

# Satellite Workshop at Interspeech 2021

## Automatic Speech Recognition in Air Traffic Management (ASR-ATM)

Hon. Prof. Dr. Hartmut Helmke  
German Aerospace Center (DLR)



Knowledge for Tomorrow



# An introductory Experiment

Mister Chairman,

Again thank you very much for the invitation and for the opportunity to present my view – my personal view – of the application of automatic speech recognition in air traffic management domain.

Let's see, if at the end of the day, I am still happy.



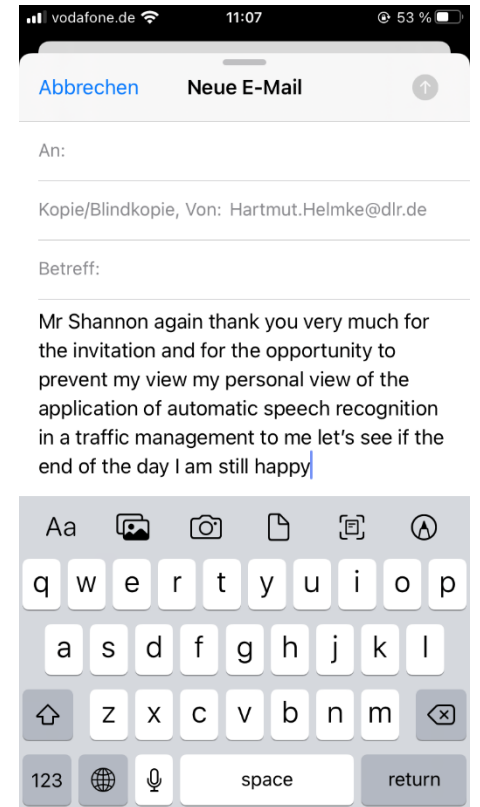
46 words



# The Output of My iPhone, second try

Mr Shannon again thank you very much for the invitation and for the opportunity to prevent my view my personal view of the application of automatic speech recognition in a traffic management to me let's see if the end of the day I am still happy

Mr Shannon again thank you very much for the invitation and for the opportunity to prevent my view my personal view of the application of automatic speech recognition in a traffic management to me let's see if the end of the day I am still happy



## The Output of My iPhone, second try

HHe: Mister Chairman

4 substitutions

lph: Mr Shannon

1 addition

HHe: again thank you very much for the invitation

1 deletion

lph: again thank you very much for the invitation

HHe: and for the opportunity to present my view – my personal view –

lph: and for the opportunity to prevent my view my personal view

HHe: of the application of automatic speech recognition in air traffic management domain

lph: of the application of automatic speech recognition in a traffic management to me

HHe: let's see if at the end of the day I am still happy

lph: let's see if the end of the day I am still happy

Word Error Rate  
WER = 6 / 46 = 13%



## Why not using, Alexa, Google ... in ATM?

lufthansa one alfa one four  
descend flight level eight zero  
reduce two twenty knots  
contact tower one one nine decimal seven bye

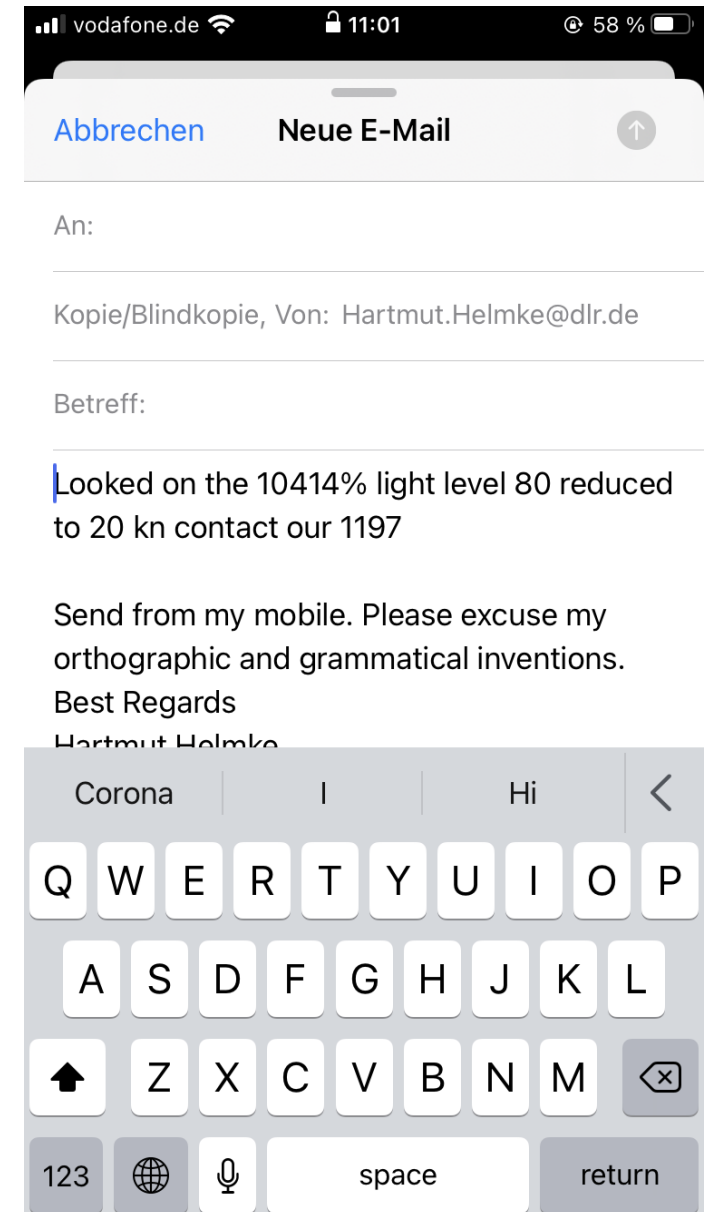


22 words



# Output of my iPphone, First Try

Looked on the 10414  
% light level 80  
reduced to 20 kn  
contact our 1197



## The Output of My iPhone, first try

HHe: lufthansa one alfa one four  
lph: Looked on the 1 0 4 1 4  
HHe: descend flight level eight zero  
lph: % light level 8 0  
HHe: reduce two twenty knots  
lph: reduced to 20 kn  
HHe: contact tower one one nine decimal seven bye  
lph: contact our 1 1 9 7 by

9 substitutions

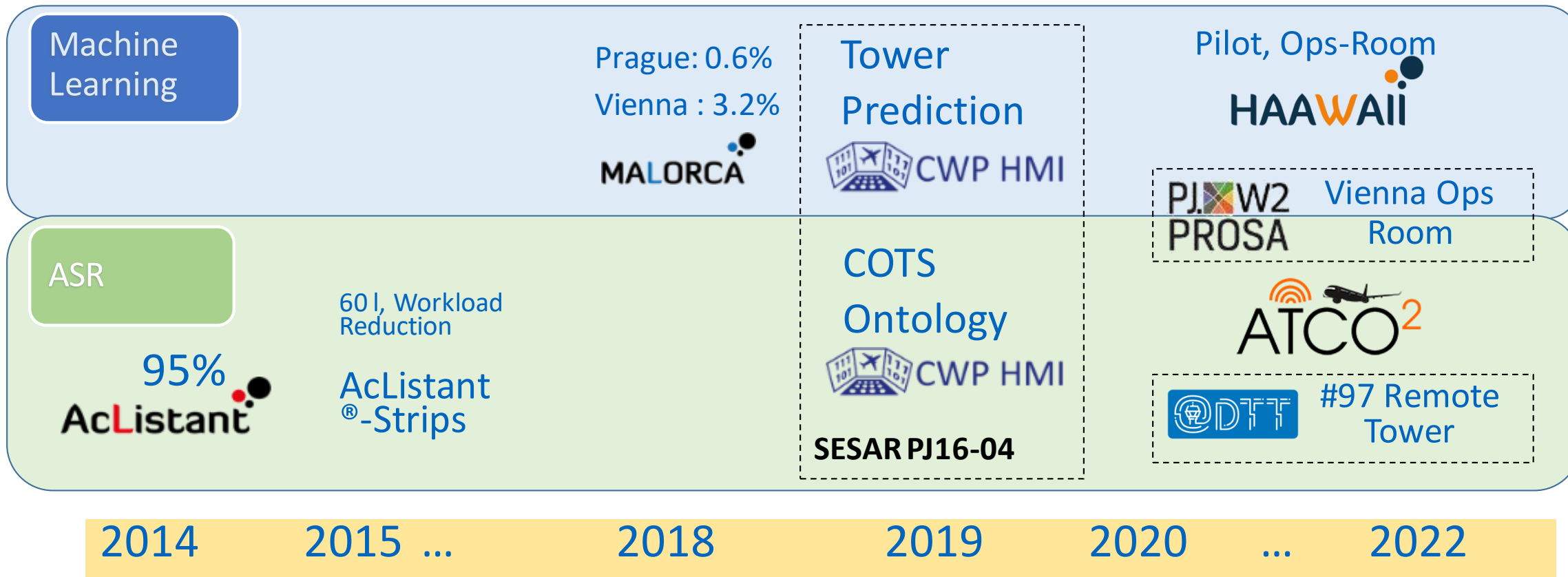
3 addition

1 deletion

Word Error Rate  
WER = 13 / 22 = 59%



# Speech Recognition and Machine Learning Roadmap





# Overview of Today

- 10 min my introductions
- 4 presentations of 15 Minutes (10 minutes for presentation)
  - **Raquel first and then Iuliia on callsign extraction**
  - **Hunter on MITRE's experience in the context of FAA voice data**
  - **Amrutha: Who is speaking: Pilot or Air traffic controller (ATCo)**
- Break
- 4 presentations (15 min resp. 10 minutes)
  - **Fernando on Workload evaluations by utterance analysis**
  - **Petr: ATCO2 project**
  - **Pavel: Honeywell's ASR solutions**
  - **Hartmut: Metrics beyond WER**
- 20-25 minutes for Q&A
  - **Use Chat functionality for questions during presentations**