



Standard Practice for Communications Procedures—Phonetics¹

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1. Scope

1.1 *Establishment of Phonetics*—This practice covers the establishment of phonetics (including an alphabet, numerals, and punctuations), and the procedures for their use, in communications.

1.2 *Performance*— This practice is intended to facilitate the performance of communications personnel and systems under adverse communications conditions. This objective is achieved by employing easily recognized and used symbols and procedures that are highly resistant to errors. This system may be used with speech, print, or other media.

1.3 *Interoperability*— This practice is intended to facilitate the interoperability of communications personnel and systems among different organizations, especially if they use different internal practices. This system is also recommended for use within any organization for improved internal communications and uniformity of operations.

1.4 *English as Common Language*—This practice is intended for use with English. English has been designated by the International Civil Aviation Organization (ICAO) and others as a common interoperability language that is widely used in search and rescue, emergency, and international operations such as aviation, maritime, and military.

2. Terminology

2.1 The terminology used in this practice is derived from references (1-10).^{2,3}

2.2 *automatic repeat-request (ARQ)*—a system of error control for information transmission in which the receiving station is arranged to detect a transmission error and automatically transmit a repeat-request signal to the transmitting station. The transmitting station then retransmits the message until it is either correctly received or the error persists beyond a predetermined number of transmittals.

2.3 *error correcting code*—a code in which each symbol conforms to specific rules of construction so that departures

from this construction in the received signals can generally be automatically detected and corrected. If the number of errors is not greater than the maximum correctable threshold of the code, all errors are corrected.

2.4 *error correcting system*—in information transmission, a system employing either forward error correction or automatic repeat-request techniques or both, such that most transmission errors are automatically removed from the data prior to delivery to the user.

2.5 *forward error correction (FEC)*—a system of error control for information transmission wherein the receiving station has the capability to detect and correct any character or message that contains fewer than a predetermined number of symbols in error.

2.6 *interoperability*—the condition achieved among communications stations or personnel when information can be exchanged directly and satisfactorily between them or their users or both. It is desirable that the exchanges are error free, rapid, and automatic.

2.7 *phonetics*—a system of symbols and procedures that is used to control errors in communications, validate selected parts of messages, and enhance the interoperability and performance of communications personnel and systems.

2.8 *phonetic alphabet*—a selected set of phonetic symbols that has a one-to-one correspondence to the set of individual letters in a language. Also, any of various systems of code words for identifying letters in voice communications.

2.9 *phonetic punctuation*—a selected set of phonetic symbols that has a one-to-one correspondence to the set of individual punctuation in a language.

2.10 *phonetic numerals*—a selected set of phonetic symbols that has a one-to-one correspondence to the set of individual numerals in a language.

2.11 *phonetic symbol*—a unique word or combination of letters that is used as a substitute for, or an addition to, a specific letter, numeral, or punctuation in a language. It has the characteristics of an error correcting code.

3. Summary of Practice

3.1 *Interoperability and Performance*—A set of easily recognized and used symbols and procedures are established. They are used to control the errors that may be encountered in messages, to validate selected parts of messages, and to enhance the interoperability and performance of communications personnel and systems. This phonetic system is intended

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² The boldface numbers in parentheses refer to a list of references at the end of this practice.

³ This practice is based on an extensive survey of multiple organizations. Their communications documents were consulted to determine or verify compliance and interoperability among their many known and accepted phonetic systems. These documents are hereby referenced.

to be directly interoperable with the majority of standard phonetic systems presently employed, both internationally and within the United States.

3.2 *Error Control*— Error control is accomplished by detection of the errors and either prompt correction (based on the available information) or a request for another copy (if the information is inadequate for error correction).

4. Significance and Use

4.1 *Communications Errors and Delays*—Communications systems, including their procedures and channels, are subject to errors due to noise, interference, weak signals, mistakes, and other causes. They are also subject to delays due to the necessity to detect and correct these errors. There may also be errors and delays due to the lack of trained and experienced operators.

4.2 *Error Control*— Phonetics enables the control of errors through error detection, and usually prompt correction, for words and characters in speech and printed text. It employs an error correcting system of symbols and procedures that are standardized and easily recognized under adverse or high error communications conditions.

4.3 *Symbol Characteristics*—The phonetic alphabet is an error detecting and correcting code composed of phonetic symbols that are carefully selected to have distinctive sounds or appearances (or other unique characteristics) that improve detection under adverse conditions (such as severe noise or high errors) and enhance differentiation from each other.

4.3.1 Phonetics are inherently language-dependent. For English text letters, there are 26 phonetic alphabet symbols, that correspond to the 26 letters (from A to Z) that may be used to compose the words in a message. Additional symbols are used for numerals and punctuations.

4.3.2 Phonetic symbols (including an alphabet, numerals, and punctuation) must have unique characteristics as mentioned above, and they should not be restricted to only one communications media.

4.4 *Procedures for Error Detection and Correction:*

4.4.1 Phonetic communications procedures are used to minimize or eliminate information errors and to facilitate the correct transmission of messages using trained operators.

4.4.2 The phonetic procedures are carefully structured to enable symbol differentiation and error detection based on simple examination of the received data. Using forward error correction (FEC), in most cases the symbols can be identified, and the errors can be corrected promptly with no additional information.

4.4.3 FEC is based on the error detection system, which is usually the more robust of the two. Essentially, in certain poor conditions, it is possible to detect errors even though they may not be correctable (at the moment).

4.5 *Procedures for Retransmission*—In most cases, prompt error detection and correction is achievable through FEC. If this is not possible or acceptable, manual or automatic repeat-request (ARQ) is employed. The process of error detection can be used to initiate the ARQ and therefore the retransmission of the information, such as an additional copy (or copies). The copy(ies) may be received error free or with correctable errors (especially when compared with previous copy(ies)).

4.6 *Use of Non-standard Systems*—This phonetic system is not intended to prohibit the use of non-standard brevity or error control systems that are used only internally within any single organization. It also does not preclude the use of additional methods for clarity.

4.7 *Use of Standard Systems*—This phonetic system is intended to be directly interoperable with the majority of standard phonetic systems presently employed, both internationally and within the United States, as noted in references (1-9). These standard systems actually exhibit many variations among themselves. Some provide no procedures, and none include all of the symbols presented herein. Of all these known documents, this practice is the only one that presents an explanation of the phonetic system in terms of modern communications technology. To achieve interoperability and performance through bona fide standardization, system administrators should consider this comprehensive practice for superseding, or revising, these other standard systems.

5. Procedure

5.1 *Phonetic Alphabet:*

5.1.1 *Phonetic Alphabet and Pronunciations*—Table 1 presents the phonetic alphabet and the pronunciations used in this practice.

5.1.2 *Usage of Phonetic Alphabet*—Phonetic alphabet symbols are inserted in text that may be spoken, printed, or otherwise communicated.

NOTE 1—Examples of the usage of the phonetic alphabet in spoken and printed text are provided in the sections below. The word(s) to be validated are in bold for clarity. Phonetic pronunciations are included for speech, with a "pause" as indicated:

5.1.2.1 *Phonetic Alphabet in Speech*—For speech, the phonetic alphabet symbols are placed adjacent to the word(s) that are spelled, as follows:

TABLE 1 Phonetic Alphabet and Pronunciations

Letter	Symbol	Pronunciation ^A
A	ALFA	"AL-fah"
B	BRAVO	"BRAH-voh"
C	CHARLIE	"CHAR-lee"
D	DELTA	"DELL-tah"
E	ECHO	"ECK-oh"
F	FOXTROT	"FOKS-trot"
G	GOLF	"GOLF"
H	HOTEL	"hoh-TELL"
I	INDIA	"IN-dee-ah"
J	JULIET	"JEW-lee-ETT"
K	KILO	"KEY-loh"
L	LIMA	"LEE-mah"
M	MIKE	"MIKE"
N	NOVEMBER	"no-VEM-ber"
O	OSCAR	"OSS-cah"
P	PAPA	"pah-PAH"
Q	QUEBEC	"keh-BECK"
R	ROMEO	"ROW-me-oh"
S	SIERRA	"see-AIR-rah"
T	TANGO	"TANG-go"
U	UNIFORM	"YOU-nee-form"
V	VICTOR	"VIK-tah"
W	WHISKEY	"WISS-key"
X	XRAY	"ECKS-ray"
Y	YANKEE	"YANG-key"
Z	ZULU	"ZOO-loo"

^A The pronunciations are in quotes and CAPITAL letters to indicate the verbal emphasis.

- (1) Use the word(s) to be spelled;
- (2) Add “I SPELL” (which indicates the start of phonetics);
- (3) Spell the word(s) using the phonetic alphabet symbols (with a pause between spelled word(s));
- (4) Again use the word(s) that were spelled (which indicates the end of phonetics);
- (5) Return to normal words for the spoken text that follows.

5.1.2.2 For single letters in speech, such as initials in a name, the phonetic alphabet symbols replace the letter(s) that are spelled, as follows:

- (1) Note and replace (but do not use) the letter(s);
- (2) Add “INITIALS” (which indicates the start of phonetics);
- (3) Spell the replaced letter(s) using the phonetic alphabet symbols (with a pause between spelled letter(s));
- (4) Return to normal name or words (which indicates the end of phonetics) and continue with the spoken text that follows.

5.1.2.3 *Phonetic Alphabet in Speech, Examples:*

(1) As an example, the phrase
 (... respond emergency to **Xylon** St. for a ...) would be spoken as follows:
 “... respond emergency to **Xylon** pause I SPELL pause ECKS-ray, YANG-key, LEE-mah, OSS-cah, no-VEM-ber pause **Xylon** pause

Street for a ...”

(2) As an additional example, the phrase
 (... reported sight of D.B. Cooper near ...) would be spoken as follows:
 “... reported sight of pause INITIALS DELL-tah pause BRAH-voh pause Cooper near ...”

5.1.2.4 *Phonetic Alphabet in Print*—For print, the phonetic alphabet symbols are placed (as capital letters) within parentheses adjacent to the word(s) that are spelled, as follows:

- (1) Use the word(s) to be spelled;
- (2) Add the left parenthesis “(” (which indicates the start of phonetics);
- (3) Spell the word(s) using the phonetic alphabet symbols (as capital letters if upper/lower case is available) (with a comma between the spelled words);
- (4) Add the right parenthesis “)” (which indicates the end of phonetics);
- (5) Return to normal words for the printed text that follow.

5.1.2.5 *Phonetic Alphabet in Print, Examples:*

(1) As an example, the phrase
 (... land medevac at **Jim** and **Bob** Sts. for ...) would be printed as follows:
 “ ... land medevac at Jim (JULIET INDIA MIKE) and Bob (BRAVO OSCAR BRAVO) Streets for ...”

In this example, the symbols enable validation or correction of the text, even if they are slightly garbled themselves. (Was it Jim or Gem or Jem? Was it Bob or Rob or Hob?)

(2) As a continued example, the phrase might have been received as follows (with errors “+”):
 “ ... 1 + nd med + v + c at + i + (JUL + E + + NDIA M + KE) a + d + ob (BR + VO + SCAR B + AVO) S + reets fo + ...”
 Examination of the capitalized phonetic symbols that were

received (even with errors) enable error correction of the essential words.

5.2 *Phonetic Numerals:*

5.2.1 *Phonetic Numerals and Pronunciations*—Table 2 presents the phonetic numerals and the pronunciations that shall be used in this practice.

5.2.2 *Modified Numbers and Sequences*—Certain specific numbers or combinations that are easily misunderstood, such as those ending with “teen” and “ty”, shall not be used. They shall be modified for clarity and shall be “spelled out” as digits, as presented in Table 3.

5.2.3 *Usage of Phonetic Numerals*—Phonetic numeral symbols are inserted in text that may be spoken, printed, or otherwise, and they may be mixed with letters and punctuation. Examples of the usage of the phonetic numerals in spoken and printed text are provided in the sections below. The number(s) to be clarified or validated are in bold for clarity. Phonetic pronunciations are included for speech, with a “*pause*” as indicated:

5.2.3.1 *Phonetic Numerals in Speech*—For speech, the phonetic numeral symbols replace the number(s) that are clarified or validated, as follows:

- (1) Note and replace (but do not use) the number(s);
- (2) Add “FIGURES” (which indicates the start of phonetics);
- (3) “Spell” the replaced number(s) using individual phonetic numeral symbols (with a pause between “spelled” number(s));
- (4) Return to normal words (which indicates the end of phonetics) and continue with the spoken text that follows.

5.2.3.2 *Phonetic Numerals in Speech, Examples:*

(1) As an example, the phrase
 (... subject license tag is Virginia **930FXZ** ...) would be spoken as follows:

“ ... subject license tag is Virginia pause FIGURES pause NIN-er, TREE, ZEE-roh, FOKS-trot, ECKS-ray, ZOO-loo pause ...”

(2) As an additional example, the phrase
 (... meet medic unit 10-4 near ...) would be spoken as follows:
 “... meet medic unit pause FIGURES pause WUN, ZEE-roh, DASH, FO-wer pause near ...”

5.2.3.3 *Phonetic Numerals in Print*—For print, the phonetic numeral symbols are placed (as capital letters) within parentheses adjacent to the number(s) that are clarified or validated, as follows:

TABLE 2 *Phonetic Numerals and Pronunciations*

Letter	Symbol	Pronunciation ^A
0	ZERO	“ZEE-roh”
1	ONE	“WUN”
2	TWO	“TOO”
3	THREE	“TREE”
4	FOUR	“FO-wer”
5	FIVE	“fi-YEV”
6	SIX	“SIKS”
7	SEVEN	“SAY-ven”
8	EIGHT	“AIT”
9	NINE	“NIN-er”
'00	HUNDRED	“HUN-dred”
'000	THOUSAND	“THOU-zand”

^A The pronunciations are in quotes, and CAPITAL letters indicate the verbal emphasis.

TABLE 3 Modified Numbers and Sequences

Number	Symbol	Pronunciation ^A	Comments
10	TEN	"WUN, ZEE-roh"	(NOT "ten")
11	ONE-ONE	"WUN, WUN"	(NOT "eleven")
12	ONE-TWO	"WUN, TOO"	(NOT "twelve")
13 to 19	ONE-THREE to ONE-NINE	"WUN, TREE" to "WUN, NIN-er"	(NOT "thirteen" to "nineteen")
20 to 90	TWO-ZERO to NINE-ZERO	"TOO, ZEE-roh" to "NIN-er, ZEE-roh"	(NOT "twenty" to "ninety")

^A The pronunciations are in quotes, and CAPITAL letters indicate the verbal emphasis.

- (1) Use the number(s) to be "spelled";
- (2) Add the left parenthesis "(" (which indicates the start of phonetics);
- (3) "Spell" using phonetic numeral symbols as letter words (as capital letters if upper/lower case is available) (with a comma between "spelled" number(s));

(4) Add the right parenthesis ")" (which indicates the end of phonetics);

(5) Return to normal words for the printed text that follows.

5.2.3.4 The use of phonetic numeral symbols (in parentheses) after the numbers in printed text is an essential technique to ensure the accuracy of any critical number(s) that may have been (or might be) garbled in transmission (due to errors from conditions, humans, or machines).

5.2.3.5 *Phonetic Numerals in Print, Examples:*

- (1) As an example, the phrase (... pickup Team ECHO at coordinates **A397258** for ...) would be printed as follows:

"... pickup Team ECHO at coordinates A397258 (ALFA THREE NINE SEVEN TWO FIVE EIGHT) for ..."

(2) In this example, the symbols enable validation or correction of the text, even if they are slightly garbled themselves. The phrase might have been received as follows (with errors " + "):

" ... p + ckup T + am ECH + at + oord + nat + s + 3 + 7 + 58 (+ LFA + HR + E N + NE SEV + N TW + F + VE EI + HT) fo + ..."

(3) Examination of the capitalized phonetic symbols that were received (even with errors) enable error correction of the essential letters and numerals.

5.3 *Phonetic Punctuation and Pronunciations*—Table 4 presents phonetic punctuation and the pronunciations that shall be used in this practice. The pronunciations are in quotes, and capital letters indicate the verbal emphasis.

5.3.1 *Usage of Phonetic Punctuation*—Phonetic punctuation symbols are inserted in text that may be spoken, printed, or otherwise, and they may be mixed with letters and numerals.

5.3.1.1 *Phonetic Punctuation in Speech*—For speech, the phonetic punctuation symbols replace the punctuation(s) that are clarified or validated, as follows:

- (1) Note and replace (but do not use) the punctuation(s);

TABLE 4 Phonetic Punctuation and Pronunciations

Punctu-ation	Symbol	Pronunciation ^A	Comments/ Alternates
.	PERIOD	"PEER-ee-odd"	or "FULL STOP", "DOT" ^B
?	QUESTIONMARK	"KWES-chin-MARK"	
!	EXCLAMATIONPOINT	"ECKS-kla-MAY-shin-POYNT"	
'	APOSTROPHE	"ah-PAH-stro-fee"	
,	COMMA	"KOM-mah"	
;	SEMICOLON	"SEM-my-KO-lon"	
:	COLON	"KO-lon"	
-	HYPHEN	"HY-fen"	or "DASH"
/	SLANT	"SLANT"	or "STROKE" or "SLASH" ^B
\	BACKSLANT	"BAKS-SLANT"	or "BAKS-STROKE" or "BAKS-SLASH" ^B
"	QUOTE	"QUOTE"	or "OPEN QUOTE"
"	UNQUOTE	"UNN-QUOTE"	or "CLOSE QUOTE"
(PAREN	"PAIR-ren"	or "OPEN PAIR-ren"
)	NPAREN	"UNN-PAIR-ren"	or "CLOSE PAIR-ren"
[BRACKET	"BRA-ket"	or "OPEN BRA-ket"
]	UNBRACKET	"UNN-BRA-ket"	or "CLOSE BRA-ket"
.	DECIMAL	"DAY-see-mal"	or "DOT" ^B
=	EQUALS	"EE-quills"	
+	PLUS	"PLUSS"	or "PLUSS-sine"
-	MINUS	"MY-nuss"	or "MY-nuss-sine"
*	STAR	"STARR"	(NOT "asterick")
#	POUNDSIGN	"POWND-sine"	(NOT "tic-tac-toe")
\$	DOLLARS	"DOLL-arrrs"	
%	PERCENT	"purrr-SENT"	

^A The pronunciations are in quotes, and capital letters indicate the verbal emphasis.

^B Several symbols have achieved widespread usage with personal computers, yet they are not recommended for phonetic use as they have not been demonstrated to provide the needed robust performance over poor channels: DOT, SLASH, and BACKSLASH.

(2) Use the individual phonetic punctuation symbols (which indicate the use of phonetics) with a pause before and after;

(3) Return to normal words for the spoken text that follows.

5.3.1.2 *Phonetic Punctuation in Print*—For print, the phonetic punctuation symbols (in capital letters) replace the punctuation(s) which are clarified or validated, as follows:

- (1) Note and replace (but do not use) the punctuation(s);
- (2) Use the individual phonetic punctuation symbols (which indicate the use of phonetics), using capital letters if upper/lower case is available;

(3) Return to normal words for the printed text that follows.

5.3.1.3 The use of phonetic punctuation symbols (in capital letters) in place of the punctuation in printed text is an essential technique to ensure the accuracy of any critical phrase(s) or structure(s) that may have been (or might be) garbled in transmission (due to errors from conditions, humans, or machines).

6. **Keywords**

6.1 alphabet; communications; English; error correction; error detection; interoperability; messages; numeral; performance; phonetic; procedures; punctuation; symbols

REFERENCES

- (1) **ACP-125**
North Atlantic Treaty Organization (NATO), Allied Communications Procedures 125 (ACP-125), Radiotelephone Procedures.
- (2) **American Heritage Dictionary**
American Heritage Dictionary, Second College Edition, Houghton Mifflin Company.
- (3) **APCO**
Associated Public-Safety Communications Officers, Inc. (APCO), Public Safety Communications Standard Operating Procedures Manual.
- (4) **ARRL**
American Radio Relay League (ARRL), Handbook for the Radio Amateur.
- (5) **CAP**
Civil Air Patrol (CAP), Manual 100-1, Communications.
- (6) **FED-STD 1037**
Federal Standard 1037 (FED-STD 1037), Telecommunications: Glossary of Telecommunications Terms.
- (7) **ICAO**
International Civil Aviation Organization (ICAO), Volume II, Annex 10, Chapter 5.
- (8) **ITU**
International Telecommunications Union (ITU) Radio Regulations, Appendix 24, "Phonetic Alphabet and Figure Code".
- (9) **NAVY and MARS**
Naval Telecommunications Procedures, U.S. Navy-Marine Corps Military Affiliate Radio System (MARS), Naval Telecommunications Policy Eight (NTP-8).
- (10) **SHARES**
National Communications System Manual NCSM 3-3, Telecommunications Operations, SHARES HF Radio Program User Manual.

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