

FIFA World Cup ATFM T/F

FPL SYS Capability

ATM Airline Coordination



Flight Planning System Capabilities

An Enabler for Regional AT(F)M

26 September 2022



Flight Planning System – An Enabler for AT(F)M



- An Introduction to Airline Flight Planning for ANSPs
- How the modern Flight Planning System can ensure adherence to State ATM Network Restrictions
- Capability to Manage Traffic Flow Restrictions and optimization and adherence through Flight Planning Systems Capabilities
- State ATM Network Restrictions and Aeronautical Information needs to be
 - Dynamic Application yet predictable and complete
 - Machine Readable, Accessible Publications
 - Timely, accurate publication without ambiguity
- Awareness of
 - Flight Planning / Dispatch Ecosystem
 - Airline Company Restrictions
 - State of registration restrictions on airlines
 - Dissemination of FPL (*responsibilities operator/tower/who to file FPL*)

The following 'Flight Planning' slides are courtesy of Lufthansa Systems and its customers to demonstrate Lido 4D Flight Planning capabilities



Lufthansa Systems

Lido/Flight 4D

Lido/Flight 4D – for your flight planning into the future



Flight Planning – The Solutions



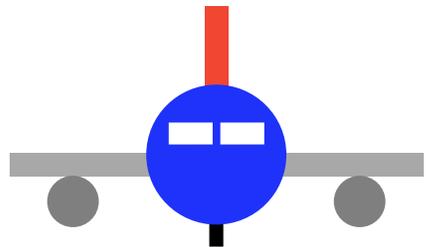
- ❑ ANSPs are responsible for effective Demand-Capacity balancing:
 - ANSPs have direct access to both Airspace Capacity data and Traffic Demand data. Airspace users do not have access to this information.
 - For this reason, ANSPs are in the position of rule-maker.
- ❑ Airspace Users are obliged to comply with published ATFM rules.
 - Airspace Users are using Flight Planning Systems with incorporated flight optimizing algorithms.
 - All Flight Planning Systems work on a similar principal, searching for the optimal route taking into account published restrictions often generating identical or very similar routes.
 - If the ATFM rules are ineffective or ambiguous, traffic may be planned in a completely different way than ANSPs intended or expected.



Data to Briefing Pack



Life of a Flight Plan / The Dispatch Ecosystem



Lido Flight 4D



Key benefits:

- Fuel, emissions and cost savings
- 24/7 helpdesk support
- High-quality aeronautical data with worldwide coverage

Lido/Flight 4D

Lido/Flight 4D – for your flight planning into the future

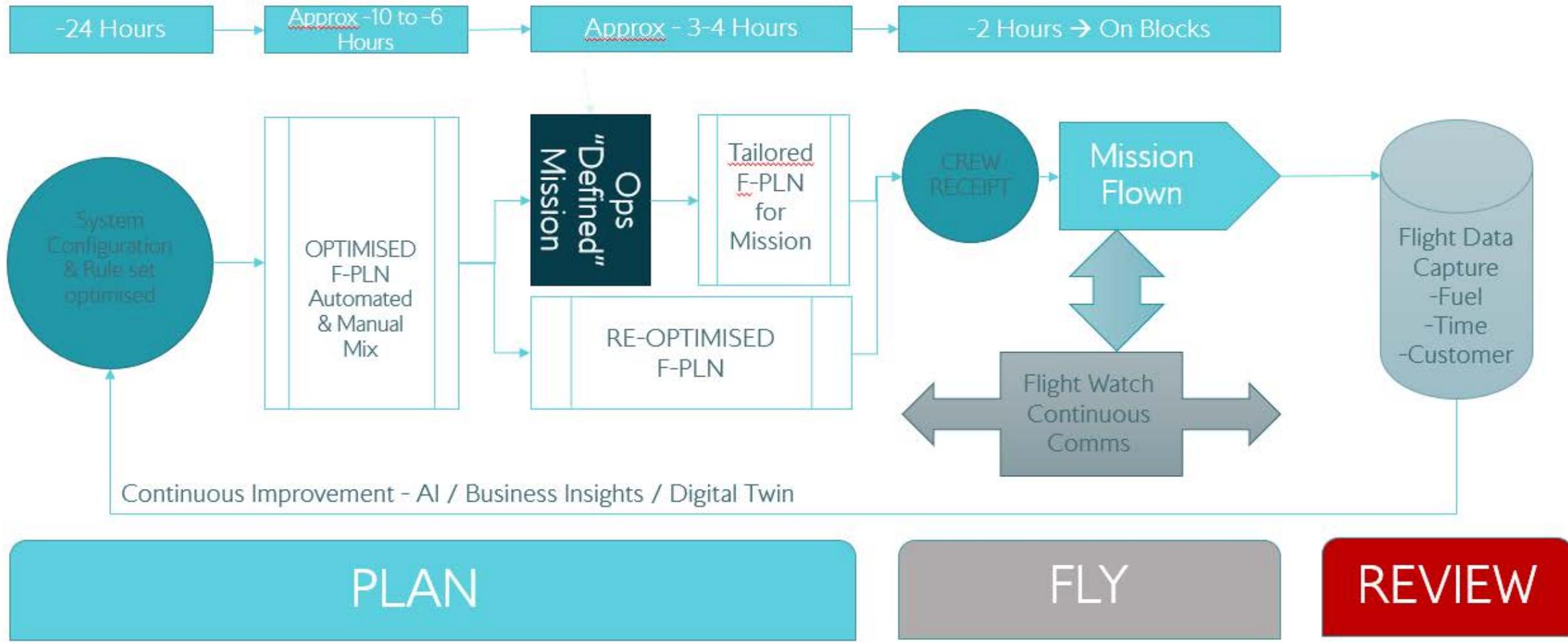
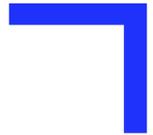


Key features:

- Interactive flight planning
- Dynamic route optimisation
- Aerodrome suitability checks
- Traffic Flow Restriction (TFR) compliance
- Flight planning process automation
- Systemised Flight Crew Briefing
- In-Flight Monitoring



Flight Planning Life Cycle





Plan | Data & Configuration

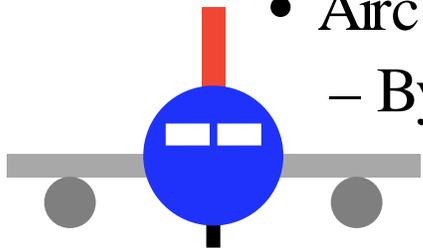


Plan | Required Data



Airline Company Data

- Company Restrictions
 - Safety & Security
- Company Preferred Routes
- Aerodrome Approvals
- Fuel Costs
- Aircraft Costs
- Cost of Time
- Aircraft Performance
 - By Type | Tail



Aeronautical Data

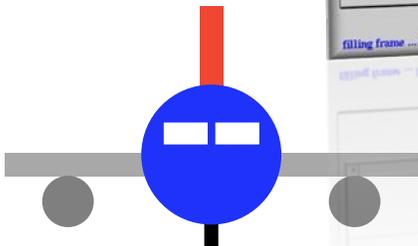
- AIS
 - NOTAMS
 - Traffic Schemes
 - Flexible Airspace Use
 - Airspace Structure
 - Route Structures
- Metrological Data
- Overflight Charges & Permits
- Terrain

Plan | Unpublished Restrictions



Through close relationships with ANSPs, we often become aware of Flight Level allocation schemes or flight level restrictions that are not published in the AIP. This often includes the contents of Letters of Agreements where certain Flight Levels must be achieved.

All requirements **MUST** be published in the AIP to ensure it is considered in the Flight Planning process



Plan | NOTAMS

State published, international NOTAMs, are automatically processed and considered in every FPL calculated.

- Currently over 240000 NOTAMS to consider
- Tailored based upon the relevance of the NOTAM

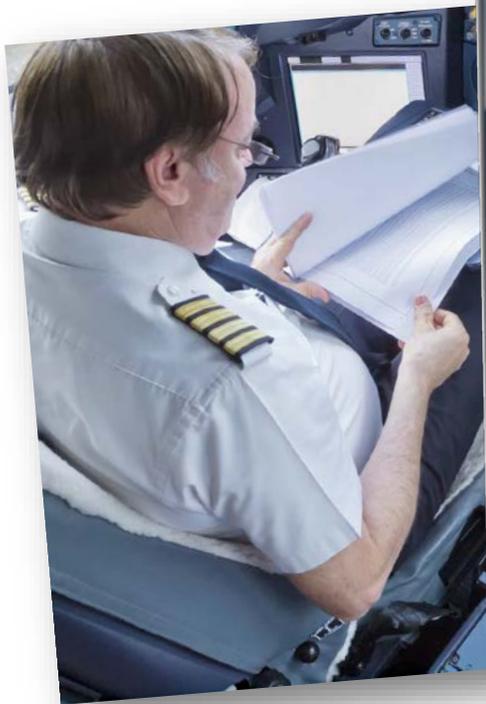
Crty	Airspace Name	Sector	Designator	Sub type	Lower	Unit	Upper	Unit	FUA
ZL	50KM OF VOR DNH			R	GND	M	UNL	M	0



Plan | Flight Planning Optimisation



History of Flight Planning – Then & Now



Operational Case
Standard ST

09R 051210 051905 12L

Climb
Procedure MN IAS
Speed 0.850 330

Cruise
Procedure Cost Index
ECON 70
Fuel MN Airspace/Airway VSOPS
Optimum MN ON

Descent
Procedure MN IAS
Speed 0.850 330
Fuel Gravity 0.000
Holding Time Fuel

ROUTE	HKT/R	MCT/R	HRDDB11	HRDDB14	HRDDB40	LHRDDB6	E/MCT/R	E/MCT/R
OFF NO	1	2	4	6	8	9	11/0/1	12/0/1
REG								
CRUISE	C170	C170	C170	C170	C170	C170	C170	C170
TRIP	62463	60275	60805	60903	61114	67841	60270	59976
TTIME	0628	0618	0620	0621	0621	0659	0618	0617
ETA	1907	1857	1859	1900	1900	1938	1857	1856
COSTS	28091	27141	27273	27443	27450	29986	27140	27038
CONT	2562	2549	2568	2562	2574	2693	2548	2536
CONT POL	CONT95	CONT95	CONT95	CONT95	CONT95	CONT95	CONT95	CONT95
ALTN	OOHS	OOHS	OOHS	OOHS	OOHS	OOHS	OOHS	OOHS
AFUEL	6610	6609	6609	6609	6609	6612	6609	6603
RESERVE	4170	4170	4170	4170	4170	4170	4170	4160
PLNTOP	75805	73603	74152	74244	74467	81316	73597	73275
P EXTRA	44117L	44131L	44112L	44118L	44106L	43984L	44132L	44861L
DIST	3289	3094	3101	3127	3117	3509	3094	3094
AVG WC	P043	P029	P025	P027	P029	P035	P029	P030
MAXFW	246750	246750	246750	246750	246750	246750	246750	246750
ESTZFW	228301	228301	228301	228301	228301	228301	228301	227600
FLNZFW	228301	228301	228301	228301	228301	228301	228301	227600
MALTOW	396810	396810	396810	396810	396810	396810	396810	396810
PLNTOW	304106	301904	302453	302545	302768	309617	301898	300875
MALLW	285760	285760	285760	285760	285760	285760	285760	285760
PLNLW	241643	241629	241648	241642	241654	241776	241628	240899
ADDFU								
TCAP	173477	173477	173477	173477	173477	173477	173477	173477
SAVINGS								

FLIGHT LOG
CAPTAIN MURRAY

UNITED AIR LINES TRANSPORT CORPORATION
TRIP 1
DATE 3-11-40 PLANE CV-LG

CT	MC	BF	SV	XA - HX	PG	FMN	NK	LG
11:21	:29	:11						
4T	4T	4T	4T	4T				
:20	:29	:13						
160	160	175	160					
45	210-52	175	160					
45	45	45	240					
overst	lgt ovc	hi alto	cumulus					
275	269	270	270					
160	160	155	140					

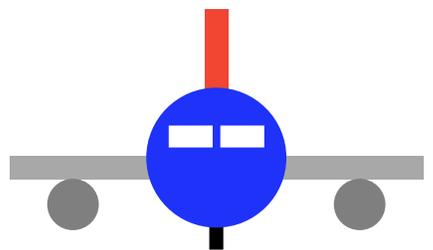
B TRAFFIC INFORMATION

8:05 UL CLRD FROM LG TO ALLENTOWN AT 4T
9:36 CLRD TO NY BNDRY
10:58 CLRD NY BNDRY TO CLEVELAND CR 4T
11:52 CLRD CV TO CV BNDRY 4T

ALTO CUMULUS

Then...

Now...

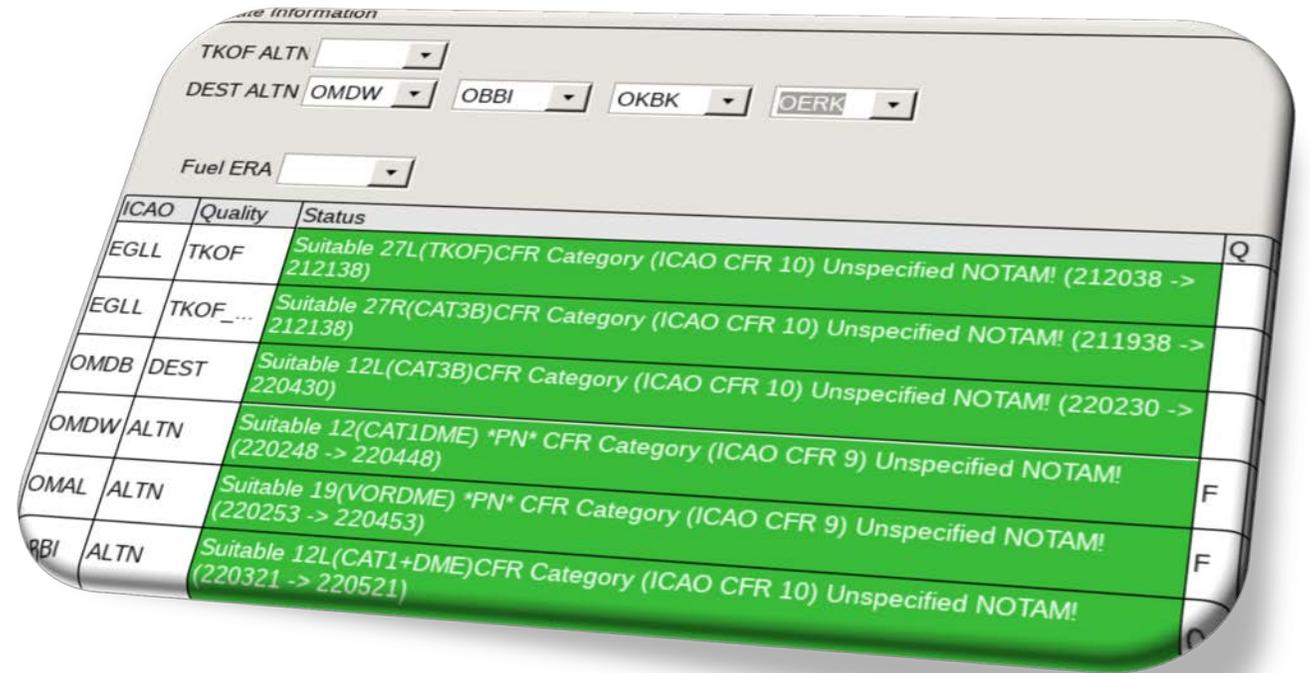


Plan | Airport Suitability

All airports used in a Flight Plan must be validated. This is known as the Airport Suitability Check.

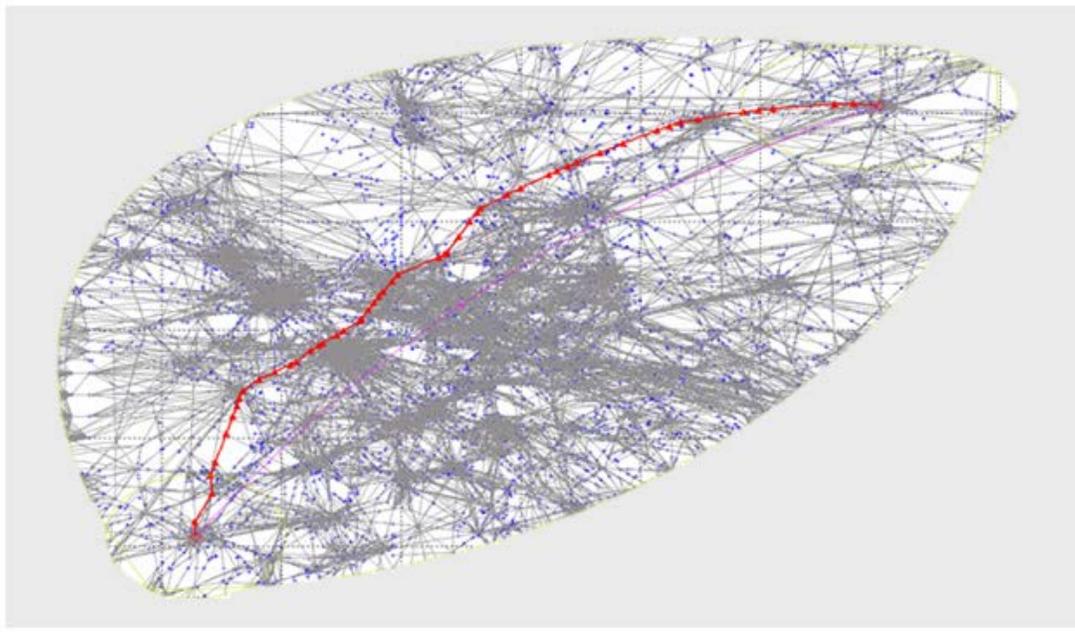
- Departure Airfield (Is a Take-Off Alternate Required?)
- Arrival Airfield
- Alternate Airfield
- En-route Alternate
- ETOPS Alternate

These will be checked against NOTAMs, MET forecasts and operating minima to ensure the airfield is available at the time it is required in the flight.



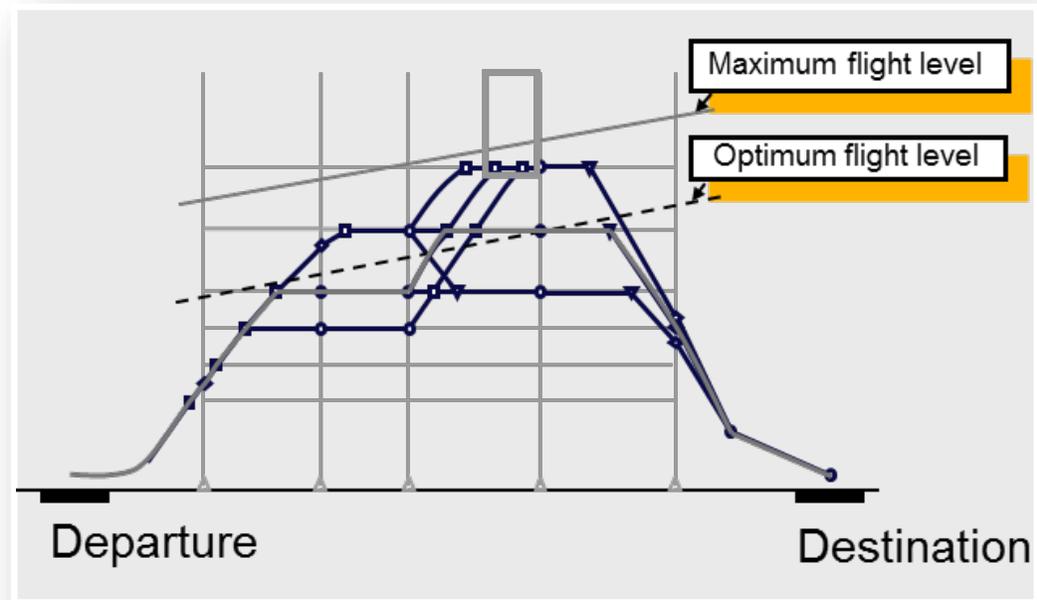
ICAO	Quality	Status
EGLL	TKOF	Suitable 27L(TKOF)CFR Category (ICAO CFR 10) Unspecified NOTAM! (212038 -> 212138)
EGLL	TKOF_...	Suitable 27R(CAT3B)CFR Category (ICAO CFR 10) Unspecified NOTAM! (211938 -> 212138)
OMDB	DEST	Suitable 12L(CAT3B)CFR Category (ICAO CFR 10) Unspecified NOTAM! (220230 -> 220430)
OMDW	ALTN	Suitable 12(CAT1DME) *PN* CFR Category (ICAO CFR 9) Unspecified NOTAM! (220248 -> 220448)
OMAL	ALTN	Suitable 19(VORDME) *PN* CFR Category (ICAO CFR 9) Unspecified NOTAM! (220253 -> 220453)
OBBI	ALTN	Suitable 12L(CAT1+DME)CFR Category (ICAO CFR 10) Unspecified NOTAM! (220321 -> 220521)

Plan | Dynamic & Automated Route Optimisation

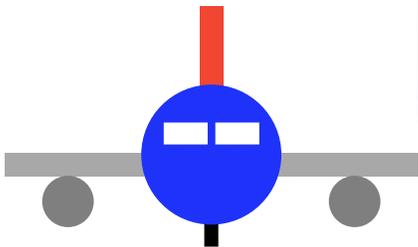
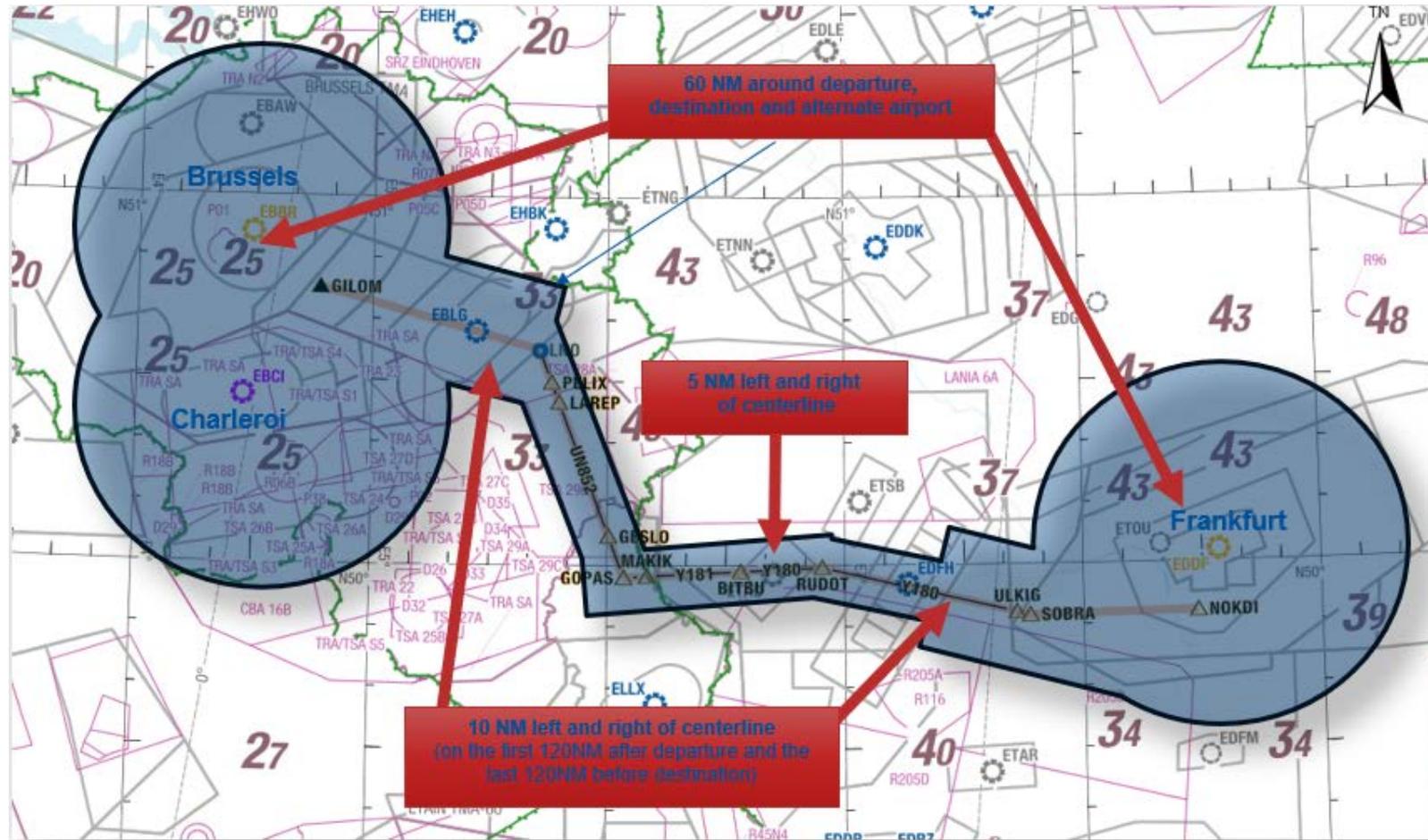


- Vertical and Horizontal Trajectory
- Fuel Requirement
- Aircraft Defects & Performance

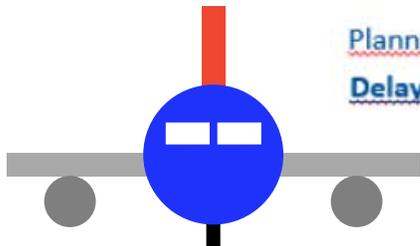
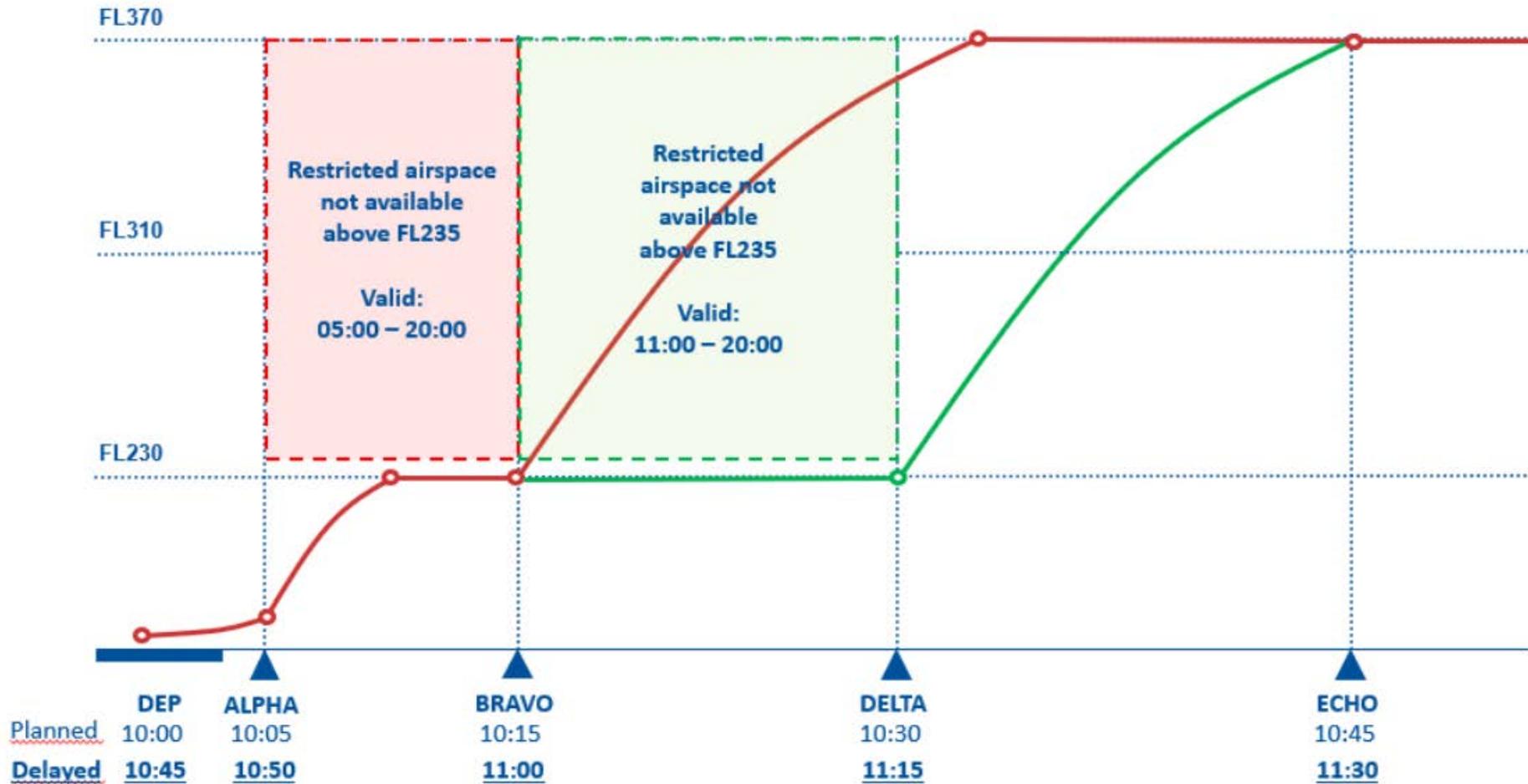
- Wind & Temperature Atmospheric Conditions
- NOTAMS
- Traffic Flow Restrictions



Plan | NOTAM Consideration



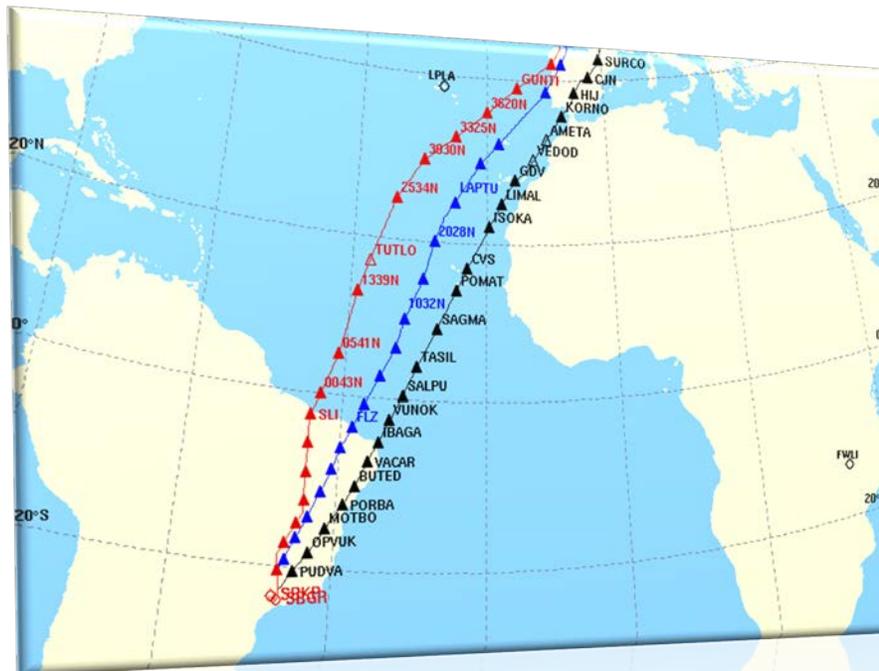
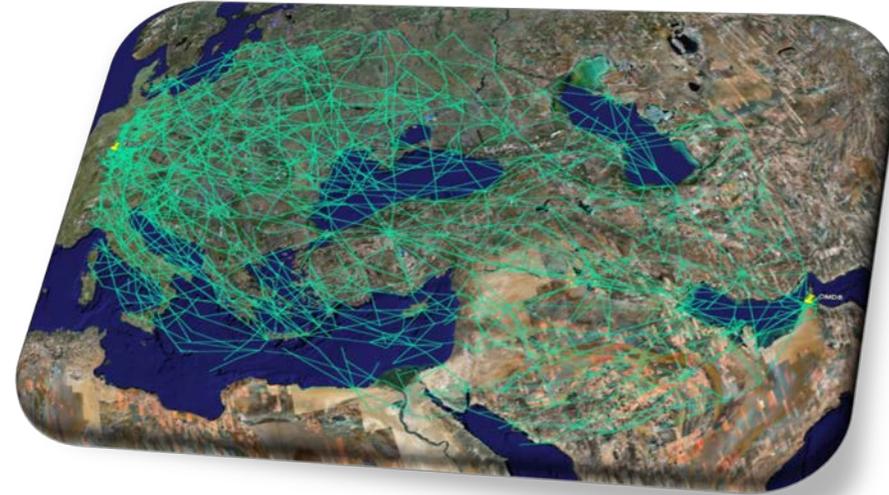
Plan | Route & Level Restrictions



Plan | Company Preferences



- Minimum Cost (Time, Fuel & ATC), Fuel, Time or Distance
- Airport Availability & Authorisation
- ETOPS



- Flight Planning & Commercial Policies
- Overflight Security Restrictions
- Operational Constraints
- Aircraft Performance / Defect Constraints





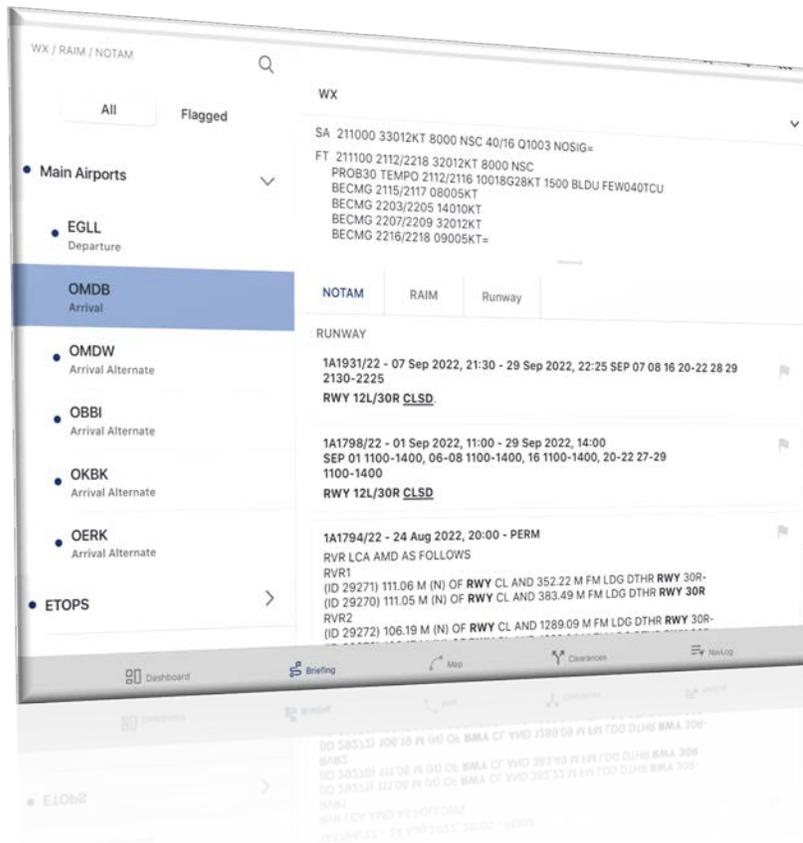
FLY | Crew Briefing & Monitoring



Fly | NOTAMs & Crew Briefing Pack



Whilst all NOTAMs are considered in the planning process, it is a regulatory requirement to brief crew on all applicable NOTAMs, which in addition to the Operational Flight Plan, FPL, MET & Charts, makes up the Briefing Pack.



Crew have a limited amount of time to brief themselves on the conditions and restrictions of a flight.

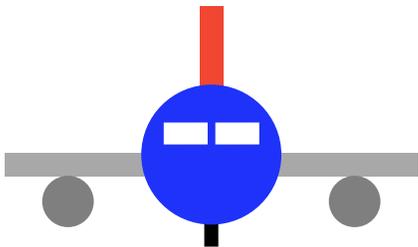
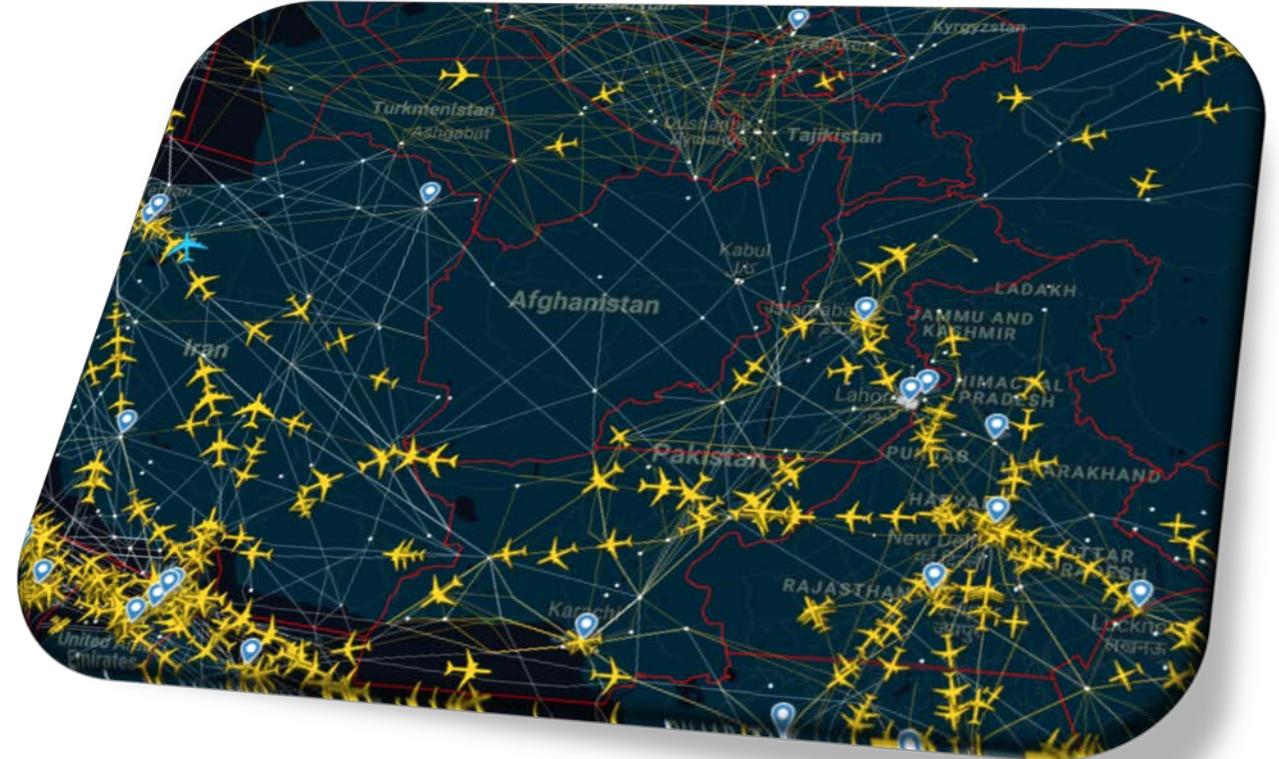
The average long haul briefing pack is in excess of 100 pages.

NOTAMs must be clear, concise and unambiguous to aid crew briefing and systemized flight planning.

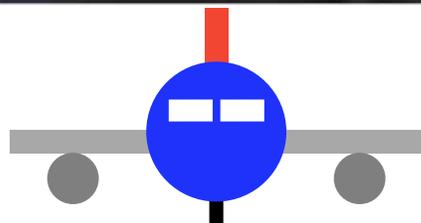
Fly | Flight Monitoring



- Continuous monitoring of all flights
- Change of situation
 - New NOTAMs
 - En-route Conditions
 - Geo-Political Issues
 - Destination Monitoring
 - Unexpected Diversion
- Flight Dispatcher alerting
- Crews eyes and ears on the ground



Fly | A Pilots View – Briefing Pack



Summary & Questions



- Airlines are continuing to leverage the capabilities of more advance flight planning systems
- Less use of fixed company routes built in advance, and instead more dynamic flight planning based upon the airspace situation on the day taking advantage of tactical changes
- Large data sets and rules are considered by the FPS when calculating a flight.
- Some flights will be planned, filed and dispatched fully by the FPS without human intervention
- Our plans are based on the published AIP, NOTAM, TOS etc. Clear, unambiguous and correct aeronautical information is essential. Informal agreements are not understood by the system

