The ATCOSIM Corpus of Non-Prompted Clean Air Traffic Control Speech

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Abstract

The ATCOSIM Air Traffic Control Simulation Speech corpus is a speech database of air traffic control (ATC) operator speech. It consists of ten hours of speech data, which were recorded during ATC real-time simulations, automatically segmented, and orthographically transcribed. The utterances are in English language and pronounced by ten non-native operational controllers.

1. Speech Corpus for ATC

- **Application Domain**
  - Civil air traffic control (ATC)
  - Radar screen and party-line analogue voice radio
  - One controller responsible for 10-20 aircraft
- **Speech Characteristics**
  - Specific language, phraseology and vocabulary
  - Specific environment and speaking style
  - Frequently non-native speakers
- **Peculiarities and Difficulties**
  - Not free, read or command&control speech
  - Spoken Language Techn. virtually non-existent
  - High reliability requirements
  - Speech recordings difficult to obtain or produce
  - Very few corpora available

2. Existing ATC Related Corpora

	NIST	HIWIRE	nnMATC	NATO N4	VOCALISE	ATCOSIM
Recording Situation						
- Recording content	civil ATCO & PLT	N/A	military ATCO & PLT	naval control	civil ATCO & PLT	**civil ATCO**
- Control position	approach	N/A	military	military	mixed	**en-route**
- Geographic region	USA	N/A	Europe (BE)	Europe & CA	Europe (FR)	**Europe (DE/CH/FR)**
- Speaking style (context)	operational	prompted text	operational	operational	operational	**operational[1]**
Recording Setup						
- Speech bandwidth	narrowband	wideband	mostly narrowband	wideband	unknown	**wideband**
- Transmission channel	radio	none	none / radio	none	none / radio	**none**
- Radio transmission noise	high	none	mixed	none	mixed	**none**
- Acoustical noise	CO & CR	CO (artificial)	CO & CR	CR	CO & CR	**CR**
- Signal source	VHF radio	direct microphone	mixed	direct microphone	unknown	**direct microphone**
Speaker Properties						
- Level of English	mostly native	non-native	mostly non-native	mixed	mixed	**non-native**
- Gender	mixed	mixed	mostly male	mostly male	mixed	**mixed**
- Operational	yes	no (!)	yes	yes	yes	**yes**
- Field of prof. operation	civil	N/A	military	military	civil	**civil**
- Number of speakers	unknown (large)	81	unknown (large)	115	unknown (large)	**10**
Publicly Available	yes	yes (?)	no	yes	no	**yes**

[1] Large-scale real-time simulation • CO: Cockpit • CR: Control Room • ATCO: Controller • PLT: Pilot
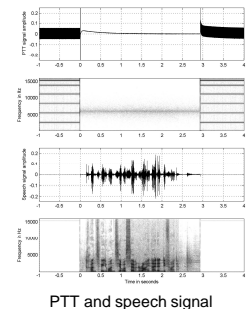
3. ATCOSIM Recording Context

- Operational recordings legally problematic
- EUROCONTROL Experimental Centre, France
- Large-scale ATC real-time simulation for operational concept evaluations with professional controllers

4. The ATCOSIM Corpus

- **Speech Recordings**
  - Close-talk microphone
  - 50 sessions,
    52 h of recordings,
    10 h of speech
  - 10 non-native speakers
    (4 female, 6 male)
  - 10078 utterances
    108883 words

PTT and speech signal

- **Transcriptions** (Examples)

```
aero lloyd five one seven proceed direct to frankfurt
speedway three three five two contact milan one three four five two bye
ah lufthansa five five zero four turn right ten degrees report new
heading
scandinavian six one seven proceed to fribourg fox romeo india
```

```
ind= israeli air force six eight six resume on navigation to tango
good afternoon belgian airforce forty four non ~r ~v ~s ~m identified
[HNOISE] alitalia six four seven four report your heading
[FRAGMENT] hapag lloyd one one two identified
sata nine six zero one is identified <OT> oh it's over now </OT>
aero lloyd [UNKNOWN] charlie papa alfa guten tag radar contact
```

- **Meta Data**
  - Speaker IDs, comments, duration, . . .
  - Supplementary HTML tables
- **Documentation**
  - Corpus manual, transcription guidelines, . . .
  - Validation report (following BAS guidelines)

5. Availability

The corpus is available as electronic download from
`http://www.SPSC.TUGraz.at/ATCOSIM`.