

Automatic Speech Recognition

Airbus Aircraft

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AIRBUS

Speech To Text ATC Challenge

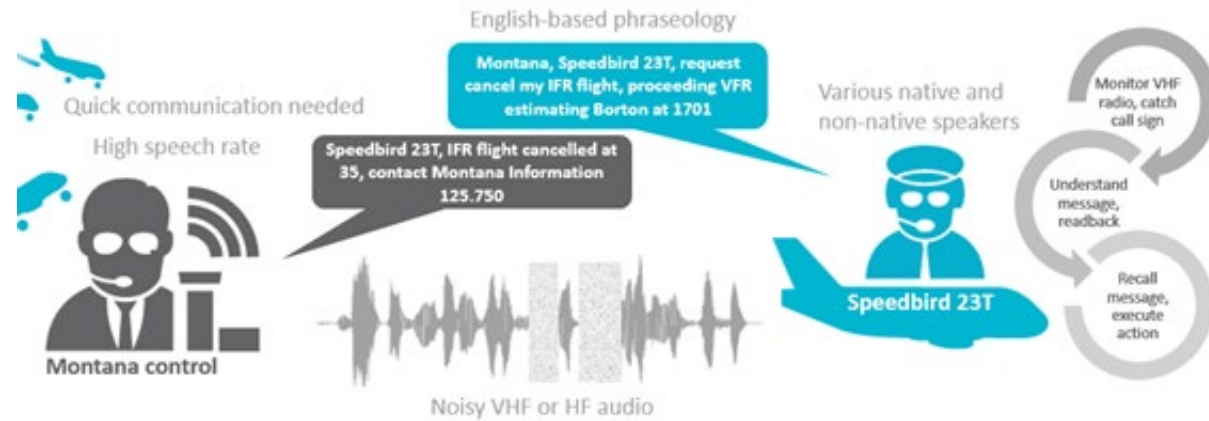
AIRBUS



AIRBUS Challenge organized in 2018 in collaboration with IRIT, ENAC and SAFETY DATA-CFH

to encourage research community to tackle the specific ATC ASR issues:

- accented speech
- bad audio quality
- noisy environment
- high speech rate
- domain-specific language



65 participants (Academics, Tech, Aeronautics,...)

Restitution workshop hosted by our academic partner IRIT

Paper:
<https://arxiv.org/abs/1810.12614>

Accent-robust approach for ATC communications transcription

Accents Study

Theoretical & survey with 1014 pilots covering 38 native languages from 54 different countries.

Experiments with ASR

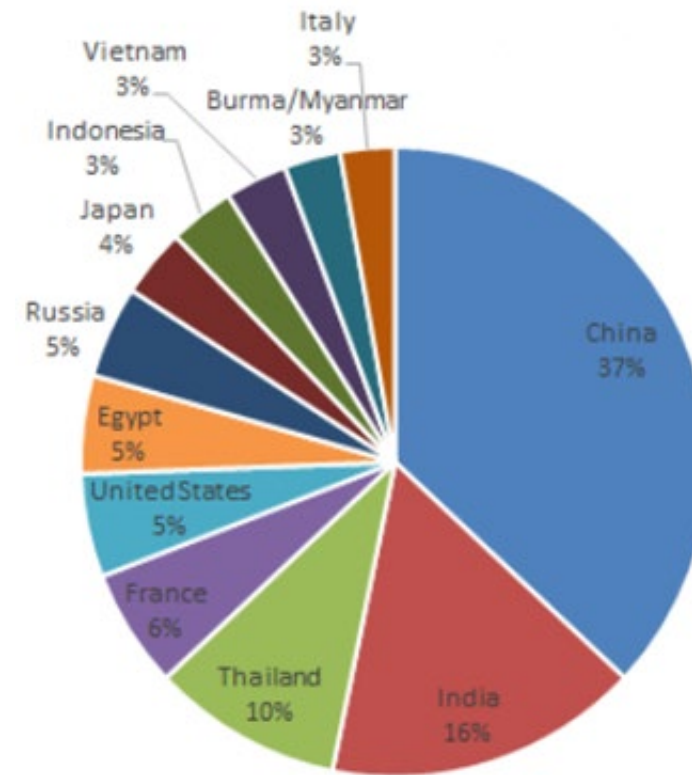
ASR can learn a wide range of accents to mitigate the comprehension issues seen in the study

Paper

https://www.isca-speech.org/archive/pdfs/interpeech_2021/jahchan21_interpeech.pdf

Accent	WER (%)
French	9.33
German	10.58
Spanish	12.62
English	16.95
Chinese	15.55

WER computed by accent - FR-ZH airports ASR engine



Top 12 Problematic Controller Native Languages in Accented English Phraseology

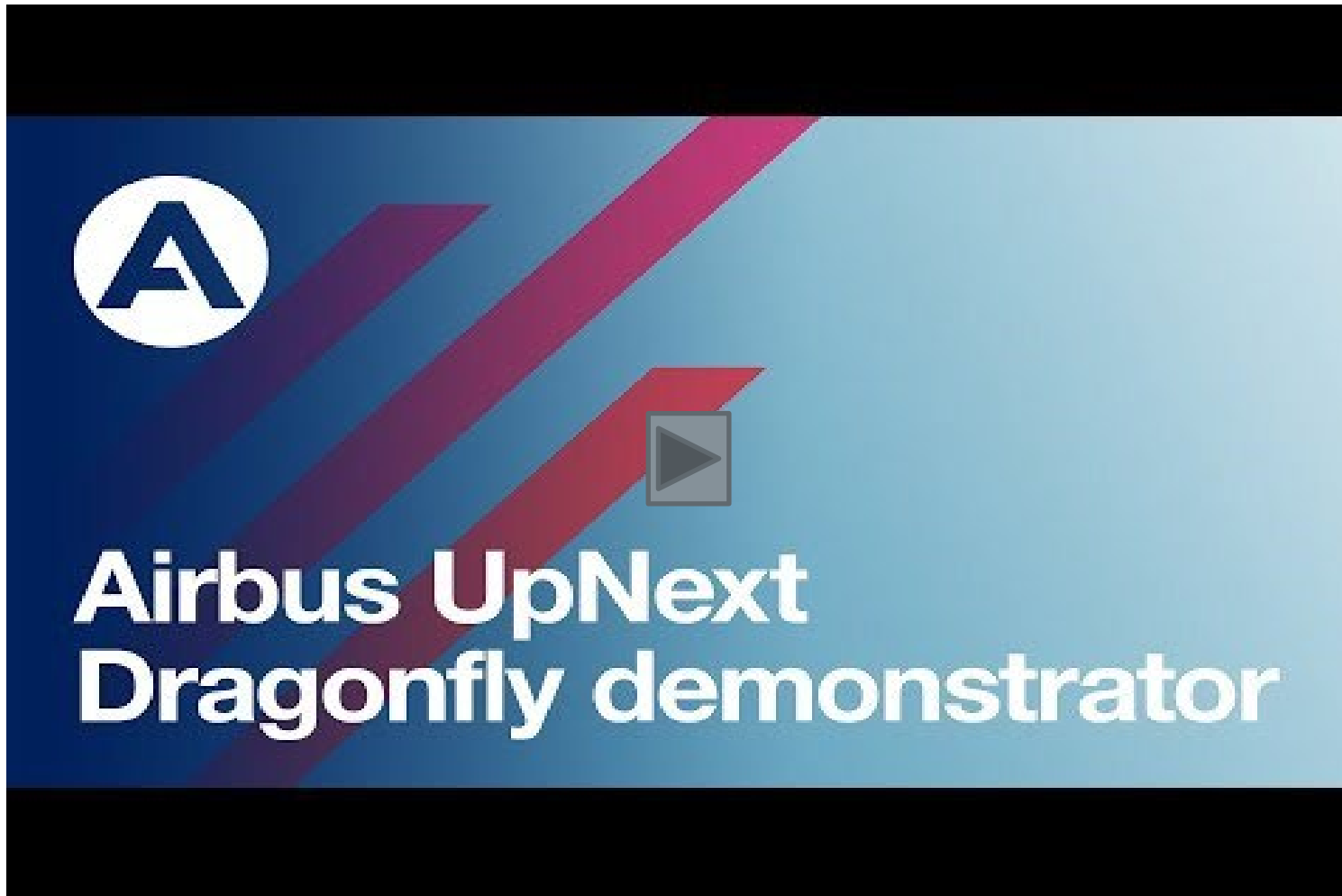
A challenging environment for ASR (Automatic Speech Recognition)

Transcription	FR accent
ASR A (FR)	~7% WER (~90% acceptability)
ASR B (FR & ZH)	~10% WER (~87% acceptability)

Transcription	ZH accent
ASR A (FR)	~50% WER (~5% acceptability)
ASR B (FR & ZH)	~16% WER (~75% acceptability)



Dragonfly Demonstrator

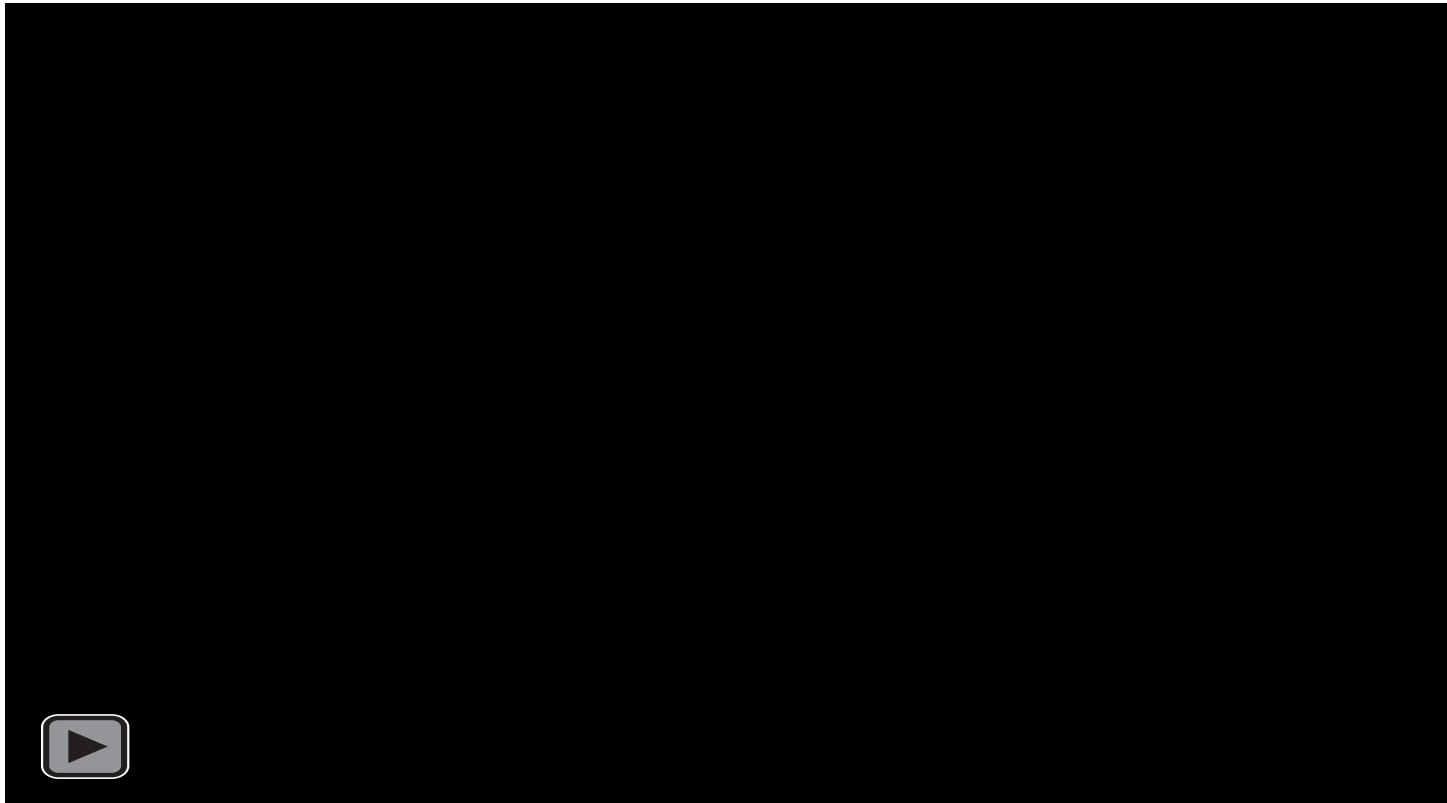


Dragonfly is a large demonstrator

Some topics related to ASR have been tested:

- ATIS voice transcription
- Taxi instructions transcription and trajectory display

Taxi Assistance



Example of ATC clearance transcription to build directly the trajectory on airport charts

Summary

Problem statement to justify having ASR (Automatic Speech Recognition) in a cockpit

Is it well understood the impact in operations of the comprehension issues existing today (e.g. accent, phraseology)?

Data challenge (extract from 2018 paper)

Furthermore, to be successful, the major players in the field should join forces for data collection but also to share the large costs needed to manually transcribe the recordings. Finally, much attention should be paid to legal aspects on data protection and privacy (in Europe, the recent General Data Protection Regulation).

Thank you

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