

Fight or flight ?

How data from voice biosignals brings advantage to crew training.



Today's talk...

- Technology readiness – from lab to market
- Voice biosignals generating training insights
- How does it work? (data science)
- Wrap up (training advantage)

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- Above is an extract of a JSON file output from vSIM dialog of a crew dialog in a LevelD simulator.
- Signal values cannot be reverse engineered into the words spoken by crew, they are prosodic values from speech communication that provide insights into communication, teamwork and workload.



Communication and teamwork is not unique to aviation – medical looks closely to the pilot training for new innovations and methods to keep their teams safe.

WHO ARE WE?



SIMULATOR TRAINING



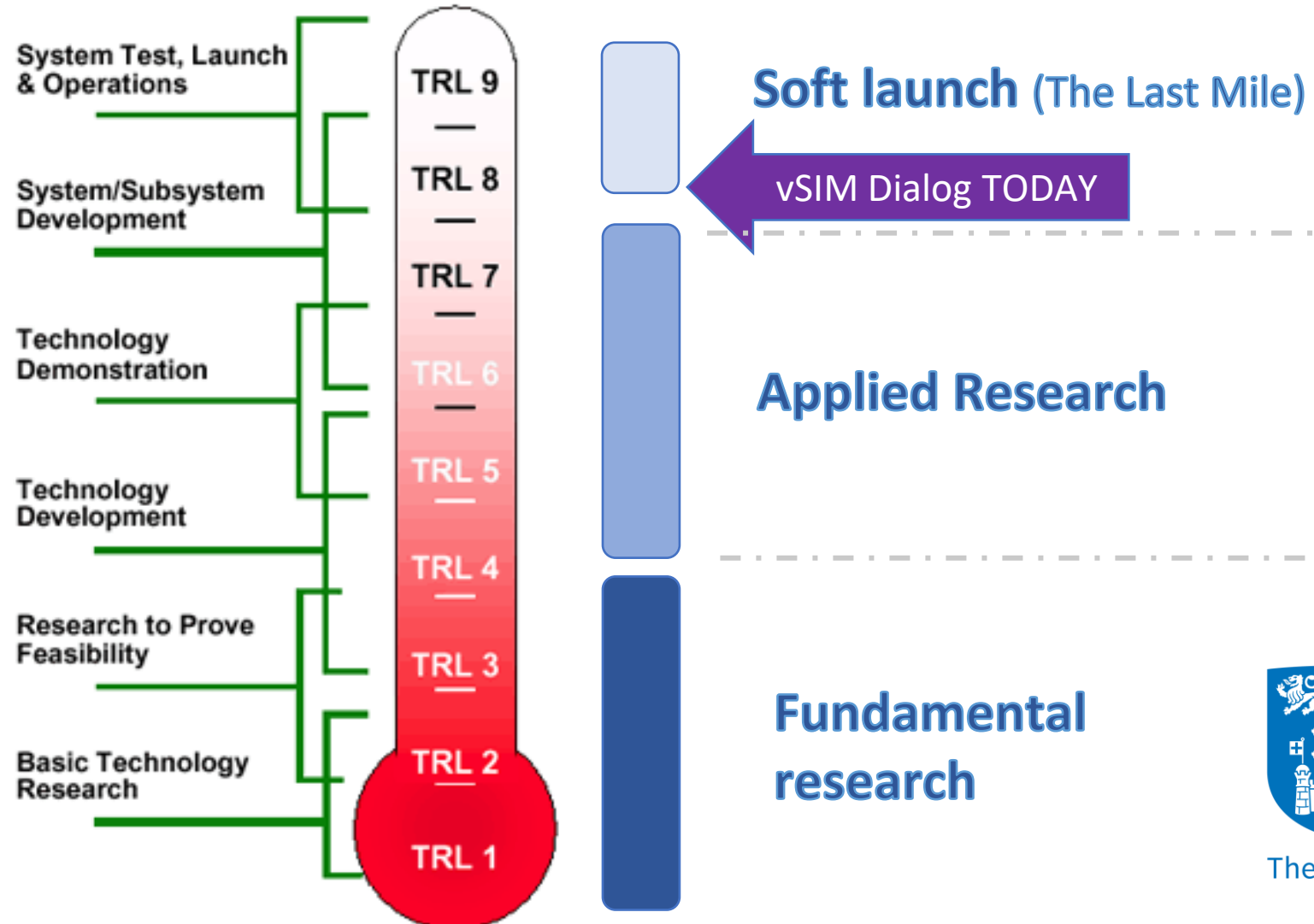
SYNTHETIC TRAINING



EMBEDDED

Voice software company bringing assurance and insights to our customers in simulation, training and *operations*.

TRL - Technology Readiness Levels



Airlines will only determine the true value and efficiencies of new data streams by using them in training.

Method for estimating the maturity of technologies during the acquisition phase of a program, developed at NASA during the 1970s.

APPLIED RESEARCH – IRL 2012



PATHFINDER – UK 2021



- Data capture of pilot speech began in 2012 (ex TCD, Simtech and others)
- The software has matured (vSIM 3.4) and now used in advanced defense synthetic training programs and civil training too.

Social signals – we process them constantly to protect ourselves.

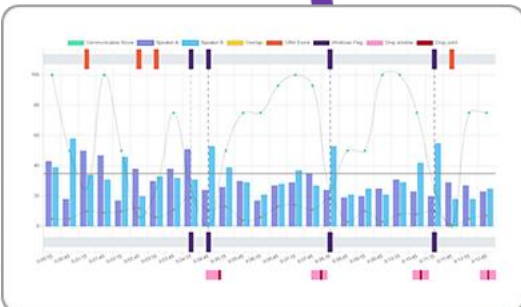


How performance data is generated

On-premise or Azure API



1. Capture crew dialog in SIM



4. Visualize voice biometric data for use in debrief



2. Transfer audio to vSIM Dialog application

Time (s)	SEG. A talking	SEG. B talking	SEG. A+B talking
30	62.5	24.5833	66.6667
90	67.0833	2.91667	70
150	31.6667	20.8333	52.5
210	31.6667	35.4167	67.0833
270	51.25	99.5833	150.833
330	16.6667	84.7667	101.433
390	44.5833	26.6667	71.25
450	29.1667	75	104.167
510	37.5	95	132.5
570	19.1667	92.5	111.667
630	37.9167	97.0833	135
690	40.4167	89.5833	129.917
750	38.3333	95.4167	133.75
810	30	96.6667	126.667
870	39.1667	92.9167	132.083

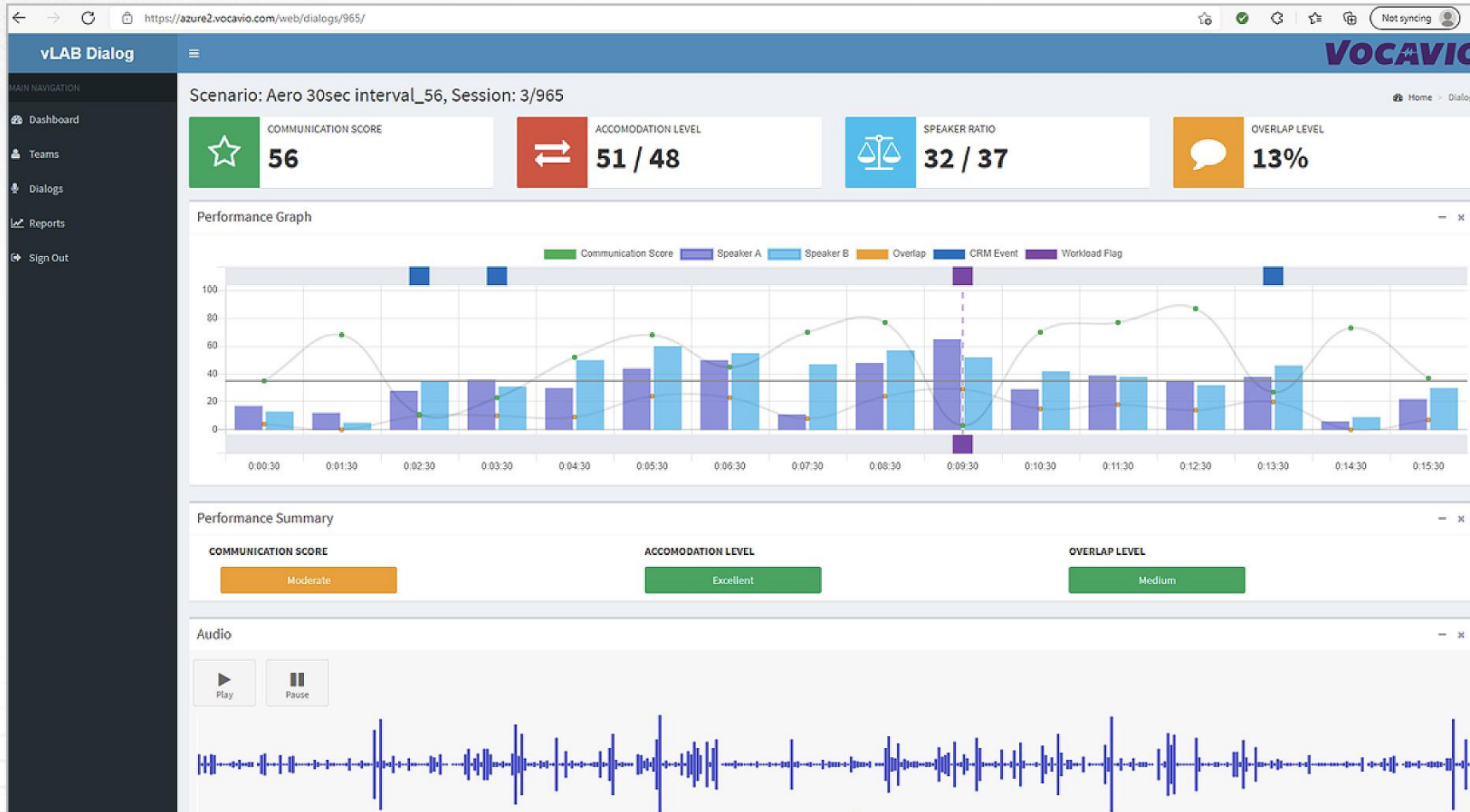
3. Extract and correlate speech signals (export json)

We separate speech communication and speech signals to determine levels of accommodation, energy and interaction.

We generate data relating to communication performance during the task.

We specifically focus on examining accommodation levels in pitch, rhythm, tone and energy.

Performance debrief data (raw outputs from json visualised)



The software is able to extract signal values from crew dialog and generate insights into;

- Communication performance
- Teamwork (hierarchy/balance)
- Effort levels
- Speaking levels
- Engagement levels
- Workload events.



- Remote multi-crew VR training tool that presents a non-native challenge.
- Competencies required; communication, teamwork, situational awareness, decision making, workload mgt.
- On completion of the task, voice data signals and ingame data are automatically blended to provide a range of behavioral insights (Composite score for CRM skills)
- Device: Oculus quest II

- With the closure of some collective training centers – funding was secured to innovate around remote training.
- Cloud based solution to advance non-technical skills of personnel from armed forces.



See TeamDX loadmaster in action for defense personnel training.

Click video link below:

<https://vimeo.com/509988171>

THANK YOU!

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VOCAVIO
communication dynamics

Voice analytics to enhance pilot training and operations

vLAB

Webtool or Matlab tool for your research phase



vConnect

Synthetic radio comms analytics for complex collective training



vSIM

Multi-crew voice analysis for simulator or VR based training.



TeamDX

The team analytics asset for VR



vEDGE

Multi-crew voice analytics for connected aircraft (FDM 2.0)



Vocavio software to augment existing instructor led training is ready to deliver new CRM insights and validate competencies of skilled and resilience civil aviation pilots.