

Wednesday, 27 March

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InterMet 1: Transport

**A unique integrated solution to support wind shear detection for aviation in all types of weather conditions**

Floriane Grussenmeyer, Aviation Weather Business Development Manager, Vaisala Oyj

# A unique integrated solution to support wind shear detection for aviation in all types of weather conditions

Floriane Grussenmeyer

Aviation Lidar business development manager

Leosphere – a Vaisala company

27.03.2019 @ InterMet Asia

**VAISALA**



**LEOSPHERE**  
A VAISALA COMPANY

# Vaisala is the Global leader in Weather Observation Systems

METEOROLOGY

TRANSPORTATION

RENEWABLE ENERGY

AMBIENT AIR QUALITY



Employs over  
**1800**  
professionals  
worldwide



EMEA	Americas	APAC
<b>73%</b>	<b>19%</b>	<b>8%</b>

Has over  
**30**  
offices in **18**  
countries



**39%**  
of Vaisala  
people work  
outside of Finland



Serves  
customers  
in over  
**150**  
countries  
annually

2018 net sales  
**348.8** million  
euros

EMEA	Americas	APAC
<b>29%</b>	<b>39%</b>	<b>31%</b>

2018 R&D  
investments  
were  
**13%**  
of net  
sales

**22%**  
of employees  
work in R&D  
activities

# Proven Track Record in Aviation Industry



more than

**1000**

**Vaisala AviMet®  
Systems** delivered

**45**

years of  
**Aviation Weather Experience**

more than

**30**

**Wind Shear  
Solutions**  
delivered

in more than

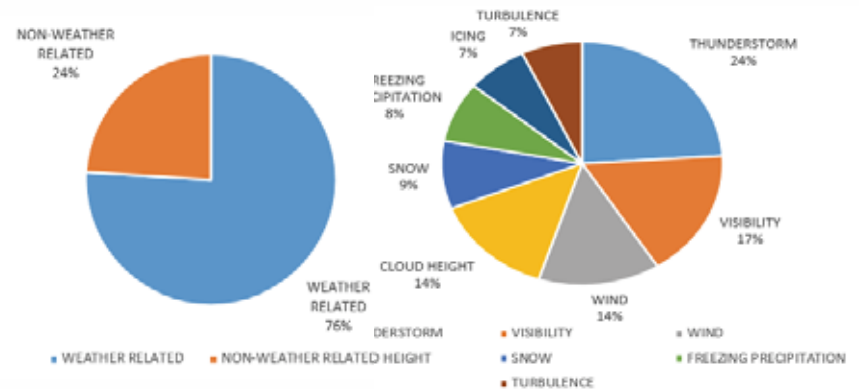
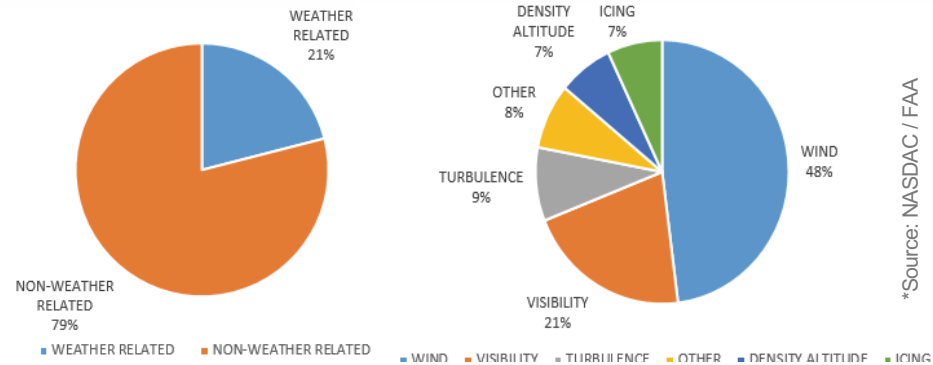
**100**

**Countries**

from Nordics to Africa, and  
Americas to Asia

# Relevance of Weather in Aviation






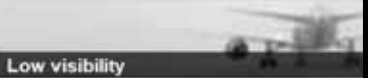



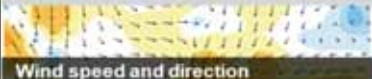




- Typically more than 20% of accidents and 70% of delays are weather related\*
- Impacts optimal traffic flow planning and passenger comfort as well
- Reliable and accurate weather awareness reduces the impacts of bad weather
- Investment in weather is an investment in aviation safety and efficiency



\*Source: NASDAC / FAA

\*Source: NOAA / NWS / The COMET Program

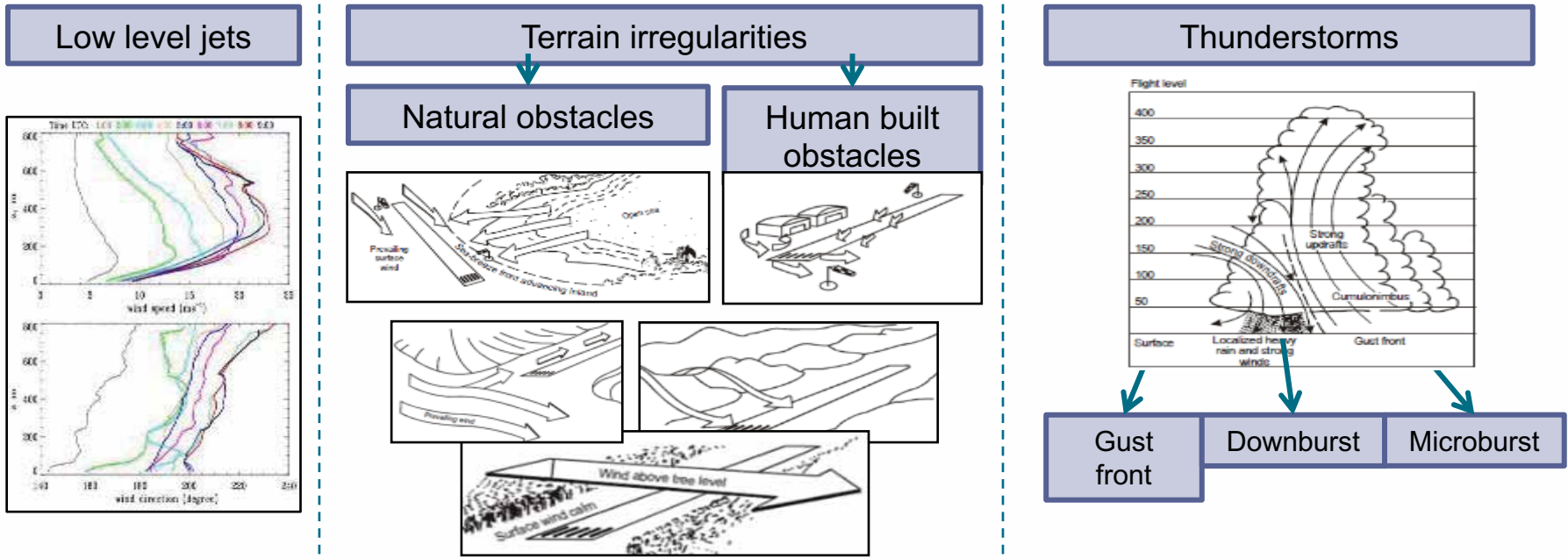
# Wind shear is one major concern affecting Aviation

Condition	Weather	Concerns
 Barometric pressure	 Lightning	 Thunderstorms
 Temperature	 Visibility	 Low visibility
 Humidity	 Precipitation	 Cross winds
 Wind speed and direction	 Cloud height	 Wind shear
		 Heavy rain
		 Icing
Continuously affecting	Occasionally affecting	

- Ground-based remote observations solutions are required to **monitor** and **anticipate** wind hazards / wind shear in order to **improve safety**



# What is the origin of a wind shear ?



- Need for a combination of technologies to address all types of wind shear events

Source : ICAO Doc9817 "Manual of low level Wind shears"

# ICAO Annex 3 recommendations

## WARNINGS



### Met observers and forecasters

- ✓ To feed METAR every 30/60 minutes
- ✓ Not automatic, generated by met analysts with several met data (pireps, AWS)
- ✓ Contextual 360°, 500m height.



## ALERTS



### Air Traffic Controller

- ✓ Automatically generated by ground-based sensors
- ✓ Landing/Take-off and runways only: glidepath measurement up to 3NM

“Wind shear warnings **shall** be prepared by the meteorological office designated by the meteorological authority concerned for aerodromes **where wind shear is considered a factor**” *Annex 3, §7.4.1*



# Multi-sensor solution for comprehensive wind shear monitoring at airports

Lidar  
  
LEOSPHERE  
A VAISALA COMPANY



Vaisala IRIS  
▪ Radar data  
▪ Lidar data



AviMet AWOS  
▪ Met Messages  
▪ Integration



▪ Observers & forecasters

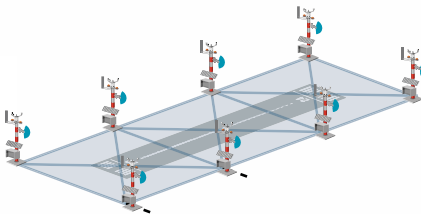


▪ ATC User interface

Weather  
radar



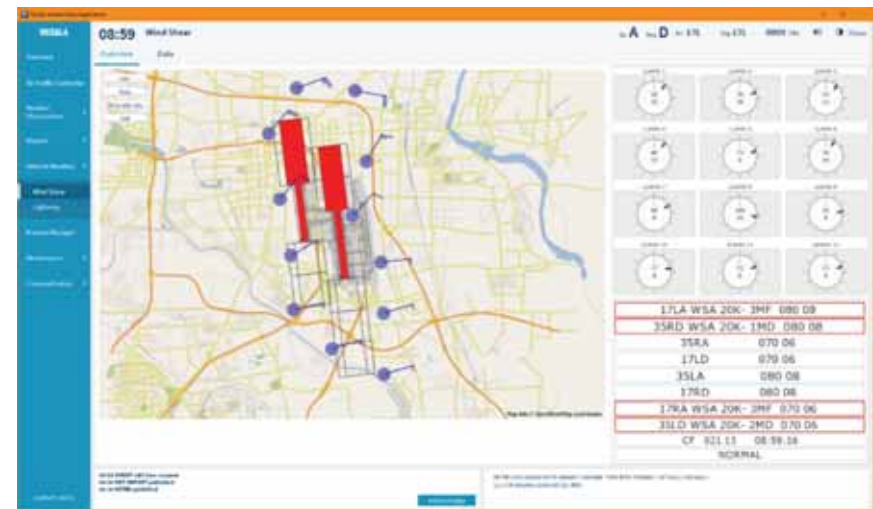
LLWAS  
wind sites



- Combination of sensors depends on **local** weather conditions and type of wind shear events
- Expert **pre-analysis** is required before designing and deploying any system

# Wind shear data as a standard input in the AWOS

- Integrated warnings displayed in AviMet® AWOS displays
- Windshear **alerts** integrated directly to METAR/SPECI messages



# Summary

- Wind shear is a major concern for airport safety which requires appropriate measurement systems
- Vaisala combines a set of complementary technologies which enable a comprehensive wind shear monitoring at the airport
- Wind shear alerts can be provided as standard AWOS data for complete situational awareness and efficient weather monitoring



Questions ?

[floriane.grussenmeyer@vaisala.com](mailto:floriane.grussenmeyer@vaisala.com)  
[www.vaisala.com](http://www.vaisala.com)