



The Benefits of Automatic Speech Recognition for Austro Control

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Speech Recognition Projects

- **AcListant (-2015)** Proofing the **workload reduction** for ATCOs
- **Horizon2020 - MALORCA (2016/2018)** Reducing adaption costs by using **machine learning**
- **SESAR2020 PJ.16-04 (2018/2019)** Proof that Speech recognition with **COTS** is not sufficient
- **SESAR2020 PJ.10-W2-96 and PJ.05-W2-97 (2020-2022)**
 - Sol 96 - Proof of ASR in Live Traffic (**OPS-Room Vienna Approach**)
 - Sol 97 - Further development for **TWR units** (DLR)
- **HORIZON2020 - HAAWAII (2020-2022)** **NATS Heathrow Approach and Iceland Oceanic Control**

Speech Recognition ACC – APP – TWR

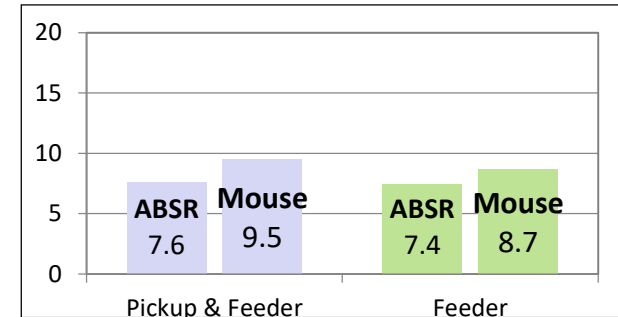


- REDUCES ATCO WORKLOAD
- INCREASES CAPACITY

Speech Recognition – Workload Reduction

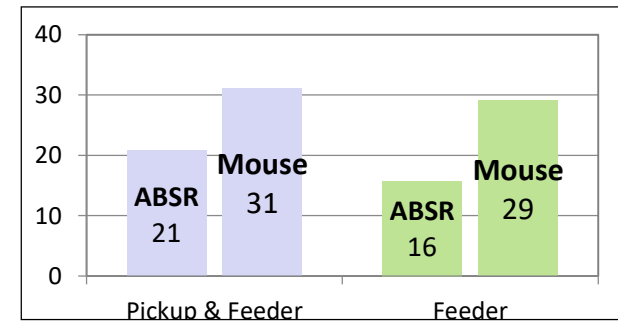
NASA-TLX workload:

- Controllers have **15% - 20% less workload** with ASR support



NASA-TLX mental demand:

- Controllers have **32% - 45% less mental workload** with ASR support



Achievable Speech Recognition Rates

➤ Command Recognition & Command Error Rates

with ATCOs from DFS, ANS-CR and ACG

Trials at
DLR/Germany

	Recognition Rate	Rejection Rate	Error Rate
With ASR	95.2%	4.4%	1.7%

Benefits in operational usage

➤ Airlines

50 to 65 litres savings of kerosene per flight in medium traffic situations (TMA)

➤ Environmental impact

Saving of about 130 kg of CO₂ per flight (TMA)

➤ ANSPs

Significant reduction of ATCO Workload in high density traffic situations

Increases possible working lifetime and capacity of ATCOs

Significant increase of Sector Capacity

➤ Airports

Increase of 1 to 2 landings per hour

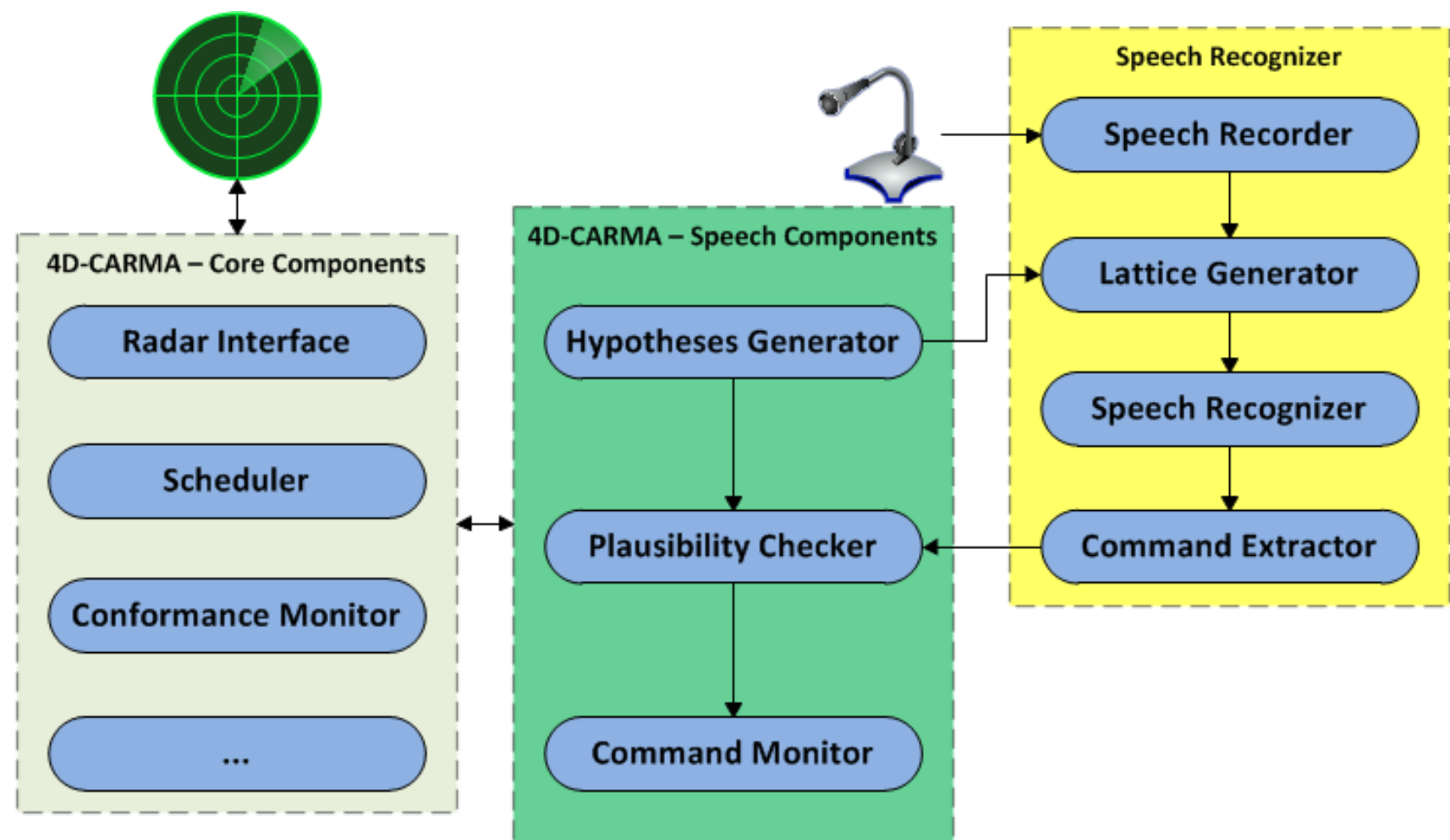
Speech Recognition ATCO Training



Benefits in ATCO training

- **Cost Reduction**
 - (less Simulator-Pilots needed for Basic Training)
- **Increased success rates**
 - (more Training hours at same or less costs)
- **Trainees incentivised to use standard phraseology**

Advanced Speech Recognition



System Integration

- Integration for **ATCO Training**
 - Simple, cost efficient
- ATC - COM System Integration
 - Interface for external Systems **considered in new ACG-VCS**
- ATC - ATM System Integration (e.g. Topsky)
 - Interface for external Systems needed (SWIM?)

ACTUAL SESAR 2020 Speech Recognition Project

- SESAR2020 PJ.10-W2-96 (2020-2023) “Solution 96”
- OPS-Room Integration of Speech Recognition-Test-System
- Proof of ASR in Live Traffic (OPS-Room Vienna Approach)
 - Live Data recording from ATC COM System
 - Speech Recognition Engine with Live Data
 - Proof of applicability in Live-Traffic
- DLR Braunschweig - High Density Traffic Simulation with ASR

Conclusions

Automatic Speech Recognition will have several benefits in Air Traffic Management

- REDUCES ATCO WORKLOAD
 - INCREASES CAPACITY on high density sectors
 - Reduces costs
 - Increases safety (Readback Error detection and mouse error rates)
 - Increases efficiency in ATCO Training
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- **Austro Control will continue development and starting integration of ASR.**



**Thank you very much for
staying online ;-)**

Christian Kern, ACG
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