
**Language resource management —
Controlled human communication
(CHC) —**

**Part 3:
Basic principles and methodology
for controlled oral communication
(COraCom)**

*Gestion des ressources linguistiques — Communication humaine
contrôlée (CHC) —*

*Partie 3: Principes de base et méthodologie de la communication
orale contrôlée (COraCom)*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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A list of all parts in the ISO 24620 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

No human is expected to master and speak several languages with the same level of competence as their own mother tongues. Faced with rapidly increasing multilingual situations, misunderstandings and confusion arise in daily communications, very often causing accidents and casualties. Industry and other business sectors, as well as different domains dealing with safety critical applications such as emergency services (police, fire, ambulance, maritime, etc.) require a precise and concise language to supplement the common use of natural human languages. Uncontrolled, these languages would allow non-parallel and non-comparable grammatical constructions, possessing inherent semantic ambiguities of variously phonetic, phonological, morphological, lexical or syntactic types.

Human communication is primarily oral, making use of the spoken medium of language.

Oral communication between native speakers, or non-native speakers, or a native speaker and a non-native speaker, can be disturbed due to different phenomena such as phoneme confusion and the resulting ambiguities due, for example, to multilingual communication or stressful situations. For an early study focussing on perceptual confusion among some consonants, see Reference [11]; for a more recent study concerning sources of variability in consonant perception, see Reference [12]. For a study and system on interferences in the domain of aeronautics and others, see References [6] and [7].

However, whatever the disturbance, the impaired communication results in confusion between distinctive phonetic features, phonemes and words including the problem of co-articulation (see Reference [24]). For early studies in the domain where phoneme confusion and interferences, and archiphonemes (see Reference [25]), norms, variants and common properties of all variants, distribution of variants as a norm, as well as distinctive features of a phoneme, are presented and detailed, see References [13], [14] and [15].

This document deals with confusion and variable pronunciation or interpretation of distinctive phonetic features (including accents, stresses, and tones or lengths) and phonemes, but also homophones, homographs, and quasi-homophones and quasi-homographs.

The basic acoustic processes involved in speech production are the generation of sound sources and the filtering of these sources by the vocal tract. The sources are generated by the modulation of airflow through narrow constrictions produced at the larynx or in the vocal tract above the larynx, airflow that is usually the result of action of the respiratory system. The filtering of the sources is controlled by manipulating the shape of the vocal tract airway above the larynx, including the opening between the oral portion of the vocal tract and the nasal cavity. The acoustic properties of the sources and of the filtering of these sources can be varied by manipulating a number of different articulatory parameters relating to the laryngeal configuration, the positions and shapes of the lips, the tongue blade, the tongue body and other structures, and the stiffness of particular structures. Some of these manipulations lead to relative stable acoustic properties that are perceptually distinctive. These particular manipulations play a role in the selection of inventories of sounds consisting of discrete units such as features, segments, and words in terms of which language is structured (see Reference [17]).

Sounds of languages are described as sets of phonemes (see Reference [26]). All phonemes can be distinguished by at least one (acoustic/articulatory) feature. Every language takes a limited number of articulatory/acoustic features out of a virtually unlimited number of possibilities. For most known languages, the inventory ranges between thirteen and seventy-five phonemes (see Reference [19]). The phonetic characteristics of individual members of the inventory are, as a rule, given through matrices showing articulatory/acoustic features. A universal phonemic inventory has been provided (see References [20] and [22]). A phoneme system is the overall pattern of characteristics and relationships of the phonemes in the phonemic inventory of a given language. The phonological characteristics of the phonemes and their allophones are described by articulatory/acoustic features, the interrelationships between phonemes through oppositions. For a discussion of the importance of distinguishing between acoustics and articulatory features, a formant chart of the vowels of standard French and an illustration of the neutrality of distinctive features between production and perception, see Reference [21].

Human beings recognise in their respective language a phoneme and its variants which allows them to understand a word. In phonetics, sound variants belonging to one and the same phoneme are

called allophones, based on their distribution and phonetic similarity. A phonetic relationship in complementary distribution is, as a rule, one criterion for considering two sound variants as belonging to one and the same phoneme.

Considering that there are norms in languages, or that a language is a system of norms, of audible signs formed by the human organs and serving the purpose of communication, these norms can fulfil their task of serving communication only if both speaker and hearer relate to them within the same speech community. They are valid for the formation as well as for the perception of those signs.

The phonological system of a language is like a sieve through which everything that is said passes. Each person acquires the system of their mother tongue(s). When they hear another language spoken, they intuitively use the familiar 'phonological sieve' of their mother tongue(s) to analyse what has been said. Such filter is not suited for the foreign language, as typically it causes frequent mistakes and misinterpretations. The sounds of the foreign language receive an incorrect phonological interpretation since they are filtered through the respective 'phonological sieve' of one's own mother tongue(s) (see Reference [18]). Speakers and hearers are concerned by this 'phonological sieve'.

Language resource management — Controlled human communication (CHC) —

Part 3: Basic principles and methodology for controlled oral communication (COralCom)

1 Scope

This document provides basic principles and a methodology for establishing a specification for designing and constructing a formally defined, or controlled, system of oral communication that avoids or filters out phonetic interferences and confusions between words of the same language and between languages. The system is both abstracted from, and contextually situated in, the domains of industry, business or other technologies.

This document deals only with oral communication between native speakers, or non-native speakers, or a native speaker and a non-native speaker, who can be disturbed due to different phenomena, such as phoneme confusion, phonetic interferences and confusions between words (for example: homophony, quasi-homophony or co-articulation) of the same language and/or different languages and the resulting ambiguities due, for example, to multilingual communication or stressful situations. This document deals with speakers and listeners without speech or hearing impediments^[16], and does not include sign languages which have a phonological system equivalent to the system of sounds in spoken languages^[23].

Foreseen applications are essentially in safety critical applications using human oral communication. This document is also applicable to other domains involving, for example, training and evaluation procedures and robots.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

controlled language

CL

system that limits language, written or spoken, to a set number of core lexical items and, usually, to a set of writing guidelines for grammar and style

Note 1 to entry: See also controlled (natural) language in ISO/TS 24620-1:2015.