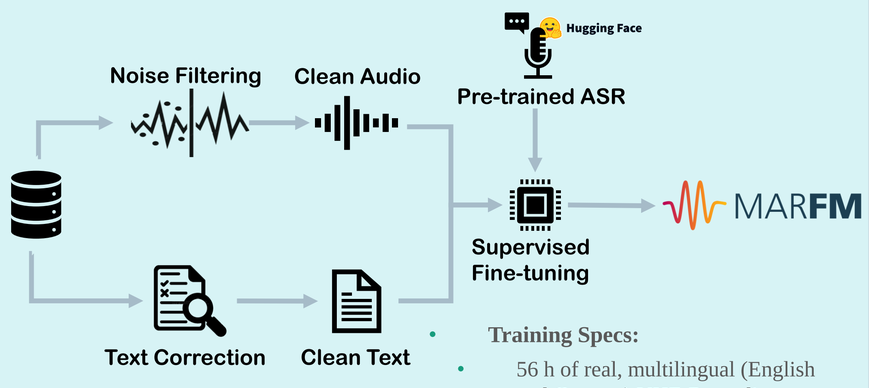
# marFM®, A Multilingual Automatic Speech Recognizer (ASR) for VHF-Radio Communication

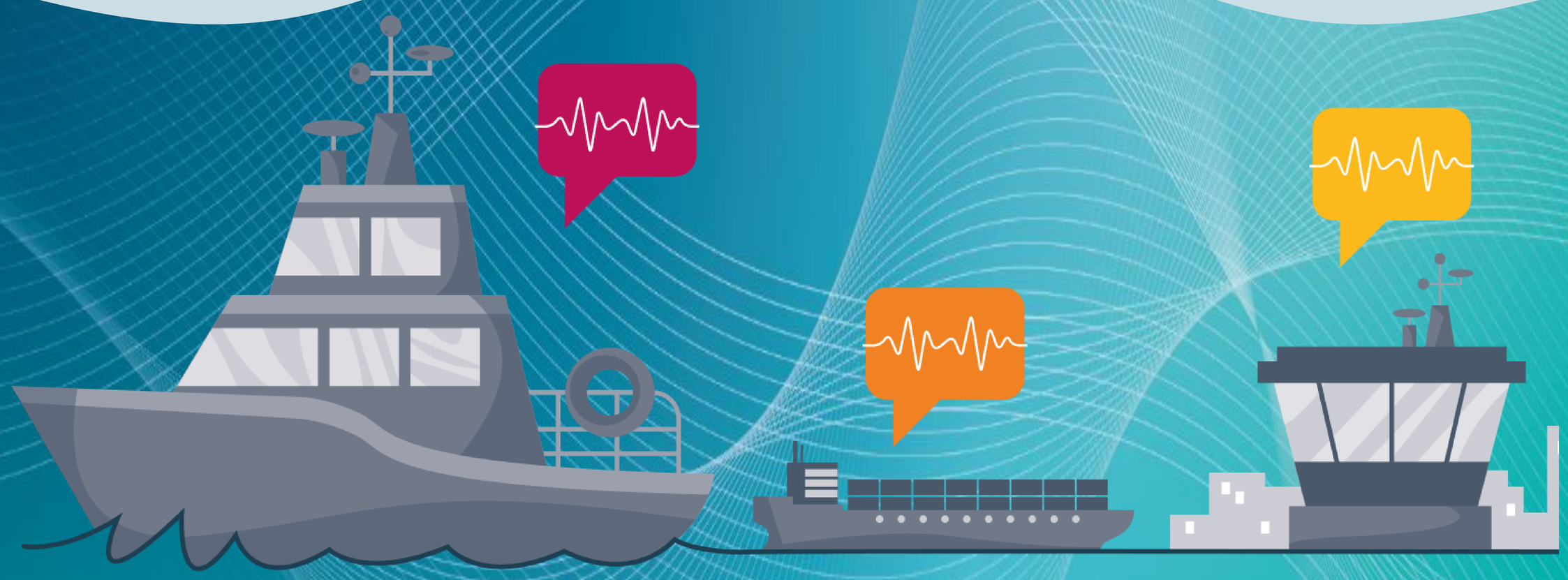
## Introduction

VHF communication has established itself as a useful instrument throughout decades and became a part of the mandatory equipment on board. However, obstacles such as background noise, noise on board, volatile signal quality due to weather conditions and antenna height, SMCP, crew's lack of knowledge in English as well as various accents and dialects on board make the radio communication difficult and can cause possible miscommunication problems which can lead to highly dangerous scenarios. To that end, we developed marFM®, a multilingual automatic speech recognizer (ASR) for maritime radio communication that automatically converts received VHF radio signals into text. To evaluate its transcription performance regarding marine radio, we have conducted a comparative performance analysis between marFM® and multiple state-of-the-art, open-source ASR architectures.

## Development Stage - marFM®




- **Training Specs:**
  - 56 h of real, multilingual (English and German) VHF-Recording
  - A single GPU training (Nvidia RTX A6000) - 34 h

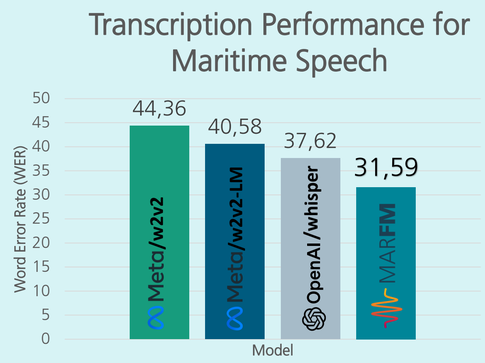


## Experimental Setup

- Comparative performance analysis among:
  - Wav2Vec2-XLSR-53 German
  - Wav2Vec2-XLSR-53 German with a language model
  - Whisper large-v2 model,
  - marFM®
- Testing Dataset:
  - 6 hours of real, multilingual (English and German) VHF-Radio recording

## Results & Discussion

In this study, we introduced marFM® a multilingual automatic speech recognizer for maritime communications. We also showcased its superior performance on the multilingual transcription task for VHF radio calls in comparison with the other state-of-the-art, open-source and readily available ASR models.




$$WER = \frac{S + D + I}{N}$$

S: number of substitutions
D: number of deletions
I: number of insertions
N: total number of words in the reference

## Results & Discussion

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