Tailored Weather Information for Pilots

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100 Member Associations
More than 100,000 pilots

ICAO
- 15 Panels
- 17 Study Groups
- 7 Regional Groups

The International Federation of Air Line Pilots’ Associations

IATA
ACI
EMBRAER
WMO
EASA
BOEING
UNCOE
IAPA
EMBRAER
BOMBARDIER
AIRBUS
IFATCA
IAEA
SAE
INTERPOL
ILO
UPU
Common requirements for future Met

1. Priority  > get modern, tailored weather information into the hands of pilots: planning to enroute to final parking

2. Priority  > develop appropriate weather info for the eFB, with uplink enroute (turbul., convection, clouds, volc. ash)

3. Priority  > invest in educating pilots about the modern ideas (uncertainty, ensemble-forecasts, decision support)

4. Priority  > improve wx –info for pilots in line with growth of computing-power and observational capabilities,
Met for pilots - when aviation was new

Costes and Bellonte, first air crossing Paris-New York Aug. 31, 1930

MeteoFrance  http://www.meteofrance.fr/nous-connaitre/decouvrir-la-meteorologie/notre-histoire#
Evolving global air navigation planning, G. Brock, Chief, Meteorology Section, ICAO, WMO CAeM-15 TeCo
MET information in systems is synonymous with DATA

Ongoing SESAR Deployment Projects

- Initial WXXXM Implementation on Belgocontrol systems:
  - IWXXM compliant Belgian OPMET data Generation
  - Upgrade of ICAO Regional OPMET DataBank in Brussels to enable IWXXM OPMET data requests
  - Upgrade of AMHS to handle IWXXM messages
  - Operational in June 2017 (IWXXM v2.0)

- Implementation of NewPENS & SWIM nodes
  - Connection to NewPENS (by end 2018)
  - Migration of applications to NewPENS (by end 2020)

Co-financed by the European Union
Connecting Europe Facility

Meteorological Services for Aviation: SWIM & MET-GATE
EUMETNET EIG, Rosalind Lapsley & Bart Nicolai, World ATM Congress 2017
Information means data, in the ICAO / aviation MET world.
Meteorologists & Met Systems provide, transform and transport data: gigabits/second, multi-terabyte storage banks
Data is available, but modern info is scarce for pilots

MET – Supercomputers

SigWx-Chart

1980ies

Data is available, but modern info is scarce for pilots

MET – Supercomputers

SigWx-Chart 2017

Concentration on data and their well-being led to stagnation in the development in display and transmission of met information to pilots.

SigWx chart 1988

SigWx chart 2017
Color? Innovative displays? Available, but not provided to pilots.

Aviationweather.gov CAT / CB tops [Link](http://www.aviationweather.gov/wafs)

Image: CRAY [Link](https://www.cray.com/company/news-and-media/image-library)
Color? Innovative displays? Available, but not provided to pilots.

WMO, 2017  http://www.wmo.int/pages/prog/sat/images/cgms_satellites_1000.jpg
CIMMS. 2017   http://tropic.ssec.wisc.edu/real-time/windmain.php?&basin=atlantic&sat=wg8&prod=wvir&zoom=&time
We have SYSTEM FAILURE
> get modern, tailored weather information into the hands of pilots, from planning through enroute to final parking

> develop appropriate weather info for the eFB, with uplink enroute (turb. convection, clouds, volc. ash)

> invest in educating pilots about the modern ideas (uncertainty, ensemble-forecasts, decision support systems)

> improve wx –info for pilots in line with growth of computing-power and observational capabilities
Meteorologists don’t communicate with airline pilots on the expected weather anymore. In general, the provision of weather in human-readable form, the promulgation of easily digestible graphical displays does not seem to be a high priority, but is a requirement.

- Re-establish the knowledge transfer quality of a MET-briefing. Cortana, Siri or Alexa might assist selecting relevant information, and could even answer questions. Narrated movies and graphical displays could help.
Meteorologists, regulators do not seem to see the provision of weather data on displays and printouts in human-readable form as part of their duty. Consequently, the design of ‘charts’, of easily digestible graphical displays is left for others to do, with the real possibility of loss of meteorological information and a slow migration from R & D to operational use.

- Develop and standardize graphical displays most effective in the transfer of information contained in the data to pilots.

- Consider the very limited time available during briefing and in flight.
Several providers are developing eFB applications. A clear path towards making these available to airline pilots within the regulatory framework needs to be built, including a practicable form of usability/quality control for the applications.

- Actively pursue improvements of establish design guidelines for weather displays used by pilots.
- Place guidance on colorful displays / printouts in a WMO Manual
- Engage in enhancing the appropriate guidance, e.g. ICAO DOC 8896, Handbook of Meteorological Practice, ICAO DOC 10020, EFB Manual
Invest in educating pilots about progress in practical meteorology

Pilots have a limited amount of time during which to perform a prescribed curriculum of continuing education: aircraft systems, procedures, human factors. Met does not have a high priority here, a more active role of meteorologists would be welcome.

- Engage not only ICAO but the regulatory Civil Aviation Authorities to ensure they embed comprehensive Met curricula in their initial training rules and regulations.

- Work towards establish a continuing met education program for pilots within the regulatory framework.
Improve weather information actually provided to pilots in line with growing powers of computing and observation.

Meteorologists provide TAF forecasts, in TAC, traditional alphanumeric code, and information about future weather on SigWx charts. There are no standards for the display of gridded data on cloud development or turbulence to pilots, for instance.

- Conduct research with the goal to improve the situational awareness of pilots by more modern forecasts, forecast display formats
- Research the forecasting of CB, turbulence, the development and movement of all kinds of storms as well as their display in graphical form to pilots
One possible future form of display of volcanic ash - available now:

Source: M. Pavolonis, CIMSS / NOAA
One possible future form of display of precipitation/storms – available now:

Source: http://www.meteoearth.com/
One possible future form of an eFB weather display

Source: IFALPA Vision for the Future of Air Navigation and Weather Information
One possible future form of an eFB weather display – being developed now!

Source: Hong Kong Observatory
One possible future form of an eFB weather display – being developed now!

Source: BCI / NCAR / DLH / VC
One possible future form of display of airport meteorology - available now:

Source: UK Met
One possible future form of a decision support tool - available now:

Source: Aviationweather.gov
One possible future form of showing new MET to pilots - available now:

Source: Aviationweather.gov
Final thoughts

- Met data that a pilot can not see is useless for him.

- Met is more than data – it’s about information, it’s about leveraging years of experience to gain an appreciation of what’s probably going to happen.

- Met is about Mother Nature - and improving safety by accepting that she can be stranger and stronger than we can imagine.
Thank you