LRAC[2025]

IEEE Signal Processing Society

Call for Participation

2025 Low-Resource Audio Codec (LRAC) Challenge

We invite you to participate in the Low-Resource Audio Codec (LRAC) Challenge, an exciting opportunity to advance the state-of-the-art in neural audio coding for resource-constrained devices. The first edition of the challenge will focus specifically on **low-resource neural speech codecs** designed to operate under everyday noise and reverberation conditions, while meeting strict constraints on computational complexity, latency, and bitrate.

Overview

The growing demand for **speech interfaces** across a wide range of **resource-constrained** environments—including embedded systems, mobile devices, and general-purpose computing platforms with limited processing or power budgets— requires **speech codecs** for **real-time communication** that are efficient in terms of **compute**, **bitrate**, and **latency**, while also delivering **high-quality speech** under **real-world conditions**. Although recent neural coding methods excel at optimizing for these constraints individually, addressing all three simultaneously remains an open challenge.

The first edition of the LRAC Challenge is aimed at reducing this gap and advancing the state-of-the-art by fostering research on neural speech codecs under joint resource constraints, including in **realistic noise** and **reverberation**. The current edition will also explore the combination of speech enhancement and coding, provide datasets for **crowdsourced evaluation** to support comparable and reproducible research, and share insights into the effectiveness of **objective metrics** across real-world conditions.

The outcomes will be disseminated through an **ICASSP 2026 Satellite Workshop** and via related publications.

The challenge comprises **two tracks**:

Track 1 – Transparency Codecs

Development of **low-complexity**, **low-latency** and **low-bitrate speech codecs** designed to preserve the **perceptual transparency** of input speech, including under mild noise and reverberation conditions.

Goal: Minimize perceptual speech degradation introduced by speech codecs while meeting the complexity, latency and bitrate constraints (*refer to the "Rules at a glance" section*).

Focus Areas:
- Performance in clean conditions
- Robustness to mild real-world distortions, e.g., background noise, reverberation

Track 2 – Speech Enhancement Codecs

Development of **low-complexity**, **low-latency** and **low-bitrate enhancement codecs**, i.e., those that in addition to **coding** and **compression** perform **denoising** and **dereverberation**, including under challenging acoustic conditions.

Goal: Enable transmission of intelligible and natural-sounding speech including under challenging acoustic conditions while meeting the complexity, latency and bitrate constraints (*refer to the "Rules at a glance" section*).

Focus Areas:
- Transparency in clean conditions
- Robustness to everyday distortions
- Denoising performance under additive noise
- Dereverberation performance under reverberant conditions

We welcome **end-to-end approaches**, as well as **modular pipelines**, e.g., codecs with enhancement front-ends.

Evaluation

Participants will apply their system's inference to open and withheld test sets and submit the processed stimuli for evaluation. Both objective metrics and crowdsourced subjective tests will be used to evaluate the performance of the neural speech codec submissions.

Objective metrics will be provided **during the development and final phases** as a guide only.

Final submissions of the **blind test set will be ranked solely based on subjective scores**, with a focus on transparency, intelligibility, and noise/reverb robustness.

A **crowdsourced listening test battery** will be used to assess:
- **Quality of clean speech** (MUSHRA-style evaluation, one system at a time)
- Track 1: **degradation in real-world conditions** (DMOS)
- Track 2: **quality of enhanced speech** (MOS)
- **Speech intelligibility** (DRT)

For further evaluation details see the challenge website: https://lrac.short.gy/evaluation

Rules *at a glance**

- Proposed systems must operate under **strict constraints** outlined below:
  - Sampling rate: **24 kHz** input and output audio rate
  - Compute complexity
    - Total complexity must be equal or lower than **700 MFLOPS for Track 1** systems and **2600 MFLOPS for Track 2** systems.
    - The receive-side complexity must be equal or lower than **300 MFLOPS for Track 1** systems and **600 MFLOPS for Track 2** systems.
  - Latency constraints
    - The total (algorithmic + buffering) latency must be equal or lower than **30 ms for Track 1** systems and **50 ms for Track 2** systems.
  - Bitrate constraints
    - **Constant bitrate systems only** are permitted. No variable or adaptive bitrate coding or entropy coding optimization is allowed.
    - Systems must support the following bitrate modes: **ultralow bitrate mode (<=1 kbps)** and **low bitrate mode (<=6 kbps)**.
    - Systems submitted to either track must support both bitrate modes within one system.
- Training data requirements
  - Training, validation, and hyperparameter tuning must be performed strictly on the designated challenge speech and noise datasets listed on the challenge website: https://lrac.short.gy/datasets
- The entry submission instructions will be provided to the participants post registration.

** For the full set of challenge rules and terms and conditions, please refer to the Official Rules: https://lrac.short.gy/rules*

Important Dates

Date	Event
Jul 10 – Sep 9, 2025	Registration open
Jul 30, 2025	ICASSP 2026 Satellite Workshop proposal acceptance notifications
Aug 1 – Sep 30, 2025	Challenge runs
Sep 30, 2025	Release of withheld test stimuli to participants
Oct 1, 2025	Submission deadline for processed test stimuli
Oct 1, 2025	Submission deadline for 2-page system report *(mandatory)*
Oct 14, 2025	Notification of final results
Oct 22, 2025	Submission deadline for 4-page peer-reviewed Workshop paper for ICASSPW proceedings (*mandatory for students applying for travel support grants, otherwise optional*)
May 4, 2026	Full-day ICASSP 2026 Satellite Workshop

Student Travel Grants

The **IEEE SPS Challenge Program** is generously sponsoring three travel grants up to $1,500 USD to support student participation in the LRAC Challenge, providing an opportunity for students to collaborate, engage, and showcase their contributions. Further details have been announced on the challenge website: https://lrac.short.gy/grants

Organizers

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Co-Organizers & Academic Partners

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Website

Visit: https://lrac.short.gy/challenge for full challenge details, including timeline, rules and terms, training datasets, baseline system, evaluation, and participation information.

Get Involved

Whether you're building practical speech codecs, researching novel neural architectures, or exploring data-efficient enhancement methods — **we invite you to participate in the LRAC Challenge** and help shape the next generation of low-resource communication systems.

Visit: https://lrac.short.gy/participate for more information regarding participation.

You can also reach out to the organizers via: lrac-challenge@cisco.com with questions and requests, including to join the LRAC Challenge Slack channel.