



Synthesis of user needs for Probabilistic Nowcasting of Snow at the Airports

Heikki Juntti

Task 5 leader in PNOWWA, Finnish Meteorological Institute

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Founding Members



EUROPEAN UNION



EUROCONTROL

Snow causes travel chaos - more Heathrow flight delays

🕒 20 January 2013



Heathrow airport all but shut as snow hits Christmas travel plans

Met Office warns of more heavy snow over the next few days as government rejects charges of complacency



Snowstorm causes hundreds of flight delays, cancellations at JFK, LaGuardia and Newark airports

POSTED 3:09 PM, JANUARY 7, 2017, BY [KATHERINE LAM](#), UPDATED AT 03:48AM, JANUARY 8, 2017

Frankfurt airport closed as snow causes Europe disruption

Kim Hjelmgaard, USA TODAY

Published 7:51 a.m. ET March 12, 2013 | Updated 1:36 p.m. ET March 12, 2013



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One of Europe's largest airport hubs, Frankfurt am Main, has been closed due to heavy snowfall, officials said Tuesday.



CATEGORIES

Daily Sabah > Turkey > Istanbul

ISTANBUL

Heavy snowfall causes more than 800 flight cancellations in Istanbul's Atatürk, Sabiha G airports

for

DAILY SABAH WITH AGENCIES

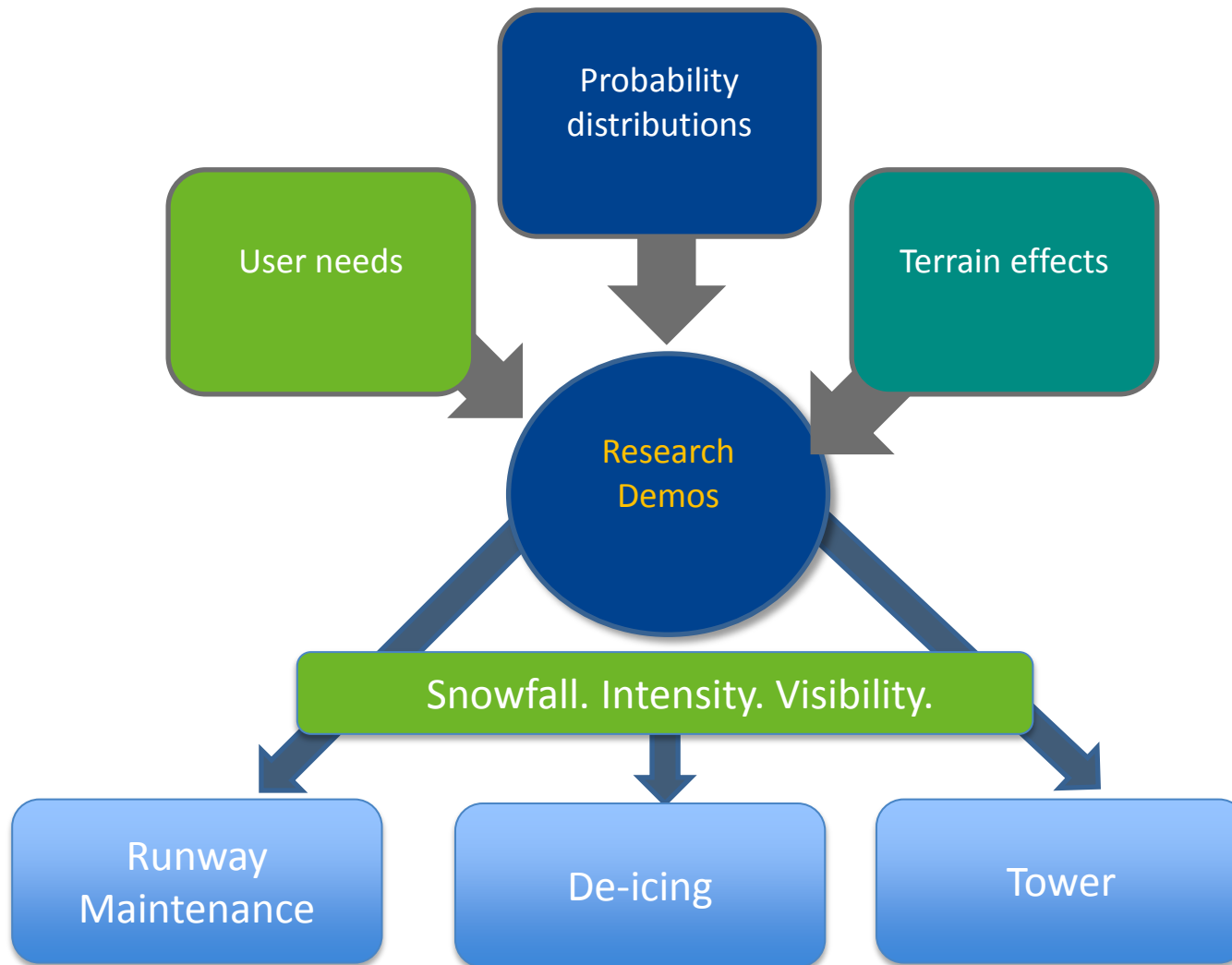
• ISTANBUL

• Published January 6, 2017



IHA Photo

PNOWWA = Probabilistic Nowcasting of Winter Weather for Airports

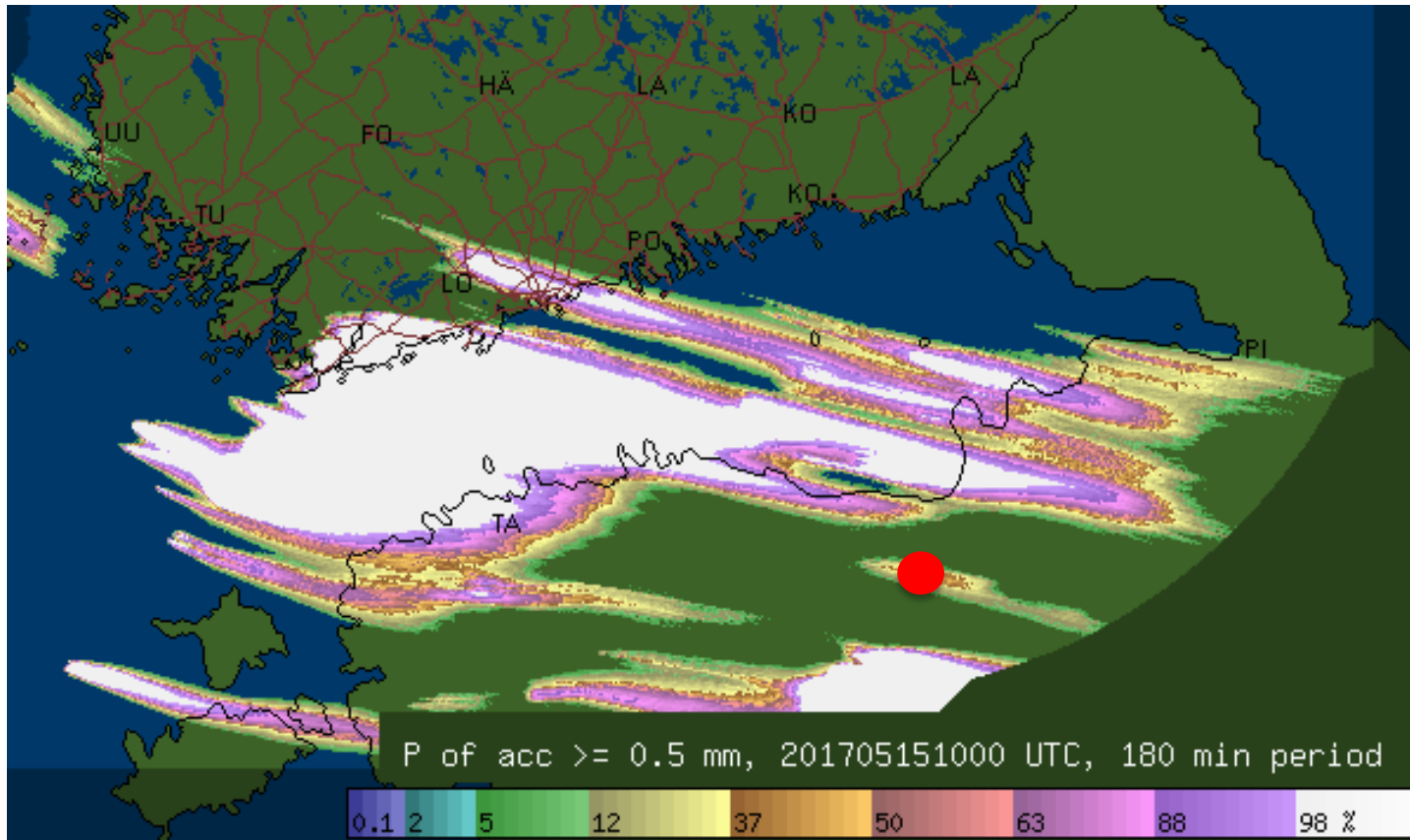


Finnish
Meteorological
Institute

Austrocontrol

Deutsches Zentrum
für Luft- und
Raumfahrt (DLR)

Nature of weather forecast is PROBABILISTIC

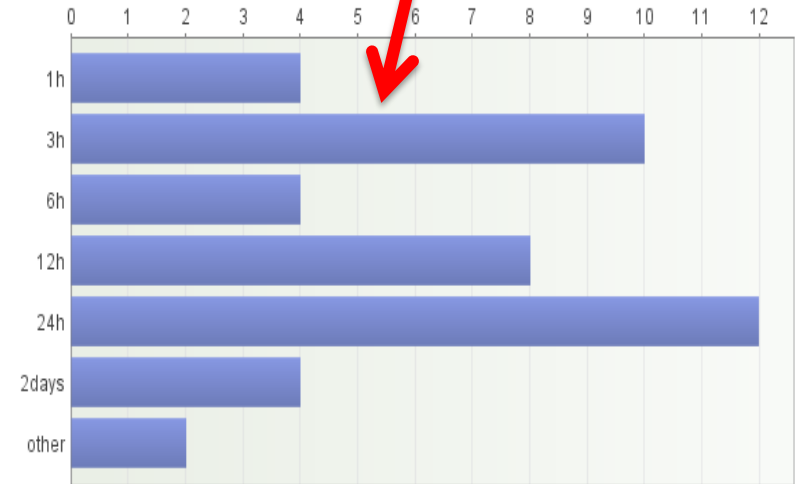


2 hour
probability
forecast for
over 0.5 mm
3 hour
precipitation

Time -> min	+15	+30	+45	+60	+75	+90	120
Prob of snow	20	0	40	80	60	0		50

Airport users opinions for probabilistic winter weather forecasts – potential benefits

- Helps to make objective decisions
- When cost-loss ratios are known it can be used in decision support
- Positive attitude to probabilistic forecasts
- Need for lead time 3 and 12-24 hours products



Useful lead time for warning of critical weather for all respondents (PNOWWA survey)

Airport users opinions– highest negative impact affecting on airport operations

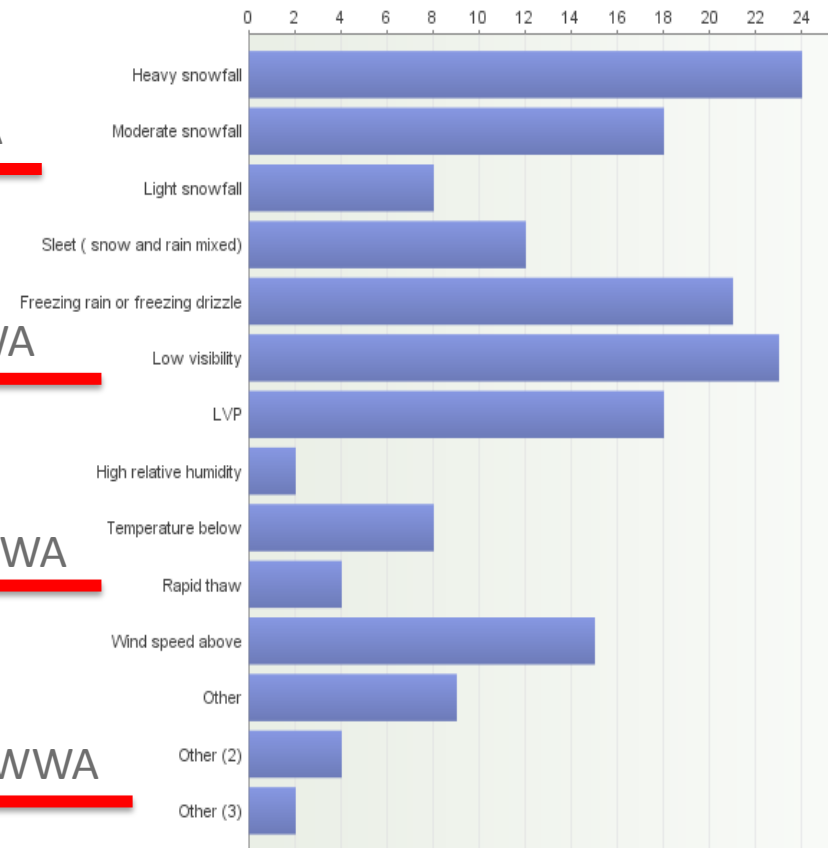
1. Heavy snowfall
2. (low visibility)
3. Freezing rain and drizzle
4. Moderate snowfall
5. Wind speed above
6. Sleet

PNOWWA

PNOWWA

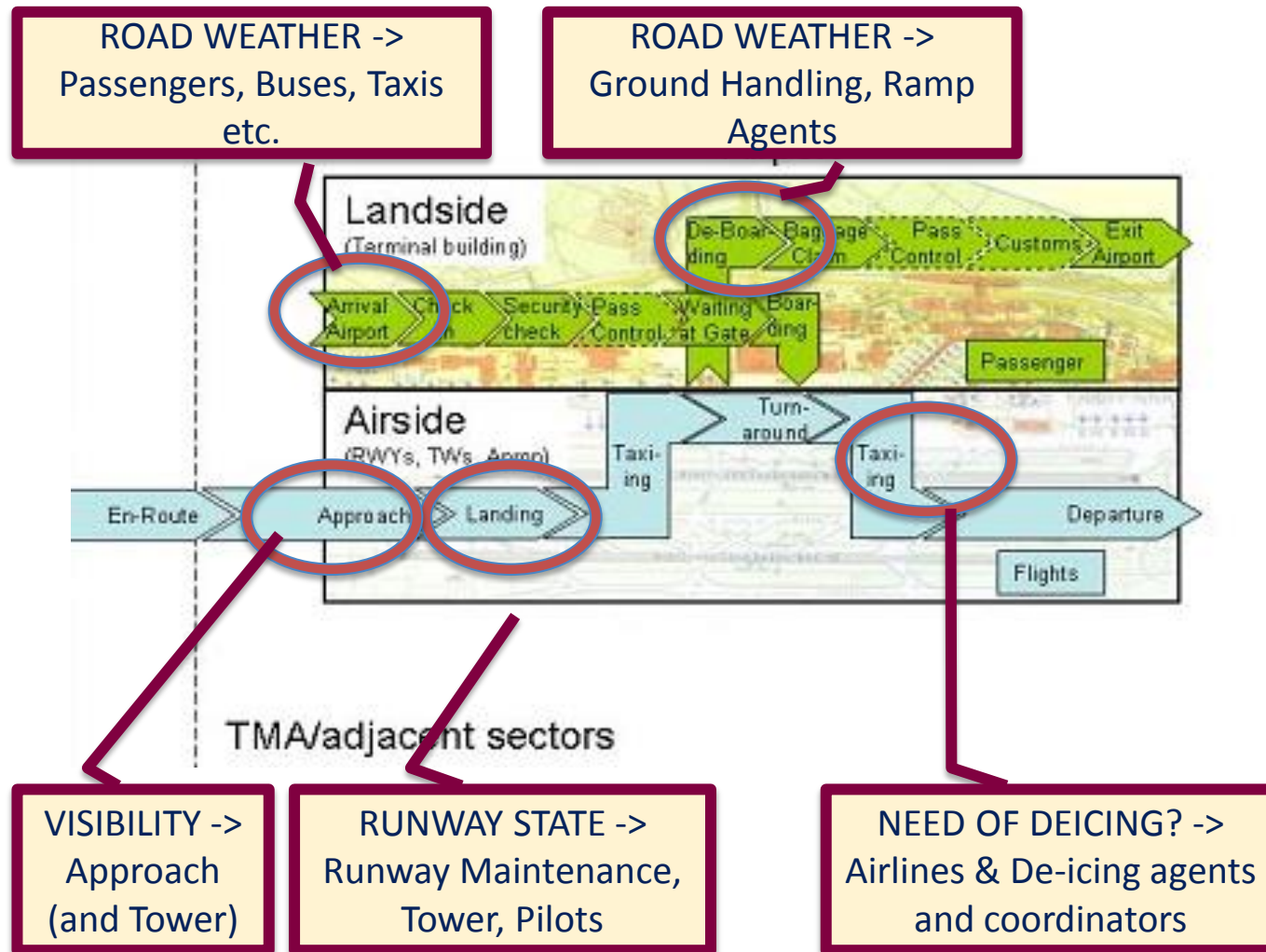
PNOWWA

PNOWWA



the type of winter weather affecting negatively to airport operation (PNOWWA survey)

Winter Weather influencing to the Total Airport Management (TAM)



TAM

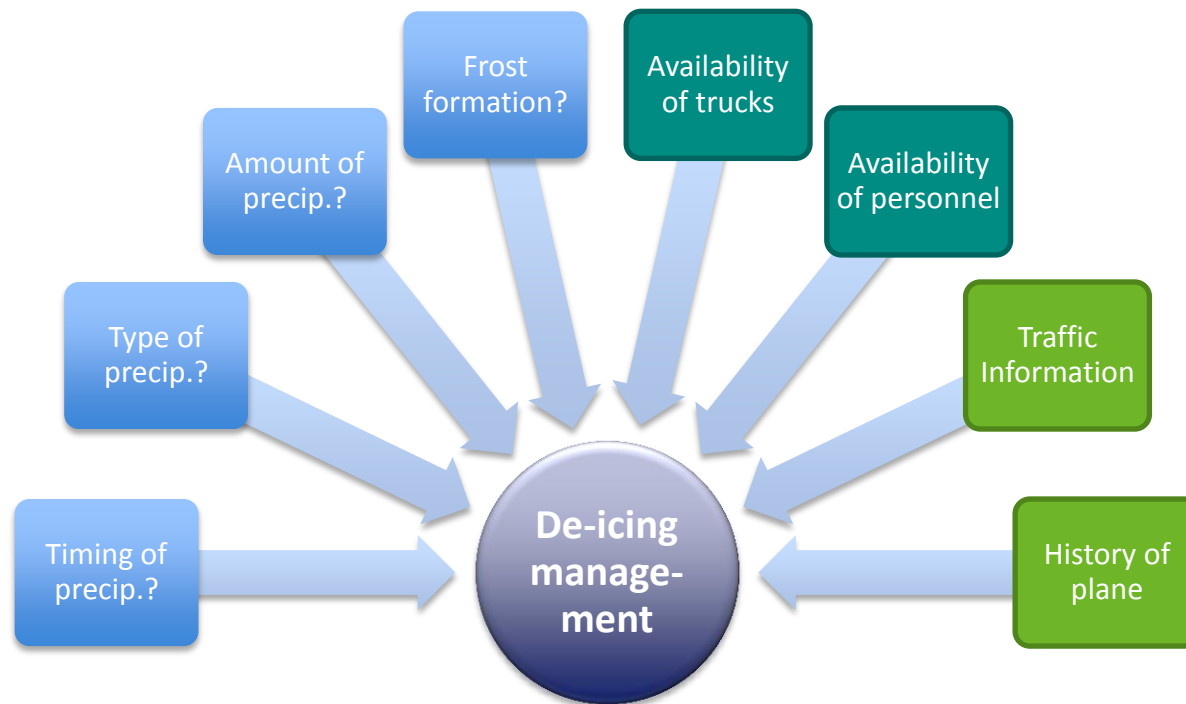
- create an environment enabling airport partners to maintain a joint plan – the Airport Operations Plan
- get full CDM (Collaborative Decision Making) benefits
 - efficiency in airport
 - enhanced use of airport resources
- Extent time horizon from tactical to pre-tactical and strategic phases.

https://www.eurocontrol.int/eec/public/standard_page/EEC_News_2006_3_TAM.html

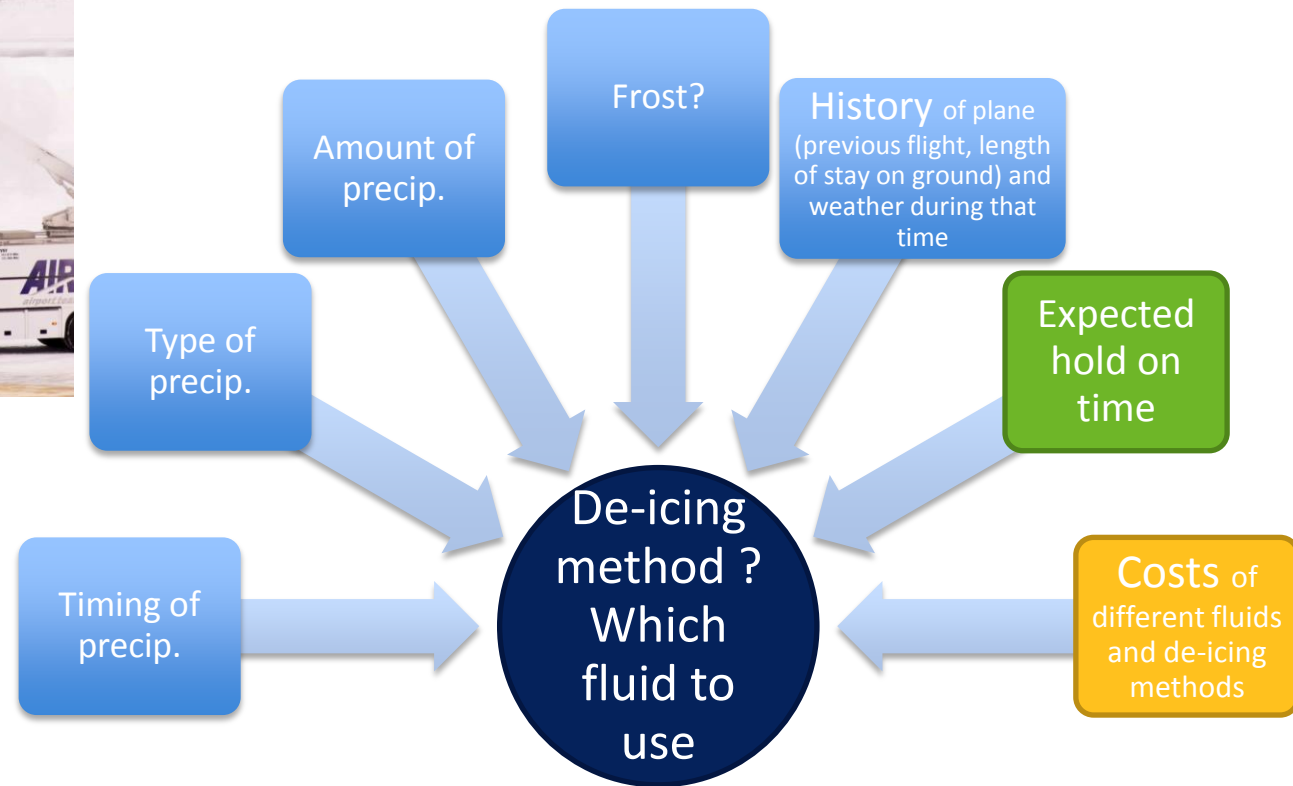
De-icing management

De-icing of aircraft=

1. Snow and ice removal
2. Prevention of ice and snow accretion on plane (-hold over time)

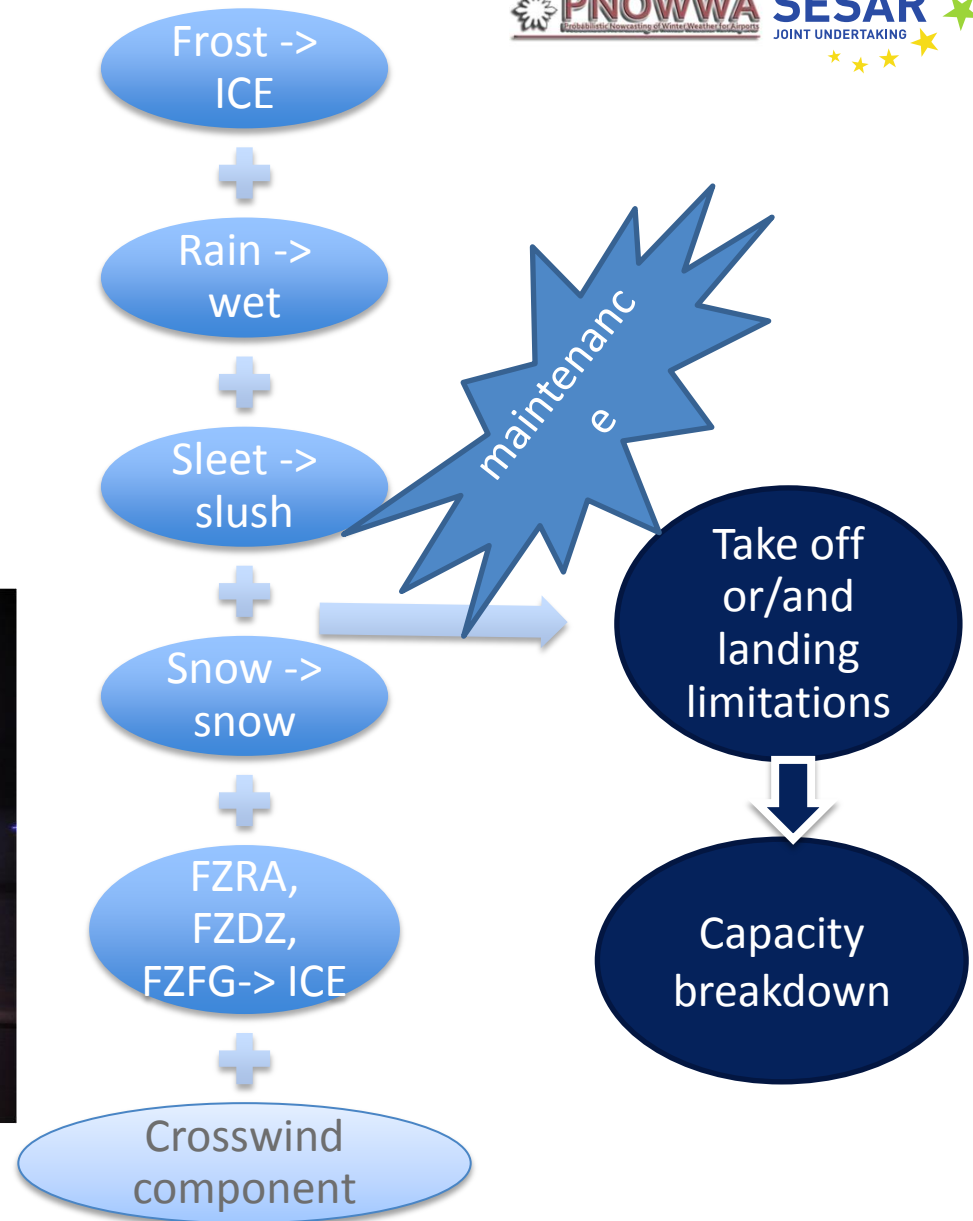


De-icing on airline's perspective



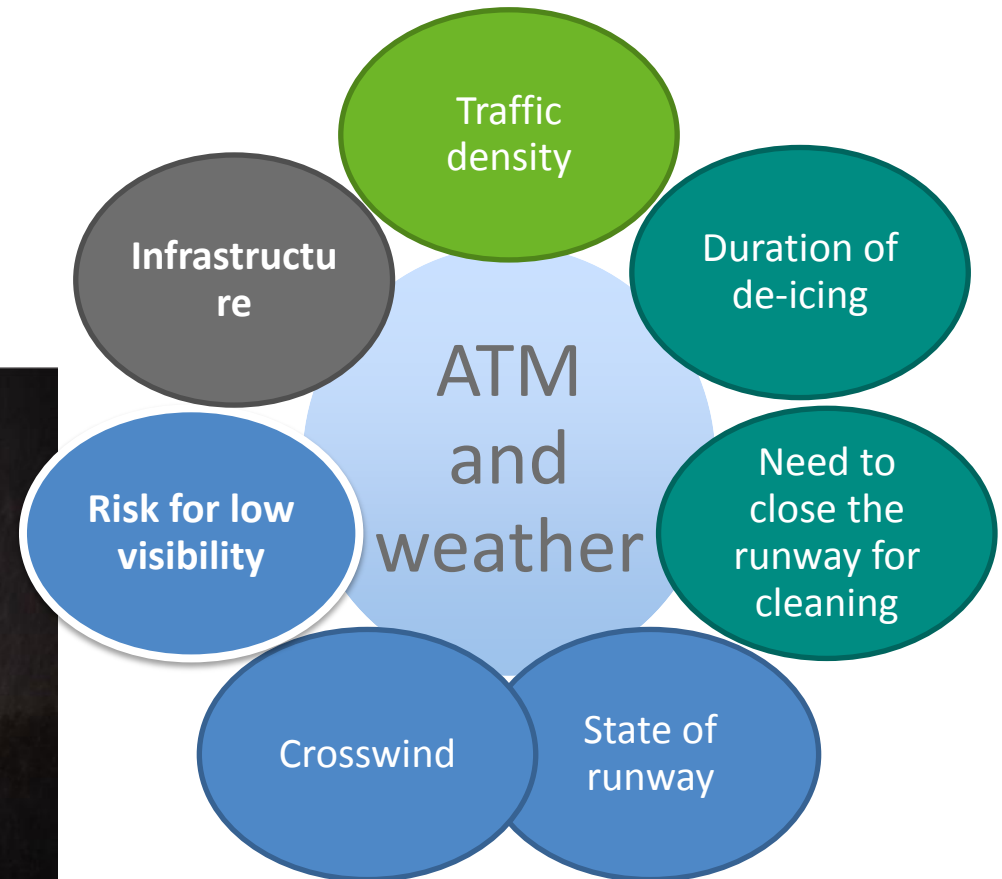
Runway Maintenance

Keep runway in safe conditions. Minimum friction conditions are achieved



Air Traffic Management / Tower

What's happening in de-icing or runway maintenance influences to ATM, too. Add to that a Low Visibility will change landing procedures and can even prevent that.



PNOWWA Scientific demo 2017

- On line service with automatic update
- Tailored products to:
 - Runway maintenance
 - De-icing agents
 - Tower
- Probabilities of the weather categories defined with users are used to individual users
- Forecasted parameters:
 - Accumulation of DRY snow
 - Accumulation of WET snow
 - Probability of freezing rain
 - Probability of freezing of wet runways
 - De-icing weather type (categories dependent on the time of individual plane de-icing duration)
 - Decrease of visibility CAUSED BY SNOW (fog or mist outscored)

FMI Ilmanet Finavian testikayttaja

Winter weather forecast for airports

EFHK EPRO

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RUNWAY MAINTENANCE (UPDATED 2017-02-22 16:15:00 UTC)

accumulation% dry snow, mm/15min	0-15 min	15-30 min	30-45 min	45-60 min	60-75 min	75-90 min	90-105 min	105-120 min	120-135 min	135-150 min	150-165 min	165-180 min	180-195 min
over 10 mm	0	0	0	0	0	0	0	0	0	0	0	0	0
5-10 mm	60	10	0	0	0	0	0	0	0	0	0	0	0
1-5 mm	40	90	100	70	30	40	40	50	40	40	40	40	30
less than 1 mm	0	0	0	40	70	60	60	50	60	70	70	70	70
accumulation% wet snow, mm/15min	0-15 min	15-30 min	30-45 min	45-60 min	60-75 min	75-90 min	90-105 min	105-120 min	120-135 min	135-150 min	150-165 min	165-180 min	180-195 min
over 5 mm	0	0	0	0	0	0	0	0	0	0	0	0	0
3-5 mm	0	0	0	0	0	0	0	0	0	0	0	0	0
1-2 mm	0	0	0	0	0	0	0	0	0	0	0	0	0
less than 1 mm	100	100	100	100	100	100	100	100	100	100	100	100	100
prob of freezing rain	0-15 min	15-30 min	30-45 min	45-60 min	60-75 min	75-90 min	90-105 min	105-120 min	120-135 min	135-150 min	150-165 min	165-180 min	180-195 min
prob	0	0	0	0	0	0	0	0	0	0	0	0	0
prob of freezing wet runway	0-15 min	15-30 min	30-45 min	45-60 min	60-75 min	75-90 min	90-105 min	105-120 min	120-135 min	135-150 min	150-165 min	165-180 min	180-195 min
prob	0	0	0	0	0	0	0	0	0	0	0	0	0

DE-ICING AGENTS (UPDATED 2017-02-22 16:15:00 UTC)

DIW class %	0-15 min	15-30 min	30-45 min	45-60 min	60-75 min	75-90 min	90-105 min	105-120 min	120-135 min	135-150 min	150-165 min	165-180 min	180-195 min
3	60	10	0	0	0	0	0	0	0	0	0	0	0
2	40	90	100	70	30	40	40	50	40	40	40	40	30
1	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	40	70	60	60	50	60	70	70	70	70
prob of freezing wet runway	0-15 min	15-30 min	30-45 min	45-60 min	60-75 min	75-90 min	90-105 min	105-120 min	120-135 min	135-150 min	150-165 min	165-180 min	180-195 min
prob	0	0	0	0	0	0	0	0	0	0	0	0	0

TOWER (UPDATED 2017-02-22 16:15:00 UTC)

VIS decreased by snow	0-15 min	15-30 min	30-45 min	45-60 min	60-75 min	75-90 min	90-105 min	105-120 min	120-135 min	135-150 min	150-165 min	165-180 min	180-195 min
VIS less than 600 m	0	0	0	0	0	0	0	0	0	0	0	0	0
VIS 600-1500 m	60	10	0	0	0	0	0	0	0	0	0	0	0
VIS 1500-3000 m	40	90	100	70	30	40	40	50	40	40	40	40	30
VIS over 3000 m	0	0	0	40	70	60	60	50	60	70	70	70	70



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Thank you very much for your attention!



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Founding Members



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