

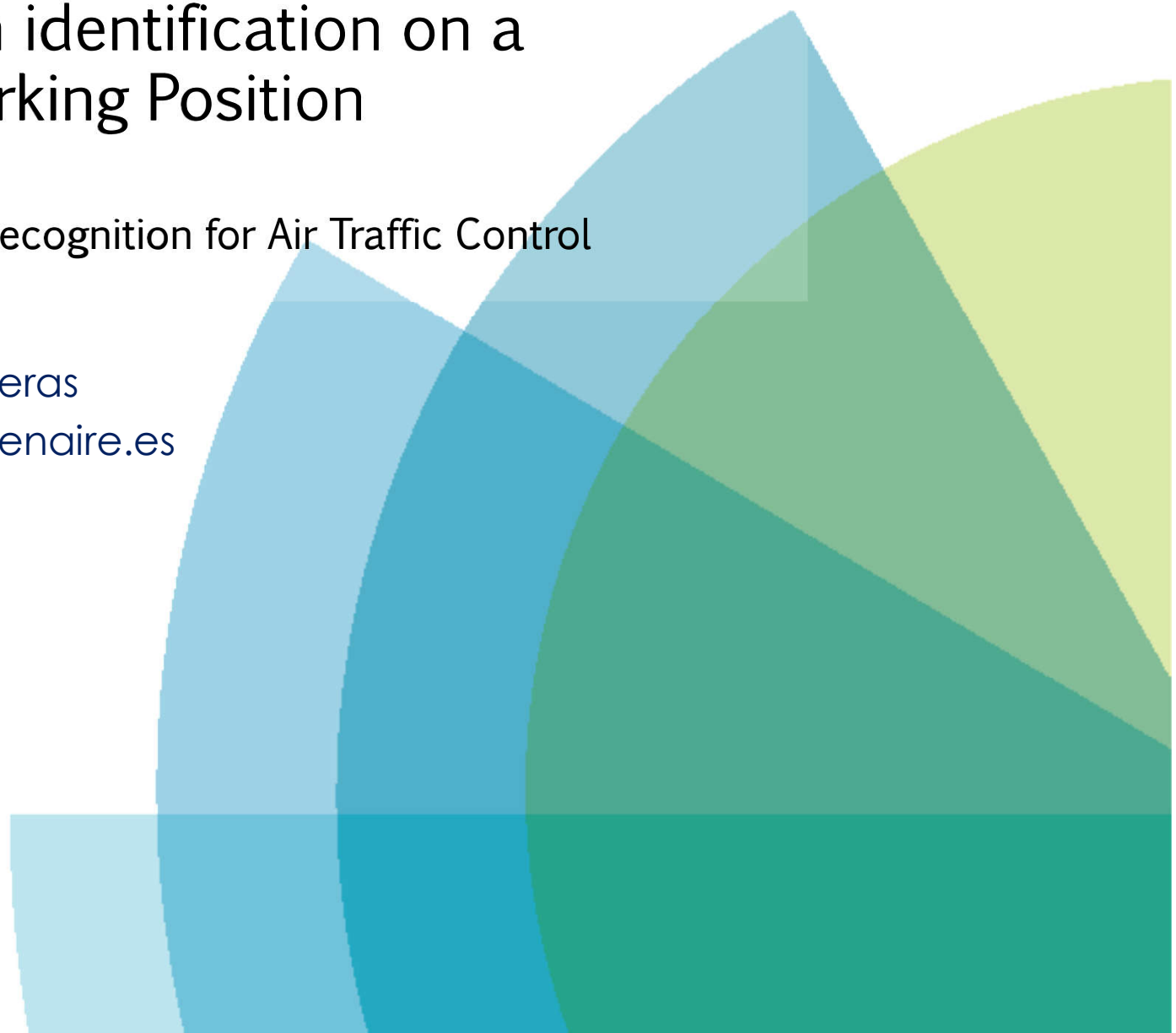
Flight call sign identification on a Controller Working Position

Automated Speech Recognition for Air Traffic Control

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Interspeech 2021 ASR/ ATM satellite workshop
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Raquel Garcia Lasheras

- Aeronautical Engineer Diploma, Air Navigation and Transport major
- Has worked at Indra as aeronautical engineer and Isdefe as system engineer
- Since 2010 she is a research engineer at CRIDA
- Has participated in several National and European research projects such as:
 - Episode 3
 - iFLy
 - ADAHR
 - SESAR Definition phase, SESAR 1, SESAR 2020 and now SESAR wave 2 and 3
- Has lead CRIDA's Speech recognition project since 2016 and coordinated its contribution to:
 - SESAR PJ16.04 CWP HMI Controller Working Position/Human Machine Interface.
 - SESAR PJ10-W2 – S96 HMI interaction for ATC modes- ASR.
 - ENAIRe's internal exploitation projects



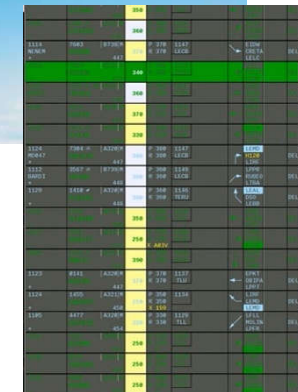
Flight callsign recognition



- **ATCOs** communications:
 - Low degree of noise
 - English or local language
 - Similar accents
 - Women and Men speakers
 - Standard: Call id + command + qualifiers



Iberia one two Alfa Tango descend flight level two five zero



Call Sign	Destination	Altitude	Speed	Direction	Status
IBE12AT	ALFA TANGO	2500	1200	180	DESCENDING
IBL1234	BRAVO	3000	1500	090	CLIMBING
IBL5678	CHARLIE	2800	1400	270	LEVEL
IBL9012	DELTA	3200	1600	090	CLIMBING
IBL3456	ECHO	2600	1300	270	LEVEL
IBL7890	FOXTROT	3100	1550	090	CLIMBING
IBL1122	GOLF	2900	1450	270	LEVEL
IBL4455	HOTEL	3300	1650	090	CLIMBING
IBL6677	INDIA	2700	1350	270	LEVEL
IBL8899	JULIETT	3400	1700	090	CLIMBING

- **Flight Crew** communications:
 - SNR from 10dB to -5dB
 - English or local language
 - Very different accents
 - Women and Men speakers
 - Standard: Call id + command + qualifiers

Command + qualifiers + Call id

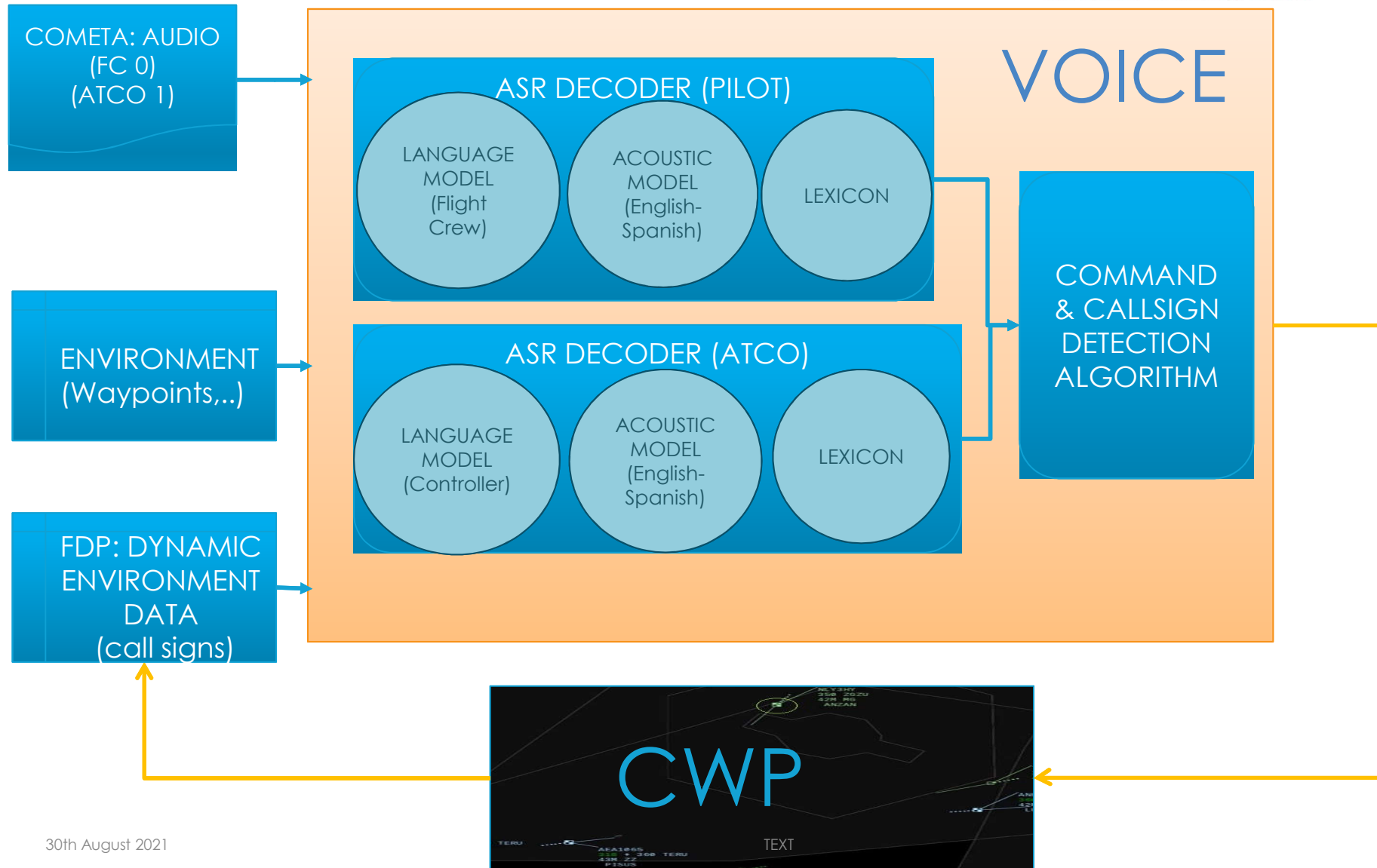


Basic Voice Recognition System (VRS) engine **requirements**:

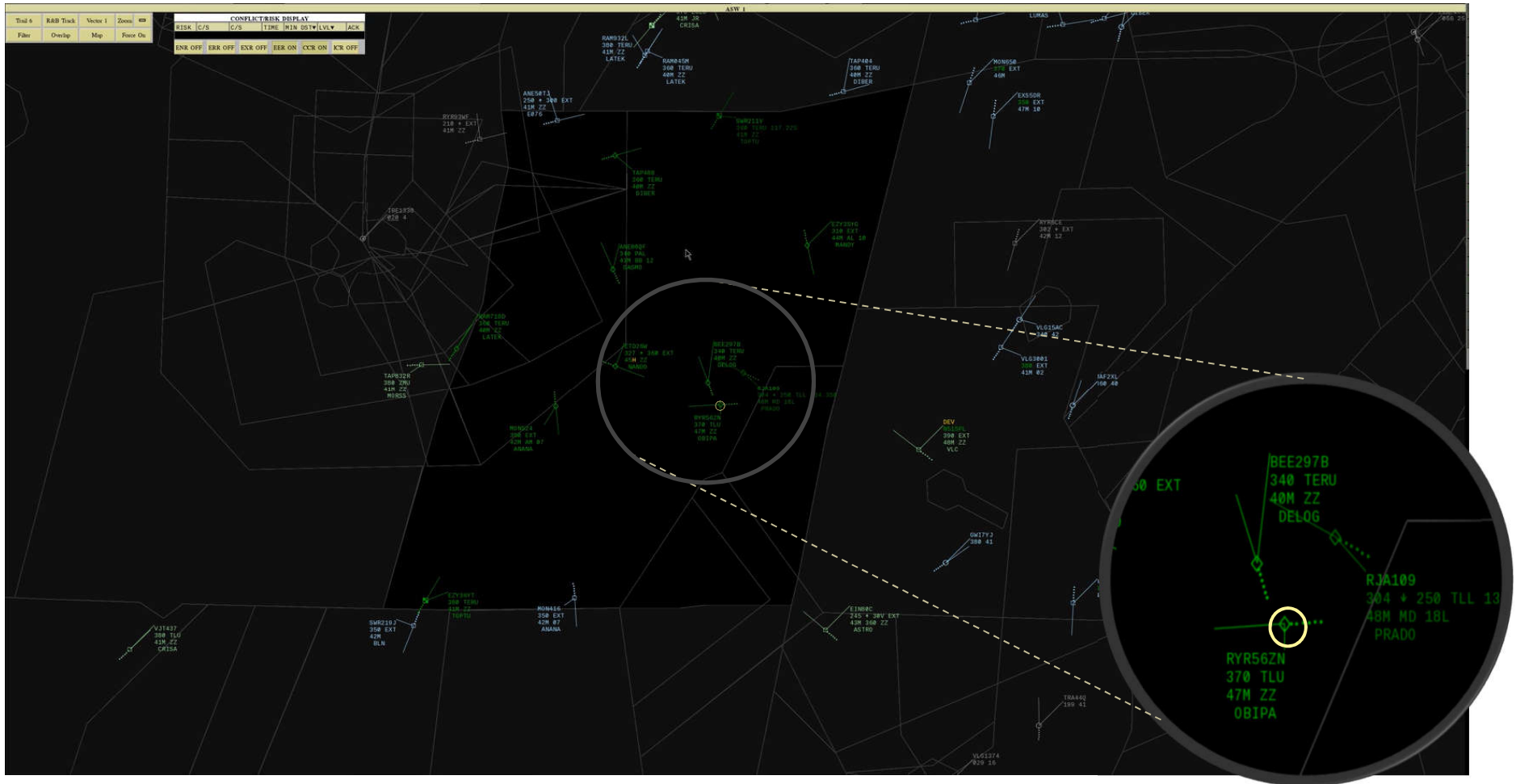
- VRS must be **autonomous**;
- Call sign must be identified **asap**;
- Able to process **English and local** language;
- Wrong call sign illumination must be **minimised**.



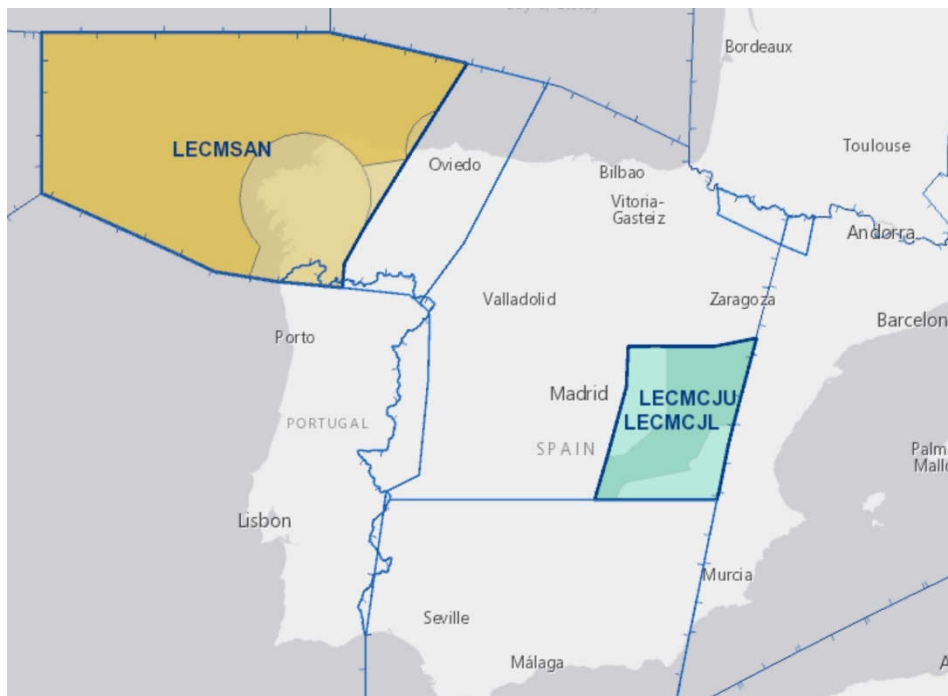
VSR architecture



Callsign identification



Technical Dry Run



	Controller utterances	Flight Crew utterances	Flight crew first call
Call signs in utterances	143	158	65
Detected callsign	125	77	38
FaFalse positive	0	0	0
Total	87,4%	48,7%	58,5%

	Streaming	WCR	WER
Controller		90,26	10,14
Flight Crew		79,19	25,32