



EASA
European Aviation Safety Agency

FLIGHT AT HIGH ALTITUDE IN ADVERSE CONDITIONS

EASA workshop - Cologne, 23-24 NOVEMBER 2015

ITCZ and convective weather

Chabbi Chaouki,
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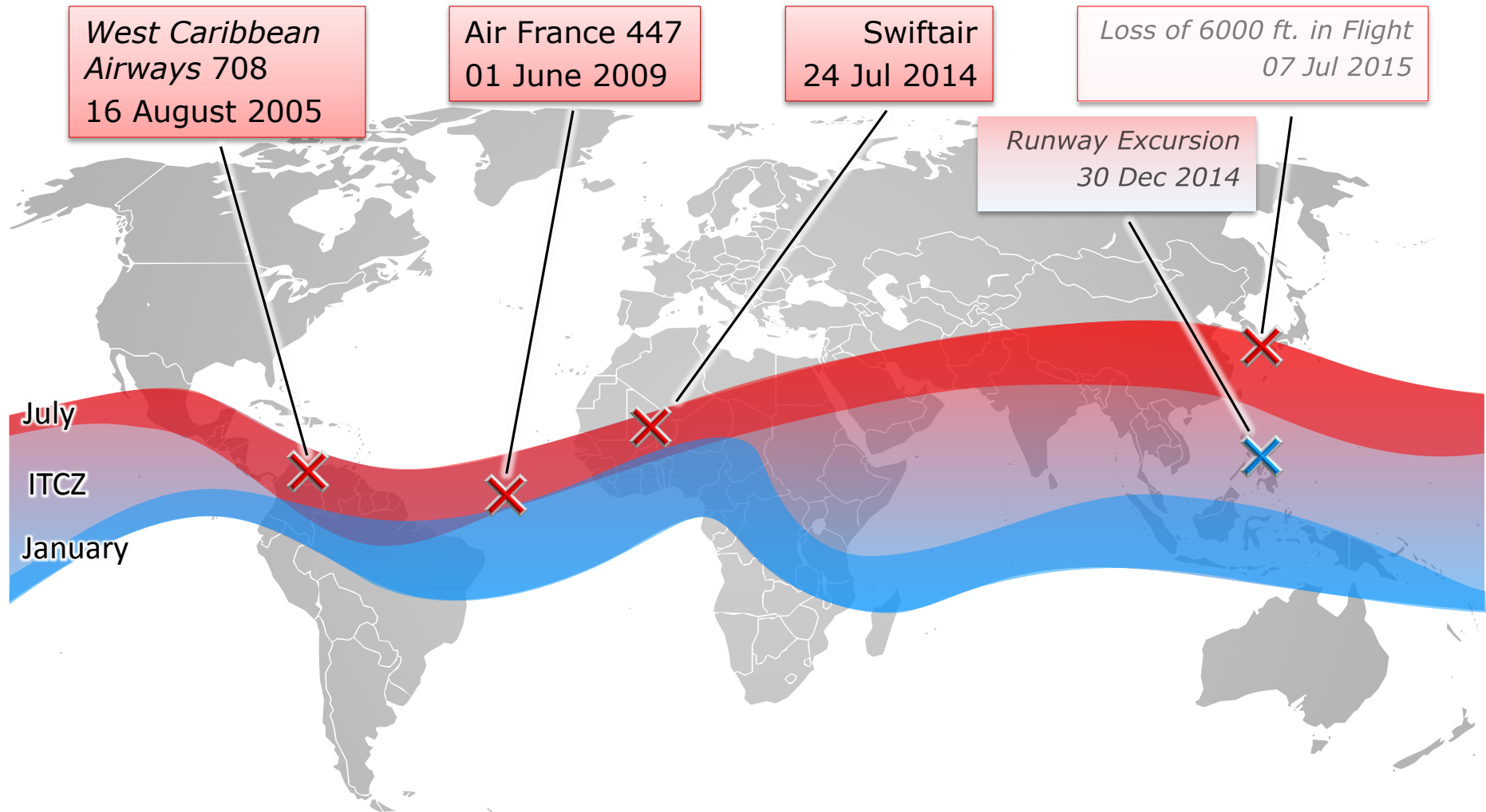
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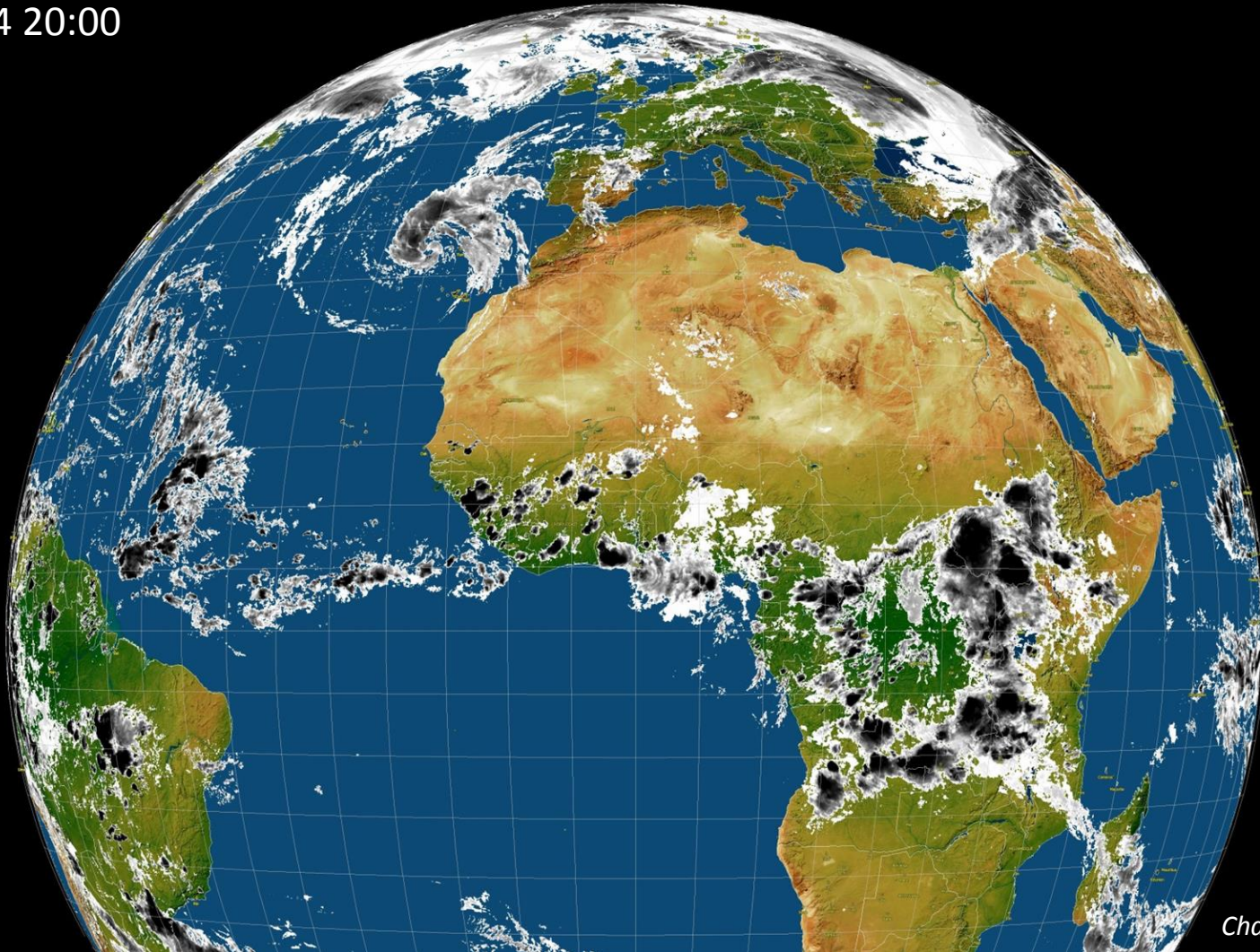
The starting point





ITCZ activity

19 Oct 2014 20:00



Chaouki CHABBI, EASA

23 Nov. 2015

ITCZ and convective weather - EASA workshop

3



Convective cell

Image taken on 5 February 2008 while the International Space Station (ISS) was located over Western Africa near the Senegal-Mali border



Credit:

Astronaut photograph ISS016-E-27426 was acquired on February 5, 2008 and is provided by the ISS Crew Earth Observations experiment. The images were taken by the Expedition 16 crew, and are provided by the Image Science & Analysis Laboratory, Johnson Space Center.



Convective cells

Credit:

Astronaut photograph ISS040-E-90343. The image was taken by the Expedition 40 crew.

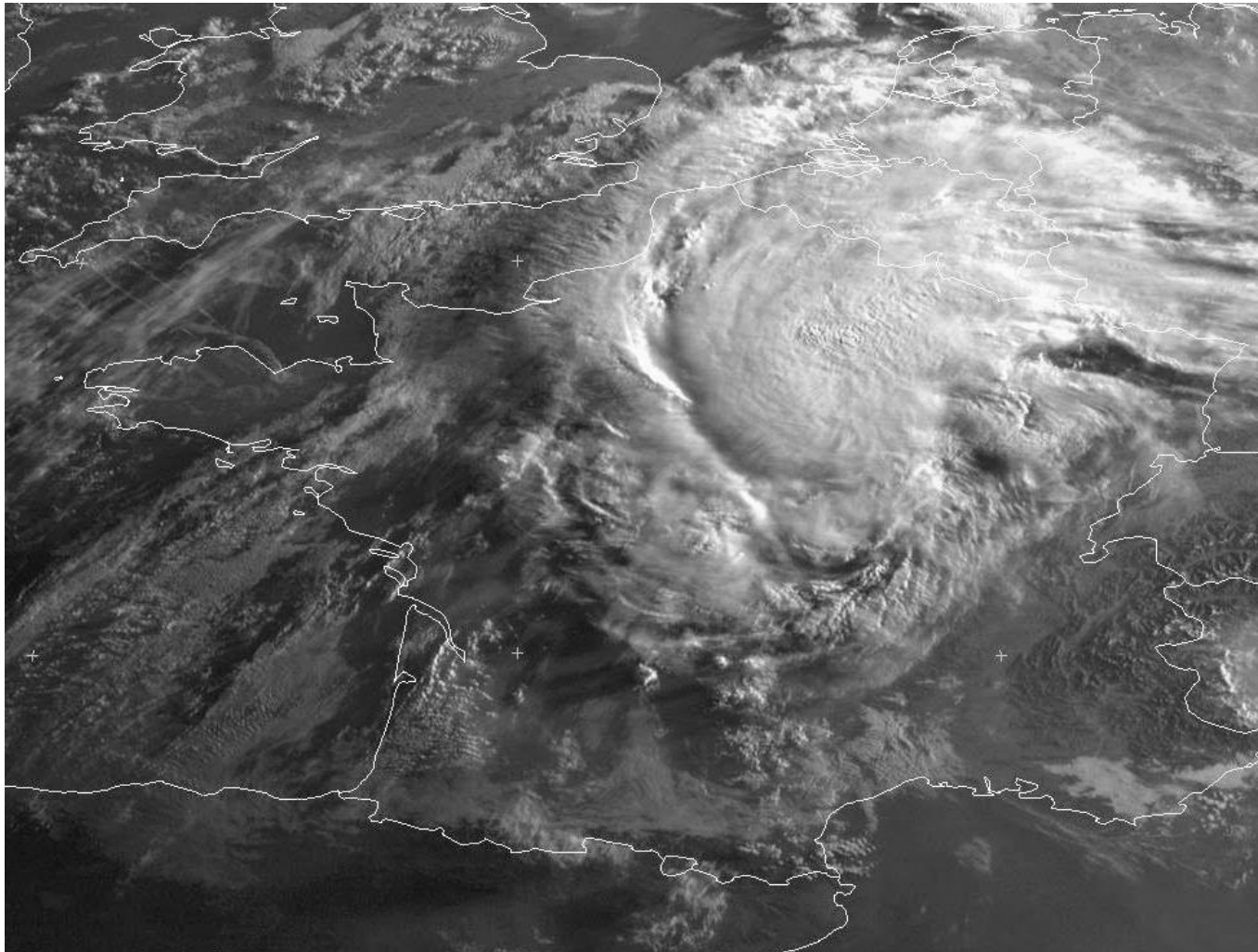


In early September 2014, this photograph was taken by astronaut Alex Gerst on 08 September 2014 from the International Space Station.

The ISS was over Libya at the time, and Gerst was looking south-southwest over a storm that stretched hundreds of kilometers across the sand seas of the Sahara.



Mesoscale convective system

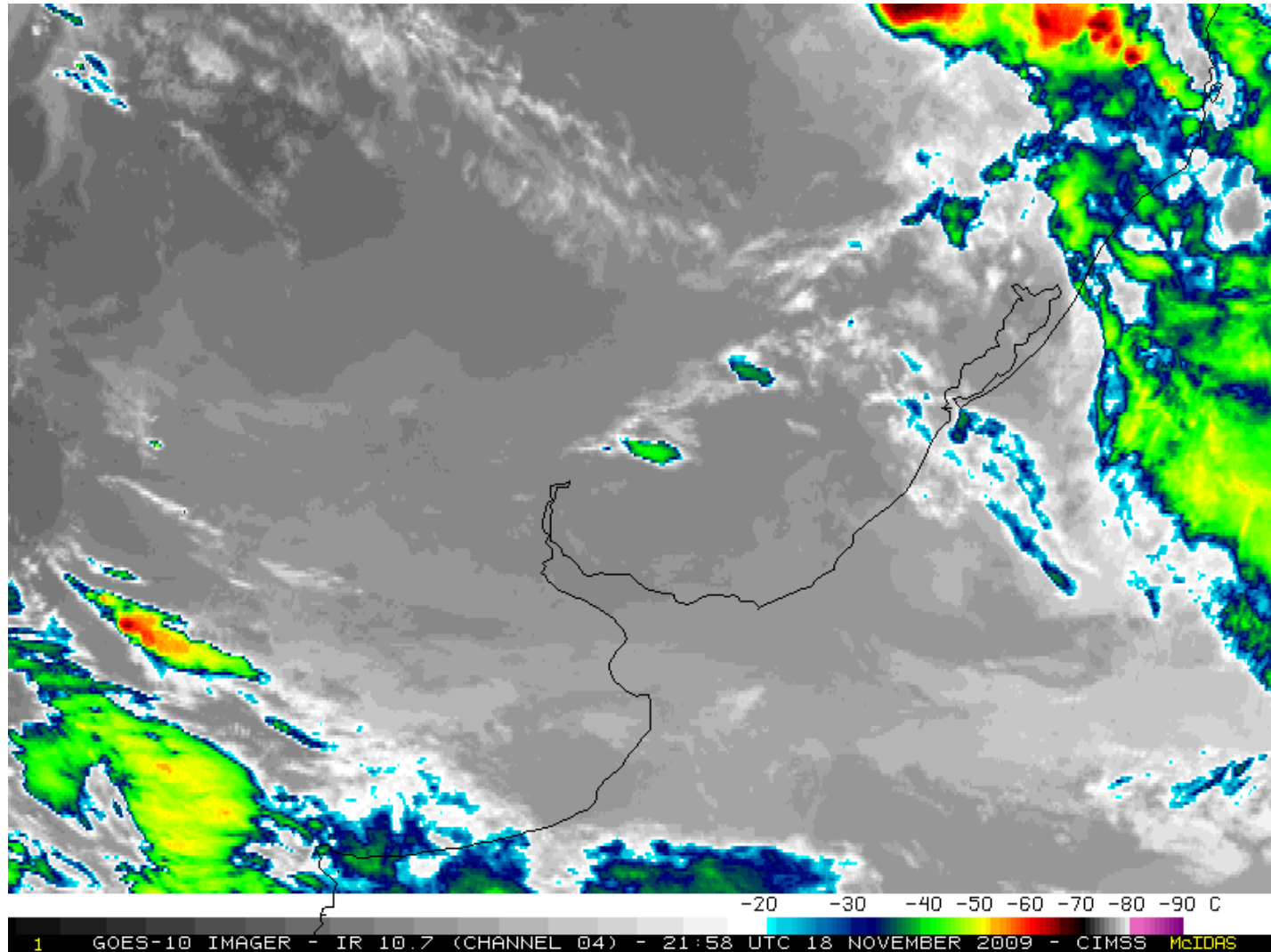


MET10 RGB-12-12-9i 2013-07-26 05:00 UTC

 EUMETSAT



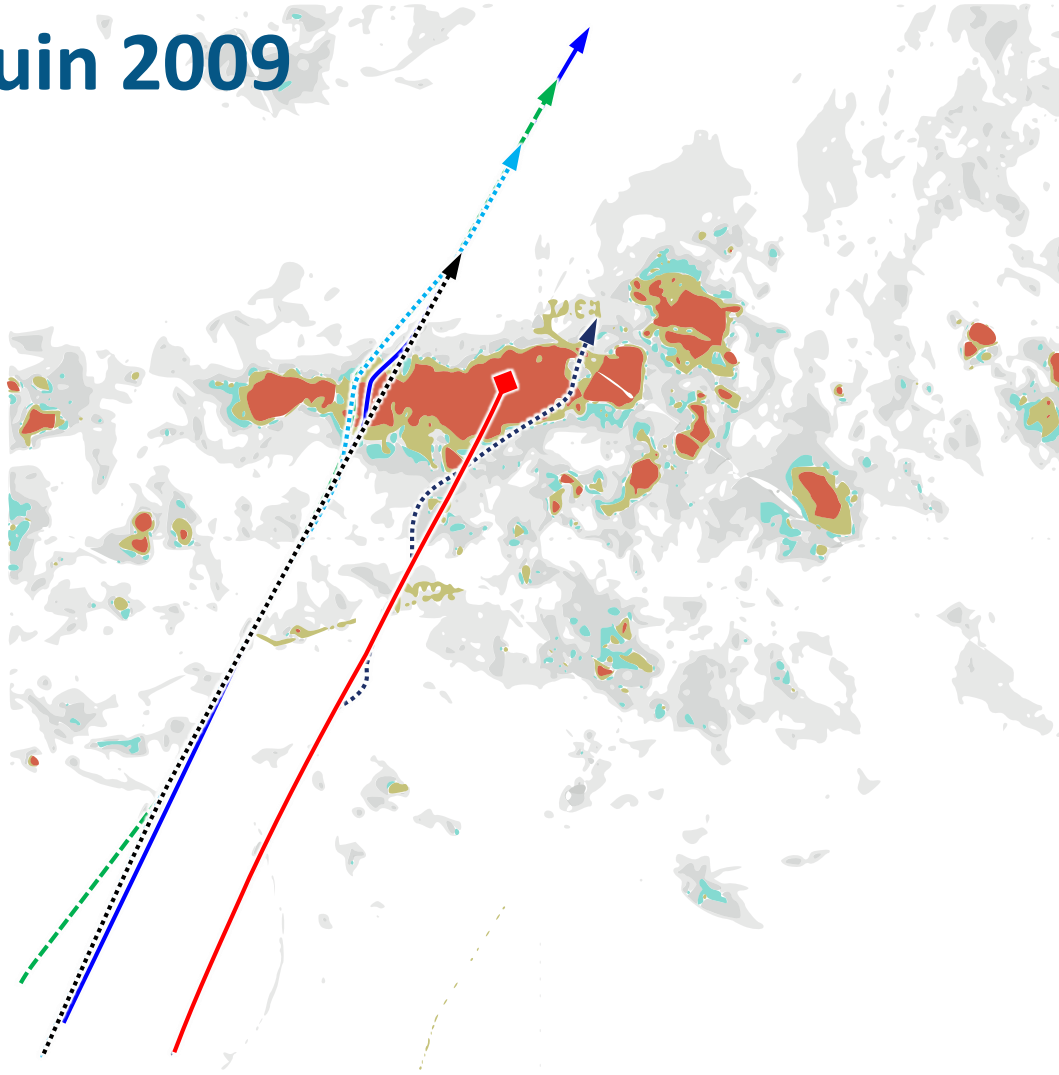
Mesoscale convective system





What are we talking about?

1^{er} juin 2009



AF459 - A330-200

AF415 - B777

AF401 - B777

KLM792 - B777

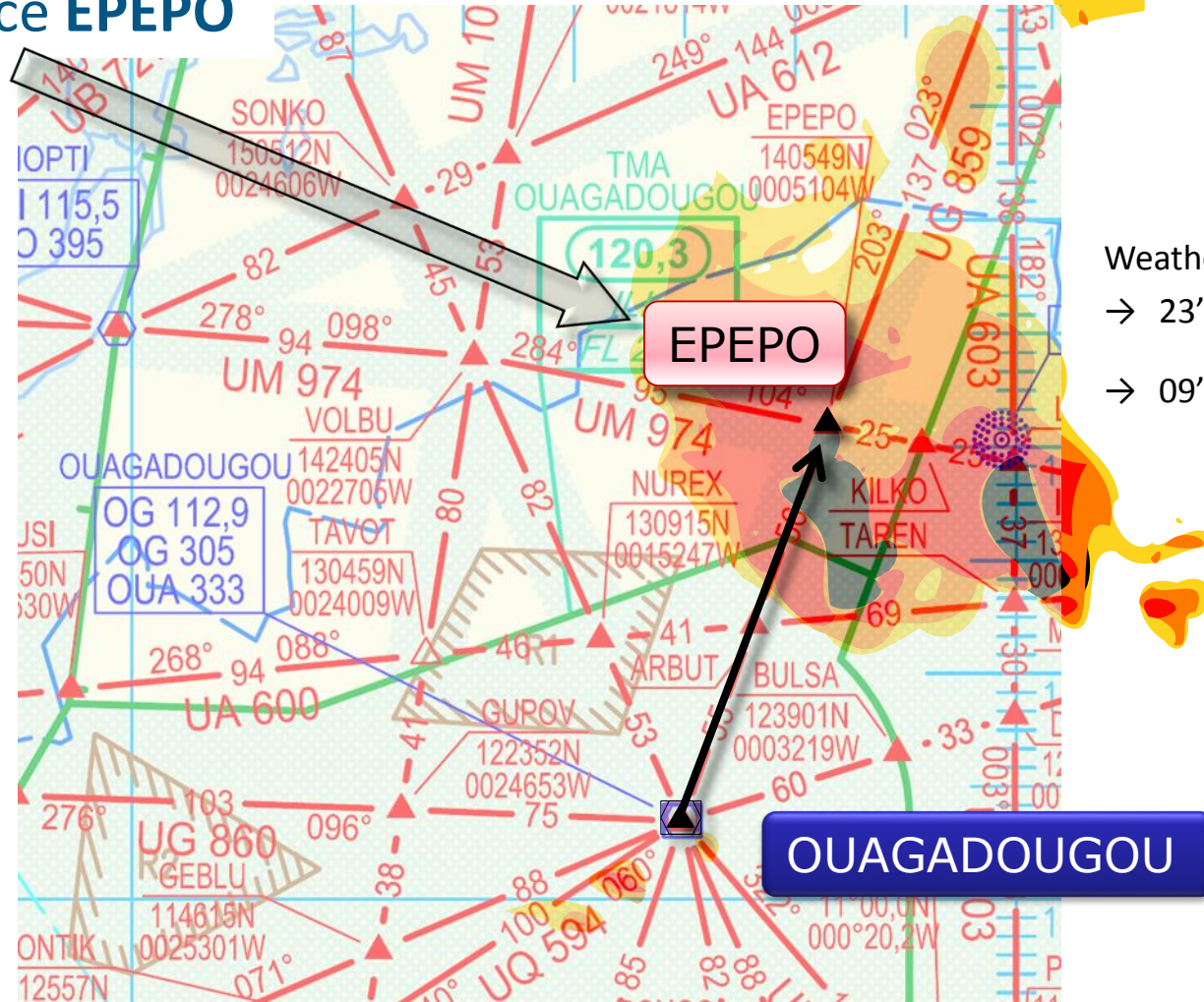
ELY010 - B777

AF447 - A330-200



MD83 Accident, Mali July 2014

ATC clearance **EPEPO**



Weather cell 01:38
→ 23' after TOFF
→ 09' before crash

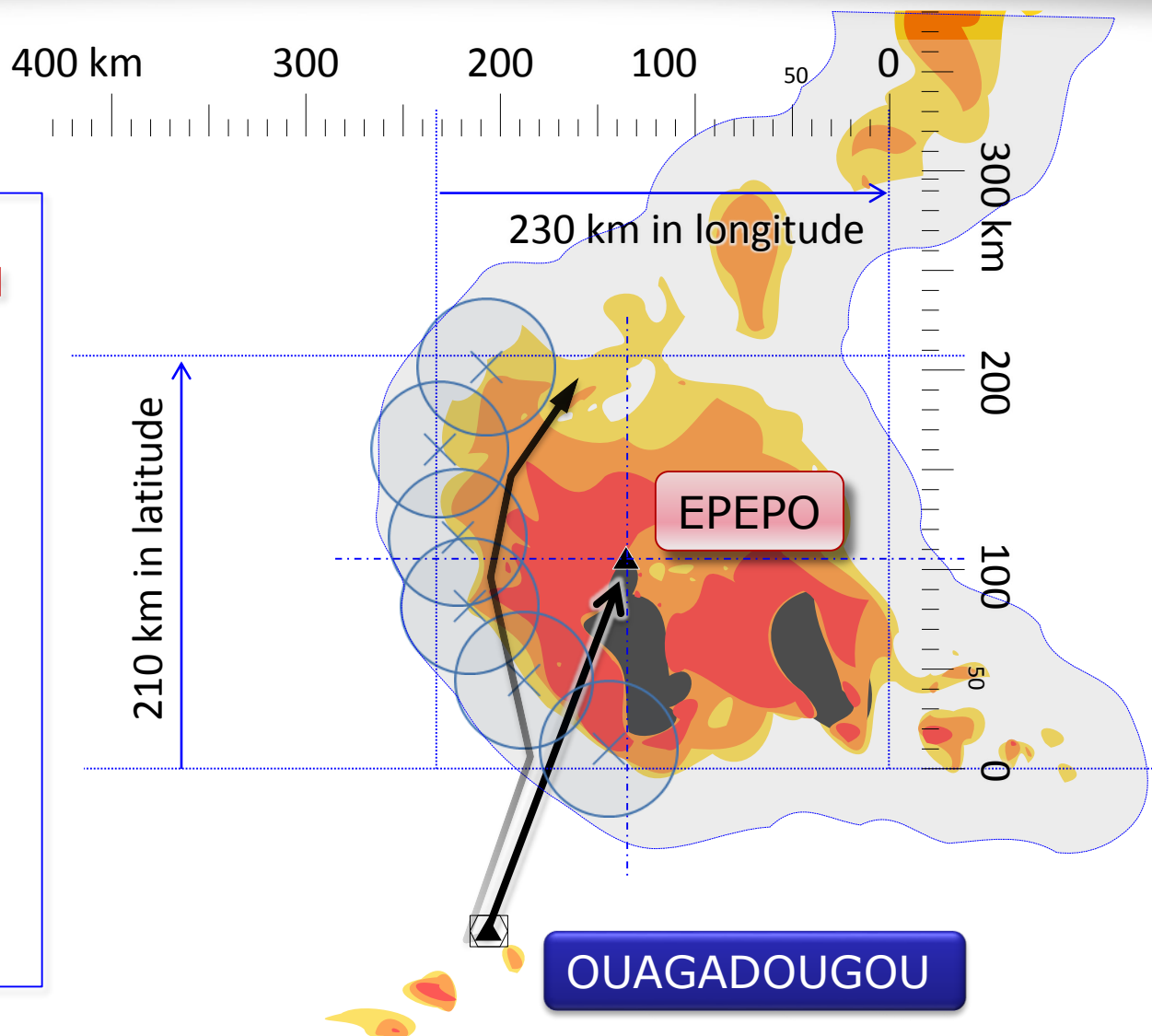
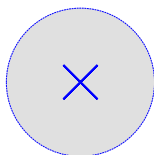


Considerations for avoidance

Outside the cloud, shear turbulence is encountered several thousand feet above and up to 20 miles laterally from a severe storm.

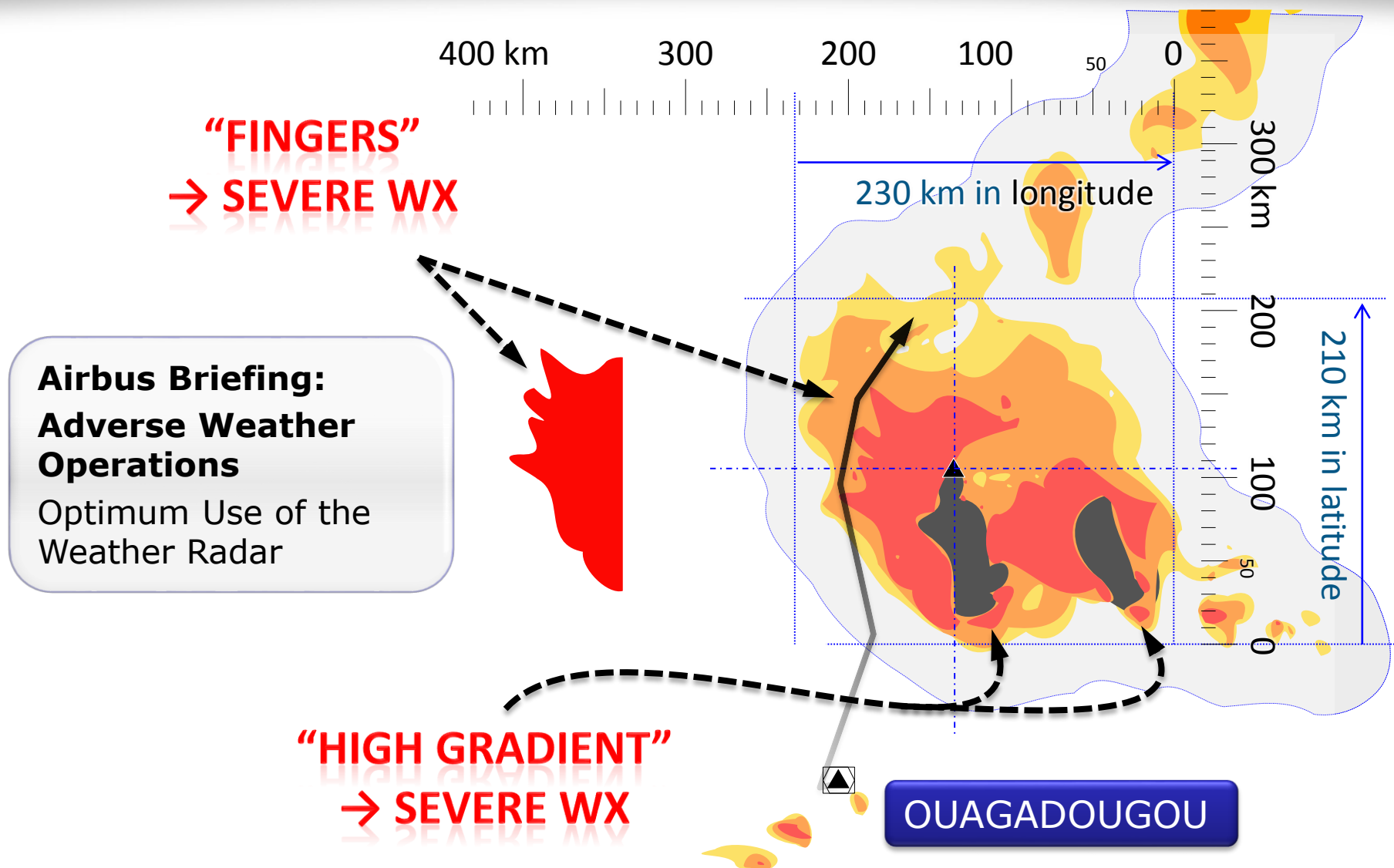
FAA AC No: 00-24C

20 NM
radius
clearance






Considerations for avoidance






Prevention

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European Aviation Safety Agency

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AD
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IMPORTANT NOTICE





Third European Aviation Safety Agency (EASA) Airworthiness Directives (AD) Workshop will be held on 09 and 10 December 2015 in Cologne.

The event is addressed to all interested stakeholders such as operators, CAMO, maintenance organisations, design approval holders, who want to have a better understanding of EASA processes related to safety publications.


More information, agenda and online registration are available [here](#).

EASA Safety Information Section

List of Safety Information
Displaying **1** record in total.

Number	Issued by	Issue date	Subject	Approval Holder / Type Designation	Effective date	Attachment
2015-13		2015-07-29	 SIB Safety Management of Flight Operations in Adverse Convective Weather and the Inter-Tropical Convergence Zone	 Safety Information Bulletin Operations		 144 kb

EASA SIB No: 2015-13

**EASA Safety Information Bulletin**
SIB No.: 2015-13
Issued: 29 July 2015

Subject: Safety Management of Flight Operations in Adverse Convective Weather and the Inter-Tropical Convergence Zone



ITCZ SIB: Reference

Such as FAA Advisory Circular No AC 00-24C "Thunderstorms" addressing:

- Crew knowledge and training topics, such as:
 - Effect on Altimeters;
 - Engine Water Ingestion;
 - Mesoscale Convective System;
 - Supercool Liquid Water;
 - Airborne Weather Radar ...
- Hazard identification for safety management, such as:
 - Turbulence;
 - Icing;
 - Hail ...
- Practical mitigation measures, such as:
 - Stay clear of radar echoes by 20 NM and 40 NM between 2 cells;
 - Don't land or takeoff in the face of an approaching thunderstorm;
 - Don't attempt to fly under a thunderstorm;
 - Don't attempt to fly under the anvil of a thunderstorm;
 - Caution when using weather satellite imagery for tactical navigation avoidance;
 - Circumnavigate the entire area if it has 6/10 thunderstorm coverage (clusters)
 - Consider as extremely hazardous any thunderstorm with tops 35,000 feet or higher ...



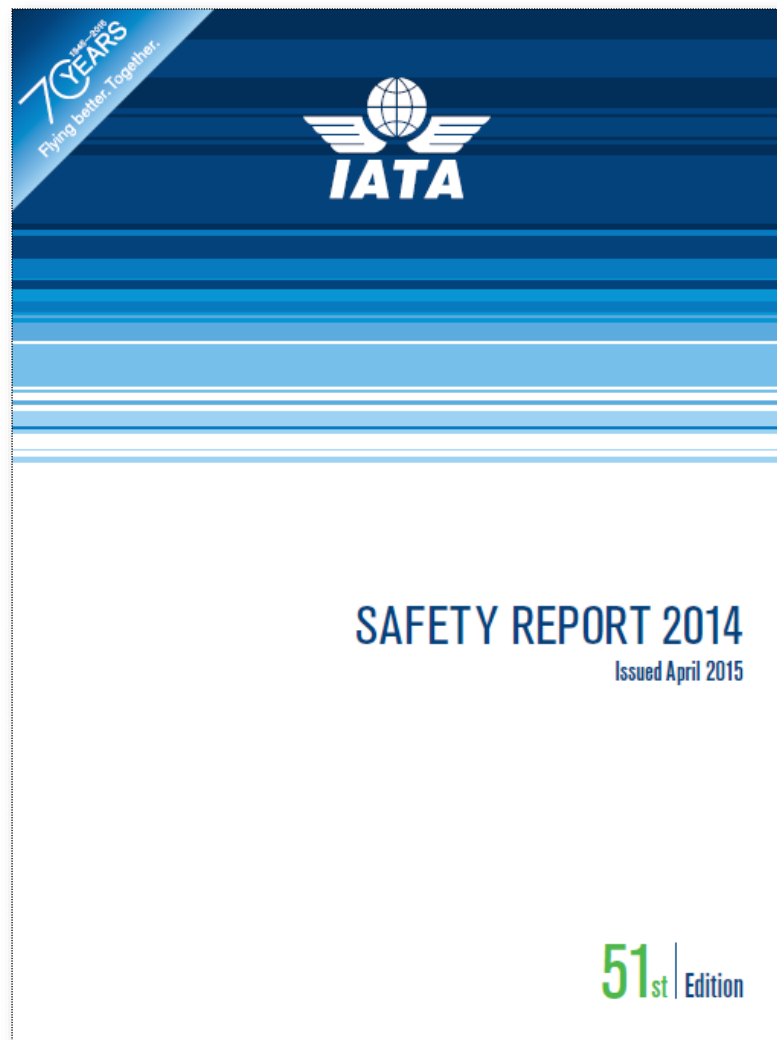
ITCZ SIB: WX safety management

- Safety data collection
 - Is turbulent air penetration recorded? Is it reported by pilots? How are the reports used?
 - Are FDM-based indicators targeting adverse convective weather and ITCZ related events?
 - Are autopilot disconnection due to turbulence monitored?
 - Are lightning strikes and hail damages recorded?
 - ...
- Safety data analysis:
 - Are trends of unnecessary WX penetrations analysed?
 - Are dispatch rates with inoperative anti-icing systems or WX radar analysed in relation to risks associated with WX conditions?
 - ...
- Risk mitigation measures:
 - How is pilot competence assessed to ensure proper use of WX radar?
 - How is training, progress and checking recorded when it comes to decision making related to WX?
 - Are there clear instructions for pilots on vertical and lateral WX avoidance in flight?
 - Is there a specific fuel policy for inclement WX operations?
 - Is in flight operational support providing pilots with regular WX updates adapted to tactical decision making?
 - ...



WX risk awareness

- **42% of loss of control** accidents occurred in degraded meteorological conditions, most of the cases involving thunderstorms and icing. (Pg 74);
- The number and combination of **MEL** items, **combined** with other factors (e.g., **weather**) can lead to degraded safety levels. (Pg 79);
- **31% of accidents** in 2014 and **27% of accidents** during the period of 2010 to 2014 are related to meteorological threats (Pg 79);
- **Unnecessary weather penetration** was a factor in 8% of the accidents in 2014, a **large increase** when compared to previous years when the average was of about 3% (Pg. 79).
- **Real-time weather information available in the cockpit should be improved** (Pg. 79).
- Capabilities for **real-time downlink** of weather data obtained by aircraft and **uplink of weather information required in the cockpit** are needed (Pg. 80).
- In 2014, **extreme weather** played a **significant role** in a **number of aviation accidents**. (Pg. 84)





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**Thank you for your
attention**

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