EASA
European Union Aviation Safety Agency

FINAL DISSEMINATION EVENT, 29th of November Bruxelles

SENS4ICE

SENSORS AND CERTIFIABLE HYBRID ARCHITECTURES
FOR SAFER AVIATION IN ICING ENVIRONMENT

Future Icing Research Needs - EASA View

Esther Garcia Gonzalez
ECS/ICING Expert
Certification Directorate, EASA

Outline

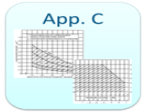
→ Background

→ EU H2020 Icing research projects supported by EASA

→ EASA views on Future ICING Research

Background

Certification Icing Environment



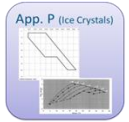
1960

Supercooled Icing conditions

March 2015 New EASA Rule published:
CS 25 @Amdt.16 and CS E @Amdt.4

ICING ENVIRONMENT
for certification of Large Aeroplanes and Engines is expanded

SUPERCOOLED LARGE DROP Icing Conditions



MIXED PHASE AND ICE CRYSTAL ICING ENVELOPE

SNOW (Engines)

1994 ATR 72 AMERICAN EAGLE F4184 crash in ROSELAWN

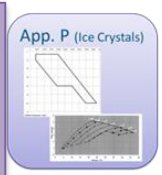
2009 A330 Air France F447, Rio to Paris crashed into the Atlantic Ocean

H2020 Icing research projects supported by EASA

These projects were targeting

APP C
3D validated simulation codes

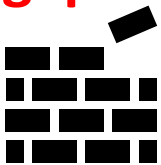
APP P
Probes: validated simulation trajectory codes
Engines: validated simulation accretion codes



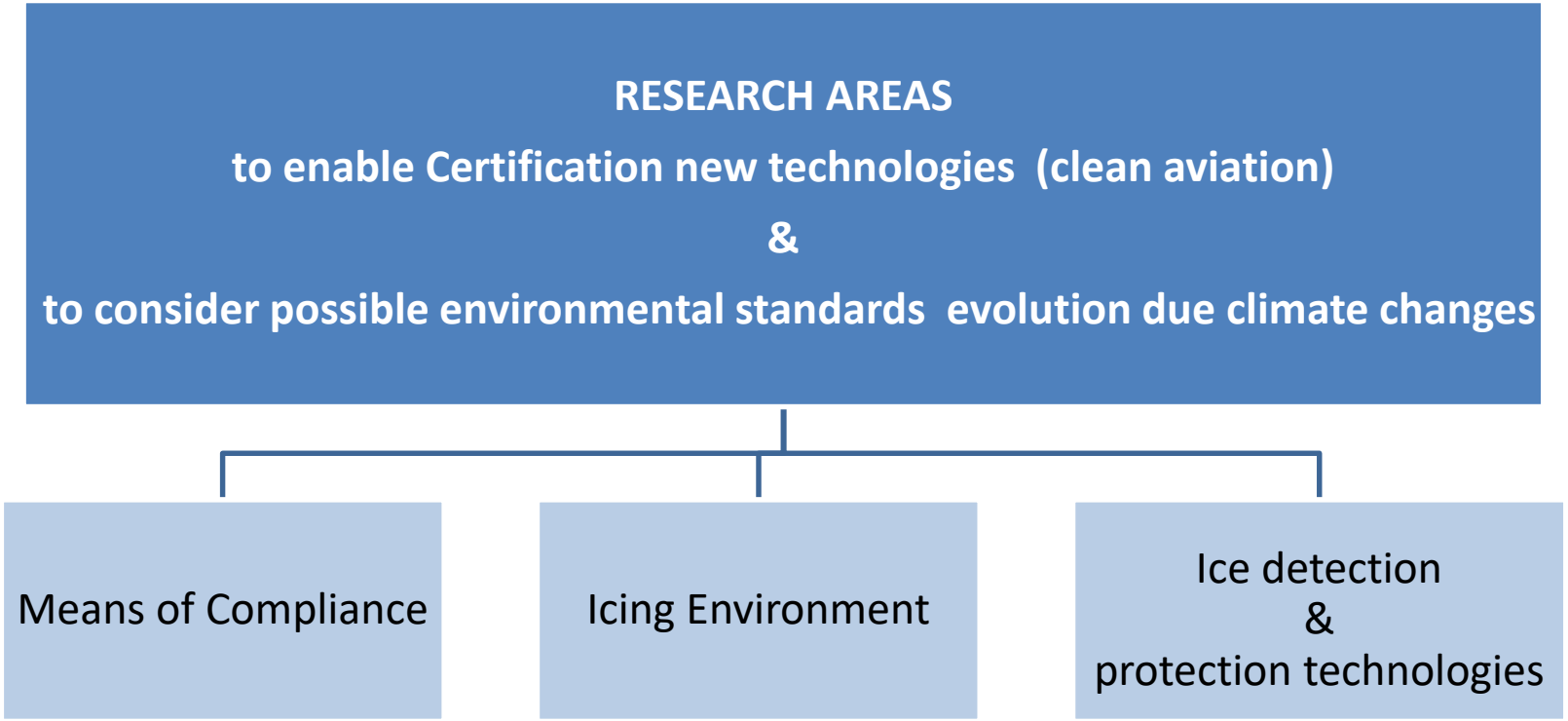
APP O
3D validated simulation codes in Freezing Drizzle/Rain
Lab Testing capabilities in Freezing Drizzle/Rain
Ice Detection Systems (direct or hybrid)

SNOW
Lab Testing capabilities in Snowing conditions /
Validated simulation codes

Progress achieved ! but…still some remaining gaps



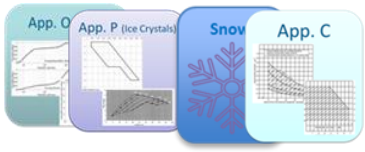
EASA views on Future ICING Research



EASA views on Future ICING Research

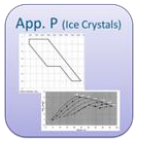
Means of Compliance

- Numerical Simulation



- Supercooled Large Drop Testing Capabilities

- Development of European Ice Crystal test Capability (engine / probe)



- Development of Falling / Blowing Snow Testing Capability

EASA views on Future ICING Research

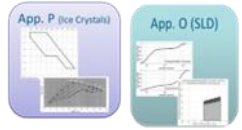
Icing Environment Update

- Appendix C Update/ Impact on Climate Change
- Characterization of Icing Environment at Low Altitude.

EASA views on Future ICING Research

Ice detection/protection technologies

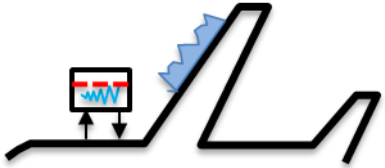
- Ice detection systems
  (Ice Crystals /Supercooled Large Drops)

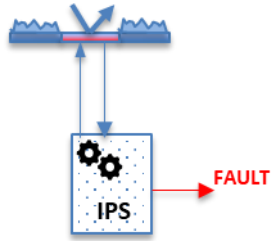


- High efficiency / Low energy ice protection systems

- Dissimilar means for Air data (AOA/Speed) measurement/insensitive to icing threat

- Enhanced aircraft performance / Ice protection health monitoring





EASA
European Union Aviation Safety Agency

THANK YOU

easa.europa.eu/connect

Your safety is our mission.

An Agency of the European Union