

# Probabilistic Weather Information using an Ensemble Prediction System

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The use of Deterministic Model Guidance will be replaced by Probabilistic Model Guidance to assist Decision Support Systems and Risk Managers

Use of Ensemble Prediction Systems (EPS) enables this approach

EPS allows users to see the range of possible weather solutions that may impact enroute and airport operations. It also provides probabilities of weather events that may disrupt operations



### Why use an EPS instead of a Deterministic forecast ?



Cntr

High Res.

			Wednesday 18 A MSLP (contour e	pril 2012 at 12 UTC EC very 5hPa) Temperatur	MWF forecast t+12 VT e at 850hPa (only -6 a	Thursday 19 April 201 nd <mark>16</mark> isolines are plot	2 at 00 UTC red)		
Member 1	Member 2	Member 3	Member 4	Member 5	Member 6	Member 7	Member 8	Member 9	Member 10
Member11	Member12	Member13	Member14	Member15	Member16	Member17	Member18	Member19	Member20
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Member31	Member32	Member33	Member34	Member35	Member36	Member37	Member38	Member39	Member40
Member41	Member42	Member43	Member44	Member45	Member46	Member47	Member48	Member49	Member50

ECMWF ENSEMBLE FORECASTS



## Forecast Uncertainty → Forecast Confidence



IFPP

# Helping to gain awareness about the JEPPESEN confidence associated to a specific forecasts.

In the example below the more ensemble members having forecasts the higher the probability of that event happening the higher the confidence a decision making can put on that forecast





Use of a system that utilizes an EPS and enables user defined thresholds can provide alerts for adverse weather events, even days in advance

In this case, algorithms combine user defined business rules with the probability of a disruptive event to provide user alerts

The probabilities are derived from the EPS with a frequency approach and are, whenever possible, calibrated on past events in order to reduce the potential bias (meteorological model used, horizontal resolution, geographical constraints etc.)



# JWA Jeppesen Weather Alerts





Current time: 10/10/2014 17:01 UTC (The arrow points to the current hour.)

Analysis time: 2014-10-10 00:00 (Time in UTC)																													
ICAO/IATA - Airport name		Fri 1	0 Oc	t		S	at 1	100	ct			Sun 12 Oct								M	on 1	3 Oc	t		Tue 14 Oct				
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PAFA/FAI - Fairbanks Intl		ĺ			Ì				Í		ĺ										ĺ								

Home page		PAEN dashboard														
	Risk Levels	Green: None	Yellow: Slight	Orange High	: Red: Severe	Grey: No data										
			Min. threshold alert	🗆 24-h snow	■ Nearby hazards (<35 mi.)											

Current time: 10/10/2014 17:04 UTC (The arrow points to the current hour.)

	Analysis time: 2014-10-10 00:00 (Time in UTC)																											
VARS	Fri 10 Oct   Sat 11 Oct   Sun 12 Oct   Mon 13 Oct   Tue 14 Oct     12   15   18   21   00   03   06   09   12   15   18   21   00   06   12   18   00   06   12															t do												
WIND VIS CIG SNOW RAIN				8 2					9			18	21	00 Cei 14 1	03 J iling 15Z	06	09	12 1 39		8 2								
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Analysis time: 10/10/2014 00:00Z

### **Deterministic and probabilistic forecasts**



PAEN's main page Main dashboard



PAON	l's main page page	F	Runway cross w	/inds: PAOM a	irport	JEPPE	
	Risk Levels	Green: None	Yellow: Slight	Orange: High	Red: Severe	Grey: No data	
Current time: 10	/10/2014 17:14 UT	°C (The arrow poin	ts to the current hour.) Analysis tir	Min. threshol me: 2014-10-10 (	ld alert 00:00		
Aircrafts B777 B757 B737 B727 MD11 MD10 A300 A310 C172 B787 Prev. for Dete RW03 Cross RW10 Cross	Fri 10 Oc 12 15 18 2 1	t S 1 00 03 06 0 1 00 03 06 0 1 00 03 06 0 1 0 0 03 06 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 0 1 0 0 0 1 0 0 0 0 1 0	Andiysis (i)	Time in UTC)   Sun 12 Oct   06 09 12 15 18 21   06 09 12 15 18 21   00 00 12 15 18 21 <td< th=""><th>Mon 13 Oc 00 06 12</th><th>t Tur 18 00 06</th><th>forecasts</th></td<>	Mon 13 Oc 00 06 12	t Tur 18 00 06	forecasts
						PS-F	



We believe the use of probabilistic weather information that utilizes an EPS can provide long term benefits

When utilized with a Decision Support System and a Cost/Loss model, decisions derived from such a system will provide large financial benefits