Transition from FPL2012 to FF-ICE: Advancing Towards SWIM-Enabled Operations

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Flight Planning Challenges & Constraints

Current FPL2012 design increasingly unable to accommodate all necessary information

Capacity for more information required to enable improved trajectory design and planning for flight efficiency and demand capacity balancing

Flight planning needs to be simplified and automated

Transition should be aligned - want to avoid another change program like the one for FPL2012

Flight Planning Challenges & Constraints

Limited fields in FPL2012 mean valuable additional information can't be submitted and utilised

Without that information, ANSPs have less data to use for optimising airspace capacity

In a complex ATFM environment provision of additional data could aid centrally managed regional flow management units to better predict actual trajectories and hence optimise flow management releasing capacity.

So, do airlines need to become SWIM-enabled?

Using aeronautical information

- Airline flight planners need to access relevant AIP information to consider restrictions and limitations to a trajectory
- NOTAM information needs to assessed and actioned in real-time
- Airline systems need to be baselined with latest AIS data and ‘refresh’ as changes occur
- Airline and ANSP systems must communicate in the same (AIXM) language
- Access to AIXM data is required for building the flight plan and for real-time decision making

Using MET information

- MET information is also vital for planning preferred route and level
- Wind data is particularly vital for planning User Preferred Routes (UPRs)
- MET Service Providers already producing MET products in IWXXM format – airline systems need to be able to consume and utilise that
- Real time weather observations and turbulence reports can be shared
- Updates to the cockpit via connected aircraft and EFBs need common data formats

Improving trajectory calculations

- Current limited data in FPL2012 limits calculation of a FPL trajectory
- Following is a technical example where the ANSP uses default aircraft performance/wind data to estimate flight profile.
- Because the planning system does not have actual aircraft performance, weather data, etc their estimated flight profile differs significantly from the airline's Flight Planning tool calculations.
- Result is that FPL is rejected unnecessarily

Calculated profile comparison

```
-A388/J-SADE3GHIJ1J2J3J4J5M1P2RWXYZ/LB1D1
-EGKK2025
-N0485F370 DVR UL9 KONAN DCT
KOK DCT MATUG DCT AMASI DCT BOMBI DCT TENLO DCT DEXIT/N0478F390 DCT
PESAT DCT TEGRI DCT ARTAT UP975 ERGUN/N0484F410 UL124
```

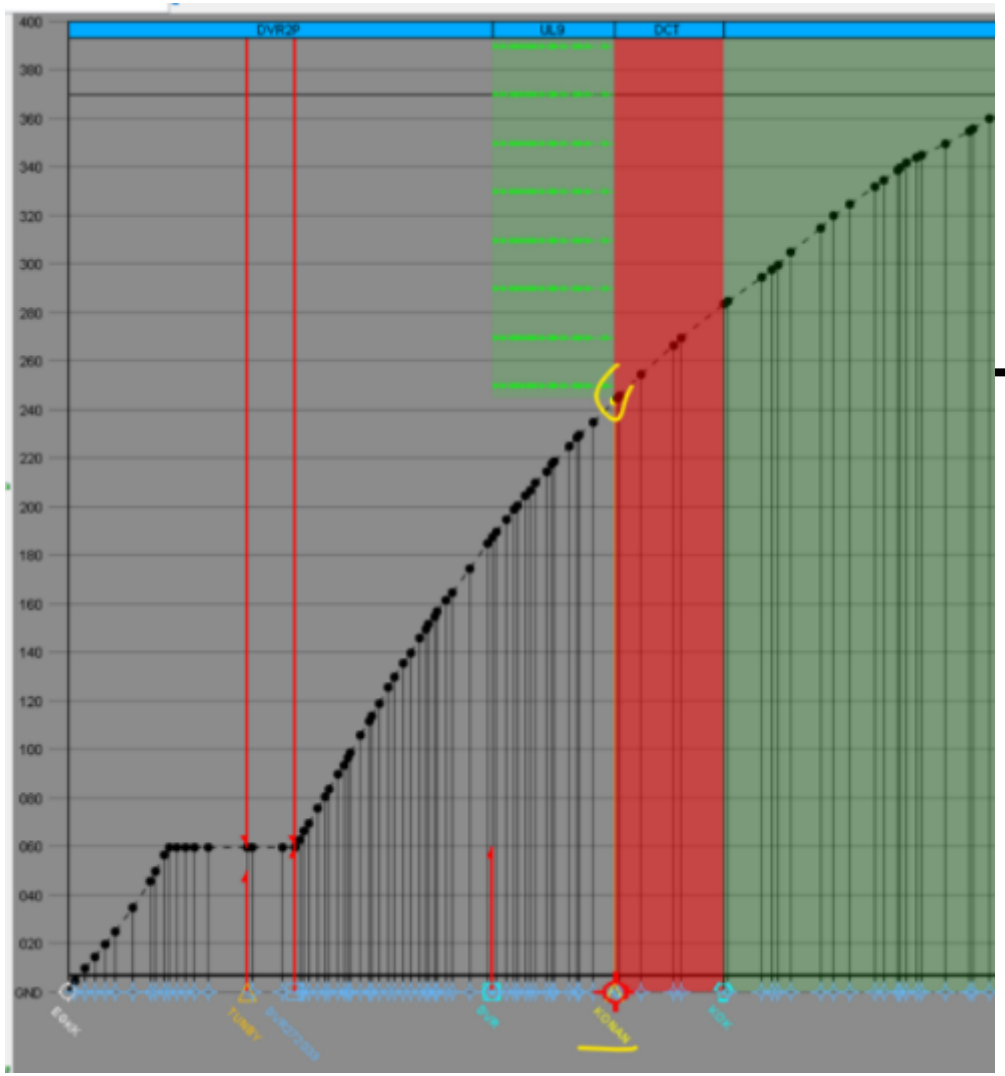
FPL submitted to ANSP (doesn't include any actual aircraft performance or profile data)

```
(R)PROF205: RS: TRAFFIC VIA KONAN IS OFF MANDATORY ROUTE REF:[YX2173A]
KONAN NOT AVBL FOR TFC
(R)ROUTE165: THE DCT SEGMENT KONAN..KOK (25 NM) IS TOO LONG FOR EBDCTX:
115:245. MAXIMUM IS 0 NM [EB2X]
```

ANSP rejects the FPL after profile calculation concludes it is outside required parameters

```
LOVV0109 LHCC0126 LRBB0146 LBSR0218 LTBB0239 LTAA0246 OIIX0359
OMAE0540 SEL/JRMQ CODE/8963EF PER/C RMK/TOW:429281 TAXI:0024 NRP
HAR TCAS ADSB)
```

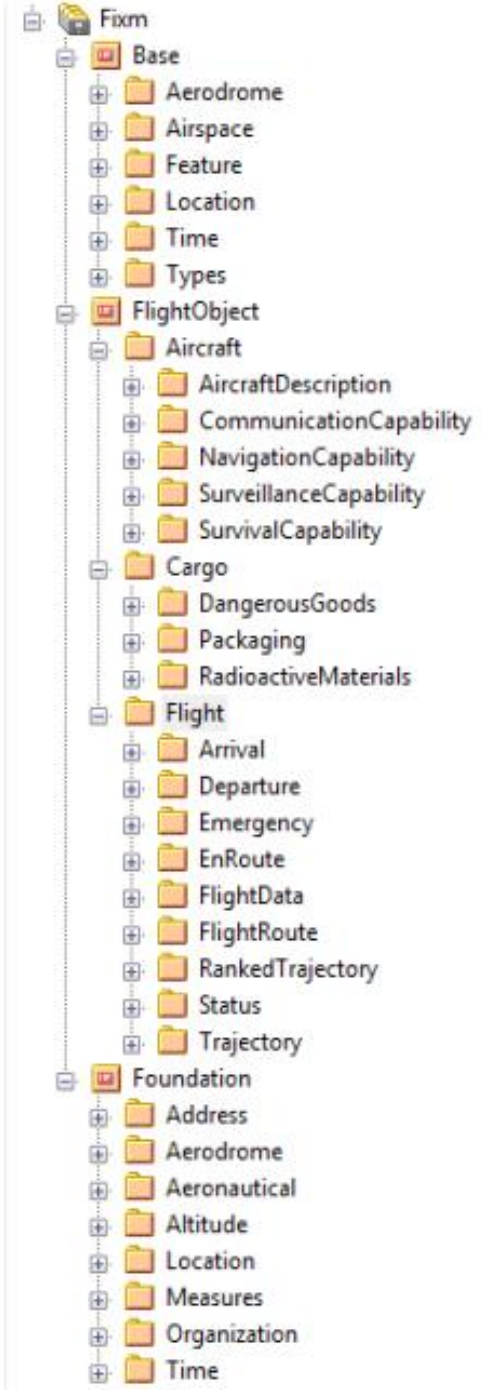
TOW and Taxi time added in and FPL system returns "No Errors".



Calculated profile comparison

Free Flight	WPT Code	Symbol	Ctry	AWY	Type	MSA [FT]	Vert Unit	FL WPT	Cruise	IAS
View	EGKK		EG	MIMFO1M	RSID	2000	FF	2	ECON	250
View	ACORN	NI	EG	MIMFO1M	RSID	2000	FF	50	ECON	314
View	MIMFO	NI	EG	MIMFO1M	RSID	1800	FF	99	ECON	314
View	DVR	VORDME	EG	UL9	AWY	1700	FF	222	ECON	314
View	KONAN	NI	EG		DCT	1200	FF	276	ECON	314
View	KOK	VORTAC	EB		DCT	3400	FF	320	ECON	270
View	MATUG	CCAI	EB		DCT	3400	FF	370	ECON	262
View	AMASI	NI	ED		DCT	4000	FF	390	ECON	262

- KONAN DCT KOK is available above FL245.
- The ANSP rejects the plan because it estimates flight will cross KONAN at FL244.
- Without additional data, the ANSP's estimated profile over WPT KONAN differs by 3000FT in comparison to the airline's Flight Planning tool calculations.



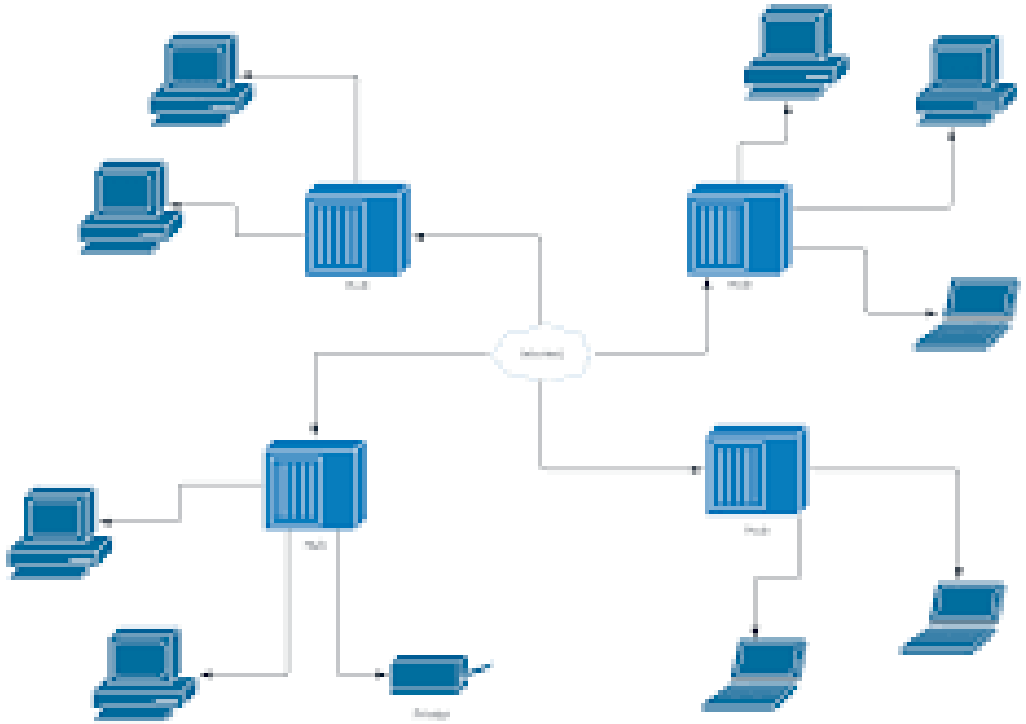
Scope of FIXM content

- FIXM permits inclusion of almost boundless scope of data
- The FIXM Logical Model Package Hierarchy maps untold more features than can be entered into FPL2012 format
- Transposing the hierarchy into the FIXM schema makes it possible to include more accurate aircraft performance and profile data
- Supplemented by AIXM and IWXXM data to influence design of most preferable trajectories
- Pre-flight trajectory negotiation can then more accurately analyse the plan for approval
- Airline flight planning systems need to be able to interpret AIXM and IWXXM and then produce the ‘plan’ using the FIXM schema
- ANSPs must be able to also share and analyse it

IATA

Understanding FF-ICE?

- The exchange of information via FF-ICE services is intended to provide the best possible integrated picture.
- FF-ICE benefits can only be fully achieved in a SWIM environment.
- Solutions for how airlines will connect to the SWIM network are still being developed.
- Important to complete trials of solutions to ensure that all potential technical and operational challenges and advantages are thoroughly evaluated.



Benefits from FF-ICE – Airline Perspective

- Address the shortcomings of FPL2012
- Support future concepts, such as TBO
- Provide ANSPs with more data to better accommodate operator interests, increasing schedule predictability through trajectory coordination
- Contain a wide range of data supporting airspace capacity and flexibility enhancements
- Facilitate smoother coordination between operators and ANSPs improving flight efficiencies

Baseline Capabilities

- SWIM XML schemas will permit exchange of more and richer data. Need for airline systems to have capability to consume, utilise and share FIXM, AIXM and IWXXM format
- Connection to the SWIM network, registry etc for receiving and sharing information and for identifying necessary SWIM services – including connected aircraft
- AIS databases to be baselined in AIXM format
- Integration with ANSPs and NM services to consume AIXM feature data as published in the Route Availability Document (RAD) and Airspace Usage Plan (AUP). This information provides FRA airspace definitions and any associated constraints
- Consume dynamic route segment and airspace constraint data that is harmonised with NOTAM constraints. Digital versions of NOTAM information will make this process seamless
- FF-ICE flight plan validation integration. Clear communication of profile validation needed (ACK/REJ) to ensure issues are addressed immediately

Transition Challenges & Expectations

- A mandate for SWIM or FF-ICE reduces the likelihood that an operator will be required to submit the flight plan in both the FPL2012 and FF-ICE formats. However mandates themselves also create unintended issues.
- ICAO FF-ICE provisions favour a flight plan distribution done by the airspace users, which means all negotiations related to the route and altitudes etc., will be done with each individual ANSP.
- The goal should be to develop and implement a plan where States transition together from the FPL2012 format, following validation of a CBA.

Transition Challenges & Expectations

- New data communication infrastructure may cause financial hurdles
- Fragmented regional implementations meaning mixed-mode operations
- Third parties required to be involved in flight plan filings during transition
- Regional FF-ICE requirements different (stricter) from ICAO
- Moving to FF-ICE while using the “obsolete” AFTN network is counterproductive.

Desired Outcomes

- Enhanced collaboration between stakeholders leads to a more integrated approach to air traffic management
- Flexibility in scheduling/route planning can help airlines adjust to real-time conditions.
- Expected that ANSPs will use the information shared for FF-ICE in their airspace management/ATFM planning to ensure that airspace and airport resources are utilized efficiently.
- Once the initial move to FF-ICE/R1 is complete, there must a strong push to implement R2.

IATA Position:

IATA supports FF-ICE conditional on the following:

- A SWIM infrastructure, enabling the deployment of FF-ICE services, will be required.
- An appropriate transition plan from FPL2012 to FF-ICE is required
- When an airline migrates to FF-ICE, the ANSP will translate from FF-ICE to FPL2012 if it is not FF-ICE capable yet.
- Contingency backup procedures and processes should be developed as part of the global standard
- Benefits will be limited if ANSPs do not adapt their automation systems to make use of the additional information.
- An appropriate dynamic change of ASM and capacity improvements utilizing flight plan information will be required.

Thank you.