SAFETY. SOLIDARITY. SUSTAINABILITY.

European Aviation Crisis Coordination Cell (EACCC) Space Weather Exercise 2023 (08 and 09 Nov., 2023)

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MET SG/11 and Workshop on Formatting a Space Weather Exercise

(Cairo, Egypt, 14 - 16 November 2023)

ABOUT IFALPA

- Approaching 100 Member Associations world-wide
- In excess of 100,000 pilot members
- IFALPA Headquarters in Montreal, close to ICAO
- ´Observer´ status with ICAO >> access and participation !

https://www.ifalpa.org/about-us/

- European Aviation Crisis Coordination Cell (EACCC)
- Conduct of the event
- Conclusion: Summary of lessons learned

European Aviation Crisis Coordination Cell (EACCC)

Recap: European Aviation Crisis Coordination Cell (EACCC)

Source: https://eu-lac-app.eu/public/uploads/7-ECTL-crisis-management.pdf

Recap: European Aviation Crisis Coordination Cell (EACCC)

Possible threats

- Volcanic ash dispersion
- Nuclear incident
- Armed conflict
- Hazardous chemicals dispersion
- Fire
- Security threats
- Airborne spread of diseases/Pandemic
- Earthquake
- Flooding
- Major failure of a pan-European function
- Industrial action or unavailability of a major or several ANSPs
- Cyber attacks
- Severe meteorological conditions
- Shortage of fuel in Europe
- Threat from space
  - space debris & meteorites,
  - space weather

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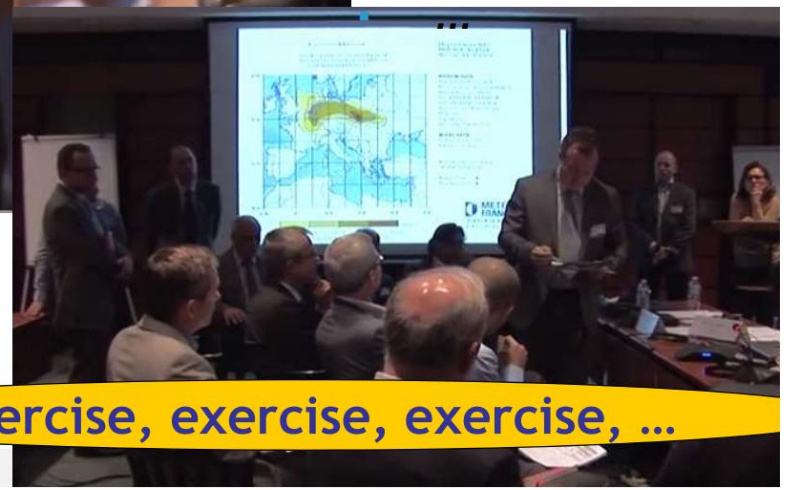
ICAO Crisis Management Framework Document
(EUR Doc 031)

EUR DOC 031.:: https://bit.ly/3G0ACEE
Source: https://eu-lac-app.eu/public/uploads/7-ECTL-crisis-management.pdf

Recap: European Aviation Crisis Coordination Cell (EACCC)

- ***2013: CYBER***
- ***2014: NUCLEAR***
- ***2015/6: SECURITY***
- ***2017: POWER OUTAGE***
- ***2018: CYBER***
- ***2019: PANDEMIC***
- ***...***



Source: https://eu-lac-app.eu/public/uploads/7-ECTL-crisis-management.pdf

Conduct of the event

Conduct of the event

- Introductory presentation
  - GLE 60 (2001) at 5x strength used
  - GLE 5 ((1956) at 45x strength used Both events have a high raditaion component. Source: https://gle.oulu.fi/#/

- Presentation on Space Weather in all it´s forms by PECASUS Consortium lead
  - lively discussion on human radiation exposure.
  - Extremely surprising information bit: There is no limit set for exposure of the flying public. While the Public is accorded protection when on the ground, radiation dose received when flying is expressly excluded. ICRP (https://www.icrp.org/) and EU Council directive (https://bit.ly/49zoJTK) refer.

Conduct of the event

SEVERE SPACE WEATHER for the exercise:

- HF Communication severely degraded
- GNSS accuracy degraded or signal lost
- Radiation exposure for passengers and crew
- Potential ground effects on electricity networks

Conduct of the event

Questions for the exercise to be answered:

> Do we sufficiently understand effects of extreme SWx events ?

> Do we have adequate intervention decision criteria ?

> Do we have sufficient information to define an adequate response ?

> Do ICAO SWx Advisories provide all the necessary information ?

Conduct of the event

- During the Exercise, the Narrator tool was used to display the progress of events and collect answers from participants. There were about 25 people in Brussels, and 60 online.

- Twice, simulated Crisis Teleconferences were held, where participants were asked for their reactions to curent SWx, their operational decisions.

- Info-bits emerged:
  - ADS-B would be affected as it needs both GNSS and communications
  - EASA can not issue a SIB or other communication in time as it´s processes are not designed for fast reactions
  - UK stated that a SWx Risk Assessment is obligatory for airlines (no details)
  - no ICAO SWx advisory exists that would provide a heads-up prior to impact of space weather. The UK Met Office Space Weather Operations Centre (MOSWOC) does such advice to customers

Conduct of the event

- Info-bits - continued:

  - Eurocontrol didn´t get information from major aircraft manufacturers on possible radiation effects on avionics
  - Eurocontrol didn´t get information from major satellite operators on SWx effects that would cause a shutdown of satellites
  - The UK has an ´Aviation Crisis Management Executive´

IFALPA

SWx Advisory	Inflight / en-route	Dispatch / before departure
GNSS MOD	- check means of navigation (DME-updating, IRS, VOR) Check RNAV/RNP-Capability and requirements - check if conventional approach procedures at destination and alternate can be used & plan accordingly	- check means of navigation (DME-updating, IRS, VOR), incl. MEL Check RNAV/RNP-Capability and requirements - check if conventional approach procedures at destination and alternate can be used & plan 2nd alternate - consider adding 30 min contingency fuel for unforeseen events, e.g. airspace closures
GNSS SEV	- check means of navigation (DME-updating, IRS, VOR) - check if conventional approach procedures at destination and alternate can be used & plan accordingly - assure availability of planned route / RNAV/RNP - consider diversion & landing at en-route airport	- check means of navigation (DME-updating, IRS, VOR), incl. MEL - check if conventional approach procedures at destination and alternate can be used & plan 2nd alternate - check airspace and route availability (RNAV/RNP) - consider including 1hr contingency fuel for unforeseen events e.g. airspace-closures - consider flight cancellation

Procedures

used during the

exercise by

IFALPA rep.

Available from the European Cockpit Association Website below !

https://www.eurocockpit.be/news/icao-space-wx-advisories-instructions-be-included-ops-manual

Conduct of the event

- Day 2 saw presentations by Stakeholders and experts on

  - **Radiation**: Mr. Bottollier, IRSN , France
  - **Radiation**: Mr. Mundigl, EU Commission, DG Energy
    Both agreed that there was no limit to radiation for passengers, not even in case of severe radiation.
    IFALPA: CPT has to protect all person on board.
  - **Radiation D-index**: Mr. Matthiä, DLR Cologne
  - **GNSS: Aviation Users´ view**: Mr. Sievers (https://bit.ly/46HklAg)
  - **ESA space safety program**, Ms. Glover

Conclusions: Summary of lessons learned

1. Dissemination of SWx advisories is lacking
2. Wide-spread wondering why the SWx advisories are not welcomed, not accepted
3. Basic info material is available on the PECASUS site: https://pecasus.eu/?page_id=593
4. Education in SWx is needed. It´s available. Example: https://www.stce.be/
5. General agreement that improvements to SWx advisories are necessary - **soon**
6. A report on the exercise will be provided at the European Space Weather Week by the exercise lead from Eurocontrol. **https://bit.ly/3QYo1Iv**
7. Agreement between the IATA rep and **IFALPA that SWx needs to be in the OPS Manual.**

Thank you

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