



Flight Plan and ATFCM adherence

for the safe and optimum flow of air traffic





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Introduction

The Dynamic Management of the European Airspace Network (DMEAN) consolidates a number of current ATM developments and improved information processes to meet capacity demands in the short-term through a network focused approach. The Flight Efficiency Plan (FEP), a common EUROCONTROL/CANSO/IATA initiative, was introduced in August 2008 to put emphasis on flight efficiency such as airspace design and the utilisation of the available capacity of airspace (en-route & TMAs) and airports.

A focus for both initiatives is to improve supporting systems, procedures and flight planning to allow operators to fly shorter routes, carry less fuel and reduce emissions.

Delivering the optimised flight plan

Flight plans and associated update messages are submitted for all IFR/GAT flights, including the IFR portions of mixed IFR/VFR flights, entering, overflying or departing the IFPS Zone (IFPZ).

The filed flight plan is the result of the preparation by AOs to ensure, as far as possible, the most efficient and economic profile for the intended flight.

- The route and levels are determined by many factors such as aircraft type, payload, weather conditions, route charges, etc.
- The flight plan data, departure and arrival times, waypoints, route and levels are key elements in the preparation for airports, ACCs and CFMU to manage the flight in a safe and optimum manner.

The forecast traffic demand and available ATC capacity is identified by Air Navigation Service Providers (ANSPs) at ATC sector level and thus appropriate scenarios and sector configurations can be put in place for the day of operations. This assessment of traffic counts and sector loads, when and where appropriate, may result in a request for Central Flow Management Unit (CFMU) to put protective ATFCM regulation in place.

- ATFCM is implemented for airspace where the traffic demand exceeds the defined ATC capacity.
- Flow and/or capacity management measures such as departure slots, level-capping or rerouting scenarios may then be needed to prevent sector overloads.

What are the Rules

A new Commission Regulation (EC) No 1033/2006 laying down the requirements on procedures for flight plans in the pre-flight phase for the single European sky applies as from 1st January 2009:

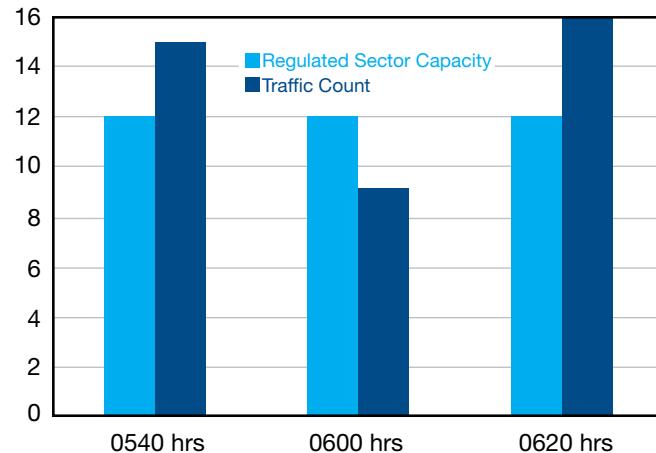
“The operator shall ensure that the conditions of acceptance of a flight plan and any necessary changes thereto as notified by IFPS to the originator are incorporated into the planned flight operation and communicated to the pilot.” and
“The operator shall ensure prior to operation of the flight that the content of the initial flight plan correctly reflects the operational intentions.”

Why is there a problem?

Daily across Europe, regulations are put in place to protect ATC from receiving more traffic than the controller can handle safely. However, it happens that more aircraft than planned enter these protected sectors, exceeding their capacities by more than 10%, which is regarded as an ATFCM “over-delivery”. When investigating those reported occurrences in most cases it is found that additional flights entered the concerned sector as a result of:

- Not flying at the initial requested flight level (RFL); or,
- Departing at times different from the original estimated off-block time (EOBT) or calculated take-off time (CTOT); or,
- Arriving in the sector earlier or later than originally planned; or
- Deviating from their original planned route (often direct routeing (DCT)).

Example: Reported over-delivery LECMAST sector (Mar 08)



The EUROCONTROL Enhanced Traffic Flow Management System (ETFMS) count was 33 flights for a regulated capacity of 36 for the period between 0540-0620hrs. The actual number of flights was 42 flights. The causes were: 3 flights earlier than planned, 2 flights later than planned and 4 flights in sector operating on another route than planned.

Why is there a lack of adherence to FPL & ATFCM measures at Airports?

In 35% of all reported ATFCM over-deliveries during 2008, the actual FL was different to the RFL in the Flight Plan. The network impact of this over-delivery can result in:

- Wasted capacity in some sectors,
- Potentially excessive workload,
- An overall lack of confidence in the accuracy of forecast traffic counts,
- Protective capacity reduction,
- Increased workload, stress or working conditions such that the ability of ATC controller may be significantly impaired and thus a safety issue.

CFMU is systematically monitoring the performance on ATFCM slot adherence. At some holiday destinations, a few flights can be hours not minutes away from their CTOT without notification to ATM. These changes to the planned timing, route or flight level, if not communicated, may cause disruption to a handling ACC but also to the destination airport. Who has not arrived early on a flight at an airport to find no stand available?

So where it is experienced, what are the principal causes for the lack of FPL adherence at airports? It can be caused by:

- AOs not submitting DLA/CHG messages.
- Poor management of delays.
- Failure to adhere to CTOT and to update EOBTs for non-regulated flights.

Dispatchers Message

- A change of Estimated Off Block Time (EOBT) of more than 15 minutes requires a DLA/CHG message.
- Ensure that the filed FPL correctly reflects the operational intentions.

Accurate flight plan data is essential. If change is not communicated then this immediately introduces an element of inaccuracy into traffic projections for both en route and destination airports.

CFMU can allocate a calculated take-off time (CTOT) to protect a congested ATC sector. In such circumstances:

- Aircraft Operators (AOs) should plan the departure of their flight so that the aircraft will be ready for start in sufficient time to comply with the CTOT.
- Slot tolerance (-5min +10min) is available to ATC to organise the departure sequencing.
- Airports and controllers should have effective practices to monitor EOBT & CTOT.
- ATC has a joint responsibility with AOs in CTOT adherence (ATFCM Users Manual).
- ATC may deny start up clearance to a flight unable to meet its CTOT until coordination with the ATFCM unit concerned.

What are the Rules

ICAO Doc 7030/4 (EUR) stipulates that

“ATC is responsible for departure slot monitoring at departure aerodromes...” and

“...Aircraft operators shall inform themselves of and adhere to... current ATFM measures (e.g. specific measures applicable on the day in question such as ATFM slot or flight suspension)”.

In the same document it also mentioned that

“Any changes to the EOBT of more than 15 minutes for any IFR flight within the IFPZ shall be communicated to the IFPS”

What are the Rules

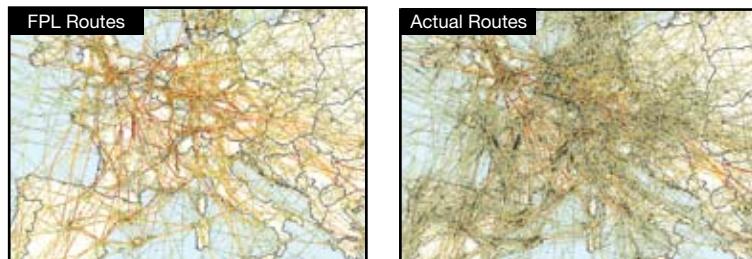
The CFMU ATFCM User Manual describes:

“ATC may deny start up clearance to a flight unable to meet its CTOT until coordination with the ATFCM units concerned has been effected and a revised CTOT issued.”

Why is there a lack of adherence to FPL & ATFCM measures in the En Route Phase of Flight?

There are many genuine reasons for pilots to request different flight levels (headwinds/tailwinds, CAT, lighter payloads, etc.) and consequently deviate from the flight level originally requested in the FPL. In the current economic situation of today carrying and burning the minimum amount of fuel is considered paramount, and many pilots are placed under pressure to fly an optimised fuel trajectory wherever and whenever possible.

The Network impact



Most ANSPs provide guidelines to controllers which typically state that changes to the requested FL should only be initiated in exceptional circumstances such as for weather or for ATC reasons, however, it is often the case that controllers ask the crew for their requested level and if circumstances permit it is readily granted.

If for example the flight has been level-capped to avoid a regulated sector, the “requested level” from ATC is often interpreted as being the original higher flight level rather than the flight level envisaged in the flight plan. Thus the flight may end up back in the sector which regulation had sought to avoid.

ATC Message

- Do not ask for change to profiles unless operationally necessary
- If changing a profile for an urgent reason then ensure follow-up with Network level co-ordination
- Notify your colleagues downstream if you are making a significant change to route or level

What are the Rules

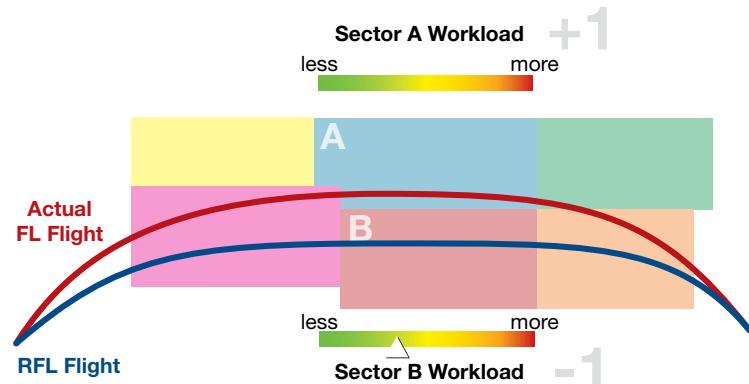
The CFMU IFPS User Manual states:

"The ATC Flight Plan Proposal Message (AFP) message shall be submitted to the IFPS by an ATS unit where that unit has new or revised information concerning an aircraft filed as IFR/GAT within the IFPZ that is already in flight."

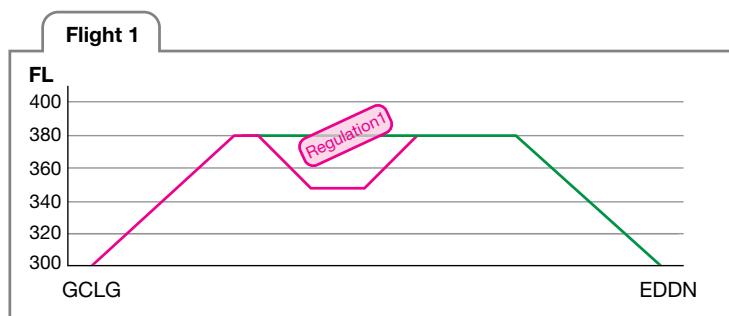
In some cases "low filers" have sought to avoid regulated airspace and then request a higher level in flight. If the higher level is granted, they will achieve a more efficient cruising level than that for which they filed and avoid the delays incurred by other airlines, who had genuinely filed at the higher level.

Cockpit Message

- Consider rationale for filed FL before requesting further level change



Result: higher workload in sector A and wasted capacity in sector B



1. A flight plan from GCLG to EDDN, through Geneva airspace is filed
2. A regulation is put in place which would impose a 20-minute delay
3. A re-filed flight plan avoids the delay
4. Pilot then requests FL 380 en-route and enters regulated sector

For controllers there is a problem of knowing whether a flight has been subject to regulation in the first place; so some major ANSPs are beginning to address this need to respect the requested flight level in a more systematic way rather than a verbal alert.

- Skyguide have a tool on the basis of CFMU data in development to monitor specific regulated sectors and to detect flights deviating from their original flight plans. If required, on a tactical basis, a correction of the flight level as filed in the FPL will be requested before it enters the regulated airspace.
- Maastricht UAC new FDPS will be able to show active flow regulation on flights through its airspace.

ATC may also clear a flight to take a more direct route (DCT) than that originally envisaged and thus the flight profile may deviate substantially from the FPL route and its planned times. Provided the controller meets the sector exit conditions it is not often regarded as an issue, and further, it is a rare occasion when a pilot refuses a shorter route!

- There are many positive reasons why the use of DCT is an appropriate course of action for a controller e.g. low traffic volumes, a flight wishing to make up time, military airspace has been made available but principally because use of DCT is seen as providing a more economic flight profile.

- However, DCT may also be a cause for flights entering sectors earlier, or indeed entering a sector which had not anticipated this traffic.
- Approach timing and sequencing is increasingly an issue and an accurate “time over” on approach will become more important for ground handling; thus an early arrival can be just as much an issue for an airport and AO as arriving late.

ATC Message

Use of DCT, while often desirable, can be the cause of sector overloads, approach sequencing problems and timing issues for ground handling.

The future

In the future with SESAR there will be a progressive move from air-space to trajectory based operations where the Shared Business / Mission Trajectory (SBT) is made widely available for ATM planning purposes to authorized users. The Reference Business/Mission Trajectories (RBT) represents an agreed 4D profile between AO and the ANSP which takes account of route, charges, weather, approach sequencing and predictable arrival times for ground handling etc. This trajectory is the choice of the AO. It will be the role of ATC and the cockpit to match that agreed profile to the extent possible and the flight plan will increasingly be regarded as a contract between parties. The use of the business trajectory is a fundamental element of SESAR, their use and definition is sought by airlines and ATM has to prepare itself to meet this requirement. The filed route, flight levels and timing will need to be respected through training, system support and practice.

Your neighbour is an ATCO too

Deviations from the FPL routes and flight level mainly occur because controllers have offered “optimum” route and flight levels whenever possible. Traditionally, pilots are also in the habit of requesting “optimum” flight levels when they can. So before asking for level changes in the cockpit and before granting changes by ATC there should be pause for reflection by both to consider as to whether the flight is subject to regulation and “am I fixing my problems at the expense of others?”

“After all, the more imprecise the projected traffic loads for airspace sectors prove to be, the bigger the safety margins will have to be which are built into their declared capacity limits. So controllers are really doing the system no favours by letting individual crews climb to higher flight levels over and over again”. (*Dr. Klaus Affholderbach Head ATFCM Skyguide*)

Consider your actions

Aircraft Operations

Inform your pilots of the reason for a lower FL being filed

Pilots

High or low, bear in mind there is a good reason behind the filed FL

ACC Controllers

Before proposing or agreeing a change to the RFL or using DCT, consider the impact downstream on your fellow controllers

ATS communication

If the RFL needs to be changed, provide means to inform all other ATC concerned via an AFP message.

AOs

Adhere to CTOT and update EOBTs for non-regulated flights

Tower Controllers

ATC has a joint responsibility with AOs in CTOT adherence

Glossary

ACC	airspace control center	EOBT	estimated off-block time
ADEP	aerodrome of departure	ETFMS	Enhanced traffic flow management system
ADES	aerodrome of destination	FL	flight level
AFP	air traffic control flight plan proposal message	FPL	flight plan message
ANSP	air navigation service provider	GAT	general air traffic
AO	aircraft operator	IATA	international air transport association
ATFCM	air traffic flow & capacity management	IFPS	integrated initial flight plan processing system
ATM	air traffic management	IFR	instrument flight rules
canso	civil air navigation services organisation	RBT	reference business/mission trajectory
CAT	category	RFL	requested flight level
CHG	change message	SBT	shared business/mission trajectory
CTOT	calculated take-off time	TMA	terminal control area
DCT	direct routeing	VFR	visual flight rules
DLA	delay message		



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