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## Acoustics — Soundscape —

### Part 1: Definition and conceptual framework

*Acoustique — Paysage sonore —*

*Partie 1: Définition et cadre conceptuel*

ICS 17.140.01

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## Foreword

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The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 12913-1 was prepared by Technical Committee ISO/TC 43, *Acoustics*, Subcommittee SC 1, *Noise*.

ISO 12913 consists of the following parts, under the general title *Acoustics — Soundscape*:

— *Part 1: Definition and conceptual framework*

The following part is under preparation:

— *Part 2: Minimum reporting requirements*

## Introduction

Soundscape studies have a rich tradition [1], [2], [3], [4], [5]. Because the field has evolved differently around the world, as well as across disciplines, there is a diversity of opinions about its definition and aims. Consequently, the use of the term 'soundscape' has become idiosyncratic and ambiguous [6].

This International Standard aims to enable a broad international consensus on the definition of 'soundscape', to provide a foundation for communication across disciplines and professions with an interest in soundscape.

The standard is based on the notion that 'soundscape' is the acoustic analogy to 'landscape' [7]. Soundscape can be understood as a perceptual construct, related to a physical phenomenon. The standard distinguishes the perceptual construct (soundscape) from the physical phenomenon (acoustic environment), and clarifies that soundscape exists through human perception of the acoustic environment.

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# Acoustics — Soundscape — Part 1: Definition and conceptual framework

## 1 Scope

This International Standard provides a definition and a conceptual framework of soundscape. It explains factors relevant for measurement and reporting in soundscape studies, as well as for planning, design and management of soundscape.

## 2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 2.1

#### **soundscape**

acoustic environment as perceived or experienced and/or understood by people, in context

### 2.2

#### **acoustic environment**

sound from all sound sources as modified by the environment

Note 1 to entry: Acoustic environment can be actual or simulated, outdoor or indoor, as experienced or in memory.

## 3 Conceptual framework of soundscape

### 3.1 General

Figure 1 presents a conceptual framework of soundscape, which describes the process of perceiving or experiencing and/or understanding an acoustic environment, highlighting seven general concepts and their relationships: (1) context, (2) sound sources, (3) acoustic environment, (4) auditory sensation, (5) interpretation of auditory sensation, (6) responses, and (7) outcomes [6], [8], [9], [10].

NOTE Figure 1 illustrates that soundscape is people's perceptions or experiences and/or understanding of an acoustic environment. However, practical applications will tend to emphasize management or change in sound sources and the acoustic environment. The principle is that measurement, assessment or evaluation of soundscape, in accordance with this international standard, is through human perception of the acoustic environment.

### 3.2 Context

The context includes the interrelationships between person and activity and place, in space and time [6], [10], [11]. The context may influence soundscape through (1) the auditory sensation, (2) the interpretation of auditory sensation, and (3) the responses to the acoustic environment:

- 1) Examples of factors that may influence auditory sensation, besides the acoustic environment, include meteorological conditions (which vary by the season), hearing impairments and hearing aids;

- 2) Examples of factors that may influence the interpretation of auditory sensation include attitude to the sound source and to the producer of the sound, experience and expectations (including cultural background, intentions or reason for being at a place), as well as other sensory factors, like visual impression and odour;
- 3) Examples of factors that may influence the responses to an acoustic environment include time of day, lighting and weather; emotional state, psychological and physiological resources to deal with the situation, perceived ability to control one's exposure to sounds, as well as personal activities and those of others.

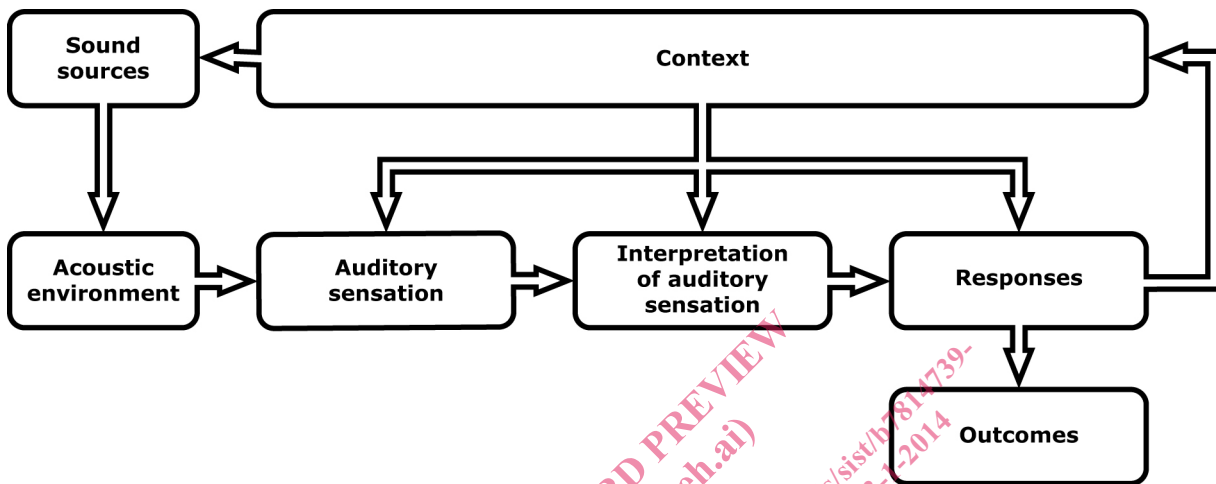


Figure 1 — Conceptual framework of soundscape

### 3.3 Sound sources

Soundscape originates in sound sources (e.g., road traffic, chirping birds, voices, footsteps, etc.) and their distribution in space and time.

### 3.4 Acoustic environment

As given in Definition 2.2 the acoustic environment is the sound from all sound sources as modified by the environment. Modification by the environment includes effects on sound propagation, resulting from meteorological conditions, absorption, diffraction, and so forth, and other effects such as reverberation and reflection [11].

### 3.5 Auditory sensation

Auditory sensation is a function of neurological processes that begin when auditory stimuli reach the receptors of the ear. This is the first stage in detecting and representing the acoustic environment.

The paths from the ears to the brain are separate, and the sound – created in the auditory cortex – is a mix of the two neural signals. Consequently, binaural hearing is influenced by masking, spectral contents, temporal patterns and spatial distribution of the sound sources (cf. psychoacoustics [12], [13]).

### 3.6 Interpretation of auditory sensation

Interpretation of auditory sensation (auditory perception) refers to unconscious and conscious processing of the auditory signal to create useful information, which may lead to awareness or understanding of the acoustic environment. Awareness of the acoustic environment, in context, represents an experience of the acoustic environment.

NOTE An example of unconscious auditory perception is how sounds are processed during sleep.



### 3.7 Responses

Responses include short-term reaction and emotion, as well as behaviour, which may change the context.

**EXAMPLE** Person A sitting by a fountain in an urban park may respond with emotions of joy and relief because the fountain masks the surrounding road-traffic noise. As a result, Person A may choose to stay longer. Person B passing by the fountain on a walk through the park may respond with emotions of annoyance, and choose to leave immediately.

### 3.8 Outcomes

Outcomes are an overall, long-term consequence, and include attitudes (i.e., beliefs, judgments and habits).

**EXAMPLE** Person A (in the example of 3.7) may decide to return to the park the next weekend or “frequently”. Person B (in the example of 3.7) may decide to never return.

In addition to attitudes, outcomes include visitor/user experiences in the form of activities (e.g., conversation or sleep without interference from intrusive or unwanted sounds), actions (e.g., nature appreciation), and mental states (e.g., psychological restoration) that the acoustic environment facilitates or enables. Outcomes also include health, well-being and quality of life for people, as well as reduced social costs for society.

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