6.3.1.1. Examples of Planning Minima calculation

6.3.1.1.1. Example on how to use AMC 6

Table 2 — Basic fuel/energy scheme — planning minima — aeroplanes
Destination alternate aerodrome, fuel ERA aerodrome, EDTO ERA, isolated destination aerodrome.

Row	Type of approach operation	Aerodrome ceiling (cloud base or vertical visibility)	RVR/VIS
1	Type B instrument approach operation	DA/H +200ft	RVR/VIS +800m
2	Type A instrument approach operation	DA/H or MDA/H +400ft	RVR/VIS +1500m
3	Circling approach Operations	MDA/H +400ft	VIS +1500m

1) Alternate Planning minima example: LEVC

Wind predicted to favour ILS YANKEE DME CAT 1 on RWY12

Planning minima calculated based on: (type B) ILS YANKEE DME CAT 1 for a CAT C Airplane

Operating Minima	0210ft / 0550m
Safety increment according to Table 2 (Row 1)	+0200ft / +0800m
Planning Minima	**0410ft / 1350m**

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2) Alternate Planning minima example: LGKO

- Wind predicted to favour RNP LNAV/VNAV RWY14

Planning minima calculated based on: (Type A) RNP LNAV/VNAV for a CAT C Airplane

Operating Minima	0260ft / 0800m
Safety increment according to Table 2 (Row 2)	+0400ft / +1500m
Planning Minima	**0660ft / 2300m**

6.3.1.1.2. Example on how to use AMC 8

Table 3 — Basic fuel/energy scheme with variations— planning minima — aeroplanes
Destination alternate aerodrome, fuel ERA aerodrome

Row	Type of approach operation	Aerodrome ceiling (cloud base or vertical visibility)	RVR/VIS
1	Type B instrument approach operation	DA/H +200ft	RVR/VIS +550m
2	3D Type A instrument approach operations, based on a facility with a system minimum of 200ft or less	DA/H +200ft	RVR/VIS +800m
3	Two or more usable type A instrument approach operations***, each based on a separate navigation aid	DA/H or MDA/H* +200ft	RVR/VIS** +1000m
4	One usable type A instrument approach operation	DA/H or MDA/H +400ft	RVR/VIS +1500m
5	Circling approach operations	MDA/H +400ft	VIS +1500m

* The higher of the usable DA/H or MDA/H.
** The higher of the usable RVR or VIS.
***Compliance with point CAT.OP.MPA.182(f) should be ensured.

Note 1 : The operator may select the most convenient planning minima row. For example, aerodrome with two type A approaches: one ILS CAT I (DA 350 ft/DH250 ft/550 m) another VOR/DME (MDA 650 ft/1 500 m). The operator may use Row 2 instead of Row 3.

Note 2: Operators should use either the planning minima resulting from Table 3 or the One-Engine Inoperative (OEI) Minima, whichever is higher.

1) Alternate Planning minima example: LEVC

- Wind predicted to favour ILS YANKEE DME CAT 1 RWY12

Planning minima calculated based on: (Type B) ILS YANKEE DME CAT 1 for a CAT C Airplane

Operating Minima	0210ft / 0550m
Safety increment according to Table 3 (Row 1)	+0200ft / +0550m
Planning Minima	**0410ft / 1100m**

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2) Alternate Planning minima example: LEVC

- Wind predicted to favour ILS DME CAT 1 GA 5.0% RWY33

Planning minima calculated based on: (Type A) ILS DME CAT 1 GA 5.0% for a CAT C Airplane

Operating Minima	0260ft / 0600m
Safety increment according to Table 3 (Row 2)	+0200ft / +0800m
Planning Minima	**0460 ft / 1400m**

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3) Alternate Planning minima example: LGKO

Wind predicted to favour RWY14

2 Type A approach operations available:

- RNP LNAV/VNAV (operating minima 260/800)
- VOR DME (operating minima 510/1900)

Option A

Planning minima calculated based on: **higher of** RNP LNAV/VNAV and VOR DME for a CAT C Airplane

Operating Minima	0510ft / 1900m
Safety increment according to Table 3 (Row 3)	+0200ft / +1000m
Planning Minima	**0710ft / 2900m**

Option B

Planning minima calculated based on: RNP LNAV/VNAV for a CAT C Airplane

Operating Minima	0260ft / 0800m
Safety increment according Table 3 (Row 4)	+0400ft / +1500m
Planning Minima	**0660ft / 2300m**

6.3.1.1.3. Example on how to use AMC 9

Table 4 — Basic fuel/energy scheme with variations— planning minima — aeroplanes
Destination alternate aerodrome, fuel ERA aerodrome, isolated destination aerodrome

Row	Type of approach operation	Aerodrome ceiling (cloud base or vertical visibility)	RVR/VIS
1	Two or more usable type B instrument approach operations to two separate runways***	DA/H* +100ft	RVR/VIS** +300m
2	Type B instrument approach operation	DA/H +150ft	RVR/VIS +450m
3	3D Type A instrument approach operations, based on a facility with a system minimum of 200ft or less	DA/H +200ft	RVR/VIS +800m
4	Two or more usable type A instrument approach operations***, each based on a separate navigation aid	DA/H or MDA/H* +200ft	RVR/VIS** +1000m
5	One usable type A instrument approach operation	DA/H or MDA/H +400ft	RVR/VIS +1500m
6	Circling approach operations	MDA/H +400ft	VIS +1500m

* The higher of the usable DA/H or MDA/H.
** The higher of the usable RVR or VIS.
*** Compliance with point CAT.OP.MPA.182(f) should be ensured.

Note: The operator may select the most convenient planning minima row. For example, aerodrome with two type B approaches: one CAT3 (0 ft/75 m) another CAT1 (200 ft/550 m). The operator may use Row 2 and use CAT3 (0 + 150 ft/75 + 450 m) instead of Row 1 CAT1 (200 + 100 ft/550 + 300 m).

Note 2: Operators should use either the planning minima resulting from Table 4 or the One-Engine Inoperative (OEI) Minima, whichever is higher.

1) Alternate Planning minima example: EDDM

Wind predicted to favour RWYs 08

Type B approach operations available:	**RWY08L**	**RWY08R**
	• ILS DME CAT 3 (0ft / 0075m)	• ILS DME CAT 3 (0ft / 0075m)

Planning minima calculated based on: higher of ILS CAT 3 08L and ILS CAT 3 08R for a CAT C Airplane

Operating Minima	0ft / 0075m
Safety increment according to Table 4 (Row 1)	+0100ft / +0300m
Planning Minima	**0100ft / 0375m**

But here it is mandatory to verify the One Engine Inoperative (OEI) operating minima to ensure that in case of engine failure landing remains possible:

1. If the aircraft is a new generation which is capable of the same CAT 3 operating minima with one engine inoperative, the planning minima are those resulting from table 4 (100ft/375m).
2. If the aircraft, for example, has all engine operative CAT 3 minima of 50ft/175m but reverts to CAT 1 200ft/550M on single engine, then the planning minima need to permit an OEI operation and become therefore the highest of 100ft/375m and 200ft/550m so, finally, 200ft/550m.

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2) Alternate Planning minima example: EDDV

Wind predicted to favour RWYs 09

2 type B approach operations available:	**RWY09L**	**RWY09R**
	• ILS CAT 3 (0ft / 75m)	• ILS DME CAT 1 (200ft / 550m)

Option A
Planning minima calculated based on: **higher of** ILS CAT 3 and ILS CAT 1 for a CAT C Airplane

Operating Minima	0200ft / 0550m
Safety increment according to Table 4 (Row 1)	+0100ft / +0300m
Planning Minima	**0300ft / 0850m**

Option B
Planning minima calculated based on: ILS CAT 3 for a CAT C Airplane

Operating Minima	0ft / 0075m
Safety increment according to Table 4 (Row 2)	+0150ft / +0450m
Planning Minima	**0150ft / 0525m**

But here it depends on the aircraft OEI operating minima:

3. If the aircraft is a new generation which is capable of the same CAT 3 operating minima with one engine inoperative, the planning minima are those above.
4. If the aircraft, for example, has all engine operative CAT 3 minima of 50ft/175m but reverts to CAT 1 200ft/550M on single engine, then the planning minima of option B need to permit an OEI operation and become therefore 200ft/550m.

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3) Alternate Planning minima example: LPLA

Wind predicted to favour RWYs 15

Approach operations available:

- ILS YANKEE CAT1 (0270ft / 0900m)

Planning minima calculated based on: ILS YANKEE CAT1 for a CAT C Airplane

Operating Minima (Type A)	0270ft / 0900m
Safety increment according to Table 4 (Row 3)	+0200ft / +0800m
Planning Minima	**0470ft / 1700m**

6.4. Table 4 – Flight following, flight monitoring, flight watch

Capability	Service provided	Operator's ground personnel	Communication means	Fuel/energy scheme specific requirements
FLIGHT FOLLOWING	Recording in real time of departure and arrival messages	Operational personnel (no formal training required)	Not required	
FLIGHT MONITORING	Flight Following + Operational monitoring throughout all phases of the flight (the operator knows in which phase of the flight the airplane is) + communication of all available and relevant safety information (see GM28 Annex I) + Critical assistance to the flight crew in case of : ○ In-flight emergency ○ Security issue ○ Request of the flight crew	Suitably qualified operational-control personnel (formal training detailed by AMC1 ORO.GEN.110) • FOOs (Flight Operations Officers) / FDs (Flight Dispatchers) • Training program (initial+ operator specific + recurrent) • Training provided by qualified instructors	For Individual Fuel/energy schemes, 2 independent airborne communication systems as per AMC1 CAT.OP.MPA.180(e)(6)	At least Flight Monitoring for: • any Individual Fuel/energy scheme • Fuel/energy scheme with Variation based on AMC8 or AMC9 CAT.OP.MPA.182
FLIGHT WATCH	Flight Monitoring + Active real time tracking to ensure that the flight is following its prescribed route without unplanned deviations, diversions or delays. + where no real-time automatic position-reporting is possible, the operator should have an acceptable alternative to ensure in-flight reporting at least every hour. (GM28 Annex I)	Same qualifications required as for Flight Monitoring		

7. FREQUENTLY ASKED QUESTIONS (FAQ)

7.1. Is VHF voice considered an airborne communications system?

Answer: YES

7.2. Would VHF voice and VHF Datalink (VDL Mode 2) be considered independent?

Answer: NO, see below GM3 CAT.OP.MPA.180 point (b)

GM3 CAT.OP.MPA.180 Fuel/energy scheme — aeroplanes

INDIVIDUAL FUEL/ENERGY SCHEMES — OPERATOR CAPABILITIES — COMMUNICATIONS SYSTEMS

(a) In the context of point (e)(6) of AMC1 CAT.OP.MPA.180, the availability of two independent communications systems at dispatch, is particularly relevant for flights over oceanic and remote areas (e.g. when flying over the ocean without VHF coverage, operators need either HF or satellite communications (SATCOM)).

(b) Consideration should also be given to the operational control system associated with the use of the aircraft communications addressing and reporting system (ACARS). Two communications systems (e.g. VHF and SATCOM) should be used to support the ACARS functionality to ensure the required degree of independence unless the operator has established contingency procedures for reverting to voice communication only.

(c) Additional means of communication may be required by other regulations that are not linked to fuel/energy schemes.

Note: For further information, see ICAO Doc 9976 Flight Planning and Fuel Management (FPFM) Manual, Appendix 7 to Chapter 5 A performance-based approach job-aid for an approving authority (1st Edition, 2015).

7.3. AMC1 CAT.OP.MPA.185(a) §(b)(2), when shall the request for delay information be done?

When reading AMC1 CAT.OP.MPA.185(a) §(b)(2), the request for Delay Information seems mandatory even if the plane is still far from the DEST.

Answer:

The request for delay information should be made within a time frame that allows the crew a realistic assessment of the prevailing traffic and operational conditions at the Destination, before discarding the last en route aerodrome allowing a safe landing.

Long haul flights often start the cruise phase at a non-optimal flight level. The FMS calculates then an arrival at DEST with not enough fuel. But there is a high level of uncertainty and flight conditions may improve. It is also likely that, over the next couple of hours, there will be many safe landing options along the route. In the meantime, the aircrew can adjust the flight to reduce the fuel consumption, for instance by lowering the Cost Index.

The request for Delay Information from a reliable source is mandatory when, approaching the Destination, it becomes obvious that it will no longer be possible to land at the destination aerodrome with:

(1) In the case of a flight with DEST + DEST ALT, the final reserve fuel/energy plus fuel/energy to proceed to the alternate aerodrome,
(2) when the aircraft is operated with two destination alternate aerodromes and a safe landing at DEST is still not ensured the final reserve fuel/energy plus fuel/energy to proceed to the alternate aerodrome that requires the greater amount of fuel,
(3) In the case of a flight with no DEST ALT, the final reserve fuel/energy plus the 15 minutes of (no) destination alternate fuel/energy,
(4) In the case of a flight to an Isolated Aerodrome, 2 hours of fuel/energy with normal cruise consumption above the destination aerodrome, including the FRF for turbine-engined aeroplanes, or, for aeroplanes with reciprocating engines, 45 minutes plus 15 % of the flying time planned for cruising, including FRF or for 2 hours, whichever is less.

The request for delay information is required to enable the commander to decide whether to commit to the destination or initiate a diversion (from cruise level).

Note 1: In this context, Approaching the destination means: before discarding the last en route aerodrome allowing a safe landing.

Note 2: In the case of a flight with no DEST ALT, ~~the 15 minutes must be protected until reaching the DEST~~ it is strongly recommended to protect the 15 minutes fuel until reaching the IAF to enable some options for the commander. Nevertheless, this is not a regulatory requirement.

Note 2: In the case of a flight with no DEST ALT, Tit is strongly recommended to protect the 15 minutes fuel until reaching the IAF to enable some options for the commander. Nevertheless, this is not a regulatory requirement.

Note 3: it is advisable to request this delay information already when the estimated amount of fuel on landing at DEST is close to the minimum quantity required.

Note 4: the SPT 0097 will suggest to EASA to clarify AMC1 CAT.OP.MPA.185(a) §(b)(2) with the following changes (under lined):

"If, approaching the Destination, an in-flight fuel check shows that the usable fuel expected to remain upon landing at the destination aerodrome may be less than: …"

7.4. Can Flight Radar be used by an operator for Flight Watch?

Answer : NO

Flight Radar is restricting any "operational" use of the data and states it in 6.3.1 (d) at: https://www.flightradar24.com/terms-and-conditions

EASA publishes a list of approved ATM/ANS organizations:

EASA
European Union Aviation Safety Agency

LIST OF APPROVED ATM/ANS ORGANISATIONS UNDER THE OVERSIGHT OF EASA

CERTIFICATE REFERENCE	ORGANISATION NAME	COUNTRY	SCOPE	ISSUE DATE	STATUS
EASA.AOA.NF.001	Eurocontrol	Belgium	ATM Network Functions	27/11/2019	valid
EASA.AOA.PAN.002	European Satellite Service Provider (ESSP)	France	CNS	18/09/2024	valid
EASA.AOA.TRD.004	University of North Dakota Aerospace Foundation (UNDAF)	USA	ATCO Training	30/05/2018	valid
EASA.AOA.PAN.009	Eurocontrol	Belgium	AIS	03/12/2020	valid
EASA.AOA.TRD.010	Aireon	USA	CNS	28/11/2023	valid

8. TRAINING

8.1. Training for Dispatchers

It is the responsibility of the CAT operator to train dispatchers/flight operations officers with flight-monitoring/flight-watch tasks who do not hold licences. The training plan is set out in AMC1 ORO.GEN.110(c)&(e) and must be included in the Operations Manual.

8.1.1. Briefing between dispatchers/flight operations officers

As part of the operator's responsibilities with regard to personnel procedures, including ground personnel, ORO.GEN.110(f), when there is a handover of flight surveillance activities, flight-following/flight-monitoring/flight-watch, a prior briefing must be given by the outgoing personnel to the incoming personnel, as set out in AMC2 ORO.GEN.110(f) and GM2 ORO.GEN.110(f). Among the information which must be shared is the weather, the NOTAMs applicable, operational restrictions, flights in the air and those which have not yet started, the flight schedule, etc.

9. EPILOGUE

9.1. Legislation and references

Primary legislation and references:

European Regulations:

- Regulation (EU) 2021/1296 of 4 August 2021 amending Regulation (EU) 965/2012.
  - https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R1296

ED Decisions:

- ED Decision 2022/005/R 'Fuel/energy planning and management — fuel/energy schemes'
  - https://www.easa.europa.eu/en/document-library/agency-decisions/ed-decision-2022005r

Explanatory notes and Safety promotion material (The safety material is included in the Explanatory note)

- Explanatory note to the ED Decision 2022/005/R and Regulation (EU) 2021/1296.
  - https://www.easa.europa.eu/en/downloads/136244/en

Secondary legislation and references:

- ED Decision 2023/007/R Helicopter emergency medical service performance and public interest sites and other amendments.
  - https://www.easa.europa.eu/en/document-library/agency-decisions/ed-decision-2023007r.

For info:

- EASA Opinion No 02/2020 Fuel/energy planning and management
  - https://www.easa.europa.eu/en/document-library/opinions/opinion-022020
- EASA Notice of proposed of Amendments 2016-06 (A) Fuel planning and management: Aeroplanes - Annex I (Definitions), Part-ARO, Part-CAT
  - https://www.easa.europa.eu/en/document-library/notices-of-proposed-amendment/npa-2016-06
- NPA 2016-06 (B) Fuel planning and management: Helicopters - Annex I (Definitions), Part-CAT, Part-SPA, Part-NCC, Part-NCO & Part-SPO
  - https://www.easa.europa.eu/en/document-library/notices-of-proposed-amendment/npa-2016-06-b
- NPA 2016-06 (C) Fuel planning and management: Aeroplanes/helicopters - Part-NCC, Part-NCO & Part-SPO
  - https://www.easa.europa.eu/en/document-library/notices-of-proposed-amendment/npa-2016-06-c
- ToR RMT.0573 Fuel procedures and planning
  - https://www.easa.europa.eu/en/downloads/18536/en

- ICAO DOC 9976 Flight Planning and Fuel Management (FPFM) Manual.

Other Related documents

CRD 2016-06 (A) Fuel planning and management: Aeroplanes - Annex I (Definitions), Part-ARO, Part-CAT

CRD 2016-06 (B) Fuel planning and management: Helicopters - Annex I (Definitions), Part-CAT, Part-SPA, Part-NCC, Part-NCO & Part-SPO

CRD 2016-06 (C) Fuel planning and management: Aeroplanes/helicopters - Part-NCC, Part-NCO & Part-SPO

9.2. More information at National level

9.2.1. Spain – AESA (Agencia Estatal de Seguridad Aérea).

- Amendments to the fuel policy as requested by AESA Spain:
  - Fill out the following form: https://sede.seguridadaerea.gob.es/sede-aesa/catalogo-de-procedimientos/certificado-de-operador-a%C3%A9reo-aoc-avi%C3%B3n-y-helic%C3%B3ptero), and attach the following annexes from Appendix B:
    - Annex III. Part 16. Fuel/energy scheme. Airplanes.
    - Annex III. Part 16. Fuel/energy scheme. Helicopters.
    - Annex III. Part 18. Special refuelling or defuelling. Aeroplanes. All operators wishing to apply for approval for this operations.
    - Annex III. Part 18. Special refuelling or defuelling. Helicopters. All operators wishing to apply for approval for this operations.
- NCCs.
  - Annex Refuelling helicopters with engines and/or rotors turning from Appendix B. Helicopters. All operators wishing to apply for approval for this operations.

To include other authorities.

9.3. Acknowledgments.

The industry experts updating this safety promotion activity are nominated by the EASA advisory bodies as follows:

GODEL, Claude	EASA contracted expert.
RAMROTH, Peter	IFALDA.
BORER, Thomas	IATA – Lufthansa group, SWISS International Airlines
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ARROYO, Gabriel	AESA (Spanish Authority) – Oversight expert.
DEJEAN DE LA BATIE, Antoine	DGAC France – OPS Inspector.
NORTON, Spencer	IATA - IAG
MBAYE, Ablaye	SABENA Technics.

https://www.easa.europa.eu/community/system/files/2023-05/SPT%20Group%20Composition%20%E2%80%94%20SPT.0012%20V1%20issue%201%202023.pdf

9.4. Work plan of SPT.0097

To BE summarised from WORK plan document.

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