CO-EVOLUTION of PRINT, COMPUTER, and RADIO TECHNOLOGIES

by Roy Ekberg, WØLIQ and Martin Schroedel, K9LTL

ABSTRACT

This is about standards for CAC (Computer Assisted Communication) proposed first **in** *the 12th and 16th* **K C** *proceedings. Our CAC Model* **7 7** *was entered in ARRL's library under C-135-1. R & D work began in 7 989 and continues.*

KEY WORDS/PHRASES

Categorization, inverted communication, status-line, Digital shorthand, and Digitex.

WHY PRINT-COMPUTER DATABASES CAN BE CORRELATED VIA CATEGORIES

John M. Ellis, Professor of German Literature at the University of California at Santa Cruz, outlined his views on *categorization aspects*. He related these to communication and linguistic functions as follows:

> Categorization... is the most basic aspect of language, and it is a process that must be understood correctly if anything else (including syntax) is to be understood; and categorization, not communication, is the most important function of language; one that is prior to all others.[1] JME, pg. 27

> For communication to be possible, then, there must first have been a considerable degree of processing experience--of analyzing it, abstracting from it, focusing and shaping it. It is in this complex process that the essence of language is to be found, not in communication per se. Indeed, communication is only of value to us because this prior process creates something that can be communicated and that is worth communicating.[1] JME, pg. 29

Linguistic categories let hams use multi-page, manual, randomly accessible, print media with single-paged, powered, randomly accessible, P/Cs. This convergence is analogous in part to using telephone directories (print media) to utilize computerized telephone switching systems. CAC's categories are: database, files, subjects, indexed records, and novel complements. The first four are managed in CODE mode; novel category is *managed* in TYPE mode (as illustrated later in the text).

INVERTED AND REGULAR COMMUNICATIONS NEED UNIVERSAL STANDARDS

Inverted communications are types in which data at receiving hams' QTHs are managed via hams who transmit control signals. Regular communications must be used also to include unrecorded *novel* items, to perform CQing activities, etc. Universal CAC system standards are required which will ensure that CAC system will be practical for international communications in foreign languages.

Digital shorthand includes ++ signs for switching from CODE to TYPE mode or vice-versa. Speech equivalents are CODE-CODE and TYPE-TYPE. (Note: A Morse code for the + sign has never been standardized; we proposed one later in the text.)

CATEGORIZED, FOUR LEVEL, HIERARCHY OF INDEXED RECORDS

The contents of data recorded for CAC system's communications is categorized under a four-level hierarchy: Databases, Files, Subjects, and Indexed Records. Records are referenced via their indexes (i.e., Record Indexes or RIs). Indexes will range from 0 through 9999 per file. RIs are listed under Subjects in files that have encoded names (codes simplify monitoring and switching). CAC users can peruse printed files to select records they want to display at their receiving ham's QTH. Indexes are not memorized! Receiving hams input shorthand strings in P/Cs to display decrypted messages on monitors and/or printers. Status-lines keep users posted regarding their activities in cyberspace and in real time.

UNIVERSAL DIGITAL SHORTHAND SCRIPT AND SIGNALS

Expression *Digital shorthand* replaces "Keypad Interface Language" promoted in the earlier DCC proceedings. The reason is, term *shorthand* suggests the functions of encoded strings more precisely than "language." Keypad keys are still favored as the logical source for universal script in Digital shorthand as follows:

SCRIPT	SSB	CW	FUNCTIONS OF DIGITAL SHORTHAND
0	ZERO	-----	Used for Record Indexes
1	ONE	e - l - -	" " " "
2	TWO	. .---	" " " "
3	THREE	. ✉♋ - -	" " " "
4	FOUR	[illegible]	" " " "
5	FIVE	. □✉✉□	" " " "
6	SIX	-....	" " " "
7	SEVEN	--...	" " 11 "
8	EIGHT	[illegible]	" " " "
9	NINE	[illegible]	" " . " "
.	DOT	.-.-	Executes DS strings.
-	JOIN	. ♏♏□	Joins Record Indexes.
*	CHAT	..-	Converts TYPE mode to CHAT mode.
++	MODE-MODE	---... repeat	Changes CODE mode to TYPE mode, and vice-versa.
//	FILE-FILE	-.. . repeat	Switches from one file to another... via adding file code number.
(	ENTER	-.--.-	Deletes input errors in CODE mode. Adds blank lines in TYPE mode.

SYNONYM KEYS:

Finland, Germany, and Sweden prefer synonyms (X) for (*) and (÷) for (/) on keys. Synonym keys have equivalent functions.

EXPERIMENTAL STANDARDS FOR PRINT AND COMPUTER DATA CATEGORIES

Present computer monitors have 25 lines of 80 characters per line. We presume that future digital monitors will have 120 characters per line based upon the news sources which predict that digital TV monitors will be made 30% wider on screens. We set "Indexed Record" lengths at 40 characters per line (which is half of the present line width). This seems likely to be satisfactory for the anticipated new digital line widths. Forty character line widths are adequate for text because records can be linked to form paragraphs as necessary. Wider screen widths would permit "split-screen" applications on which text could be 40 characters wide (on the left side), and graphics could be 80 characters wide (on the right). Text could be managed using Digital shorthand strings whereas graphics might be managed via other signals suitable for cross-referencing graphics. (We presume that present text width standards will not be obsoleted by the arrival of future hardware.)

CAC system's *status-line* is essential for switching among "virtual categories" (like files) in real time. Status-line posts CAC's categories in an order read left-to-right (likely to be referred to the most often during communications). Modal type changes (from TYPE to CODE, etc.) are made frequently. So, the left-most words on the status-line will post modal changes each time that you will press your ++ keys. The next most monitored category is that of the three-character file codes. It is imperative to know which file that one is managing. Both sending and receiving operators must keep synchronized to communicate. Record indexes will appear above the status-line up until the time of their execution by the DOT command. Then RI's contents will replace the "spent" RIs (which also removes a source of noise). The database category seldom changes, so it is centered on the status-line.

INTERNATIONAL MORSE CODE REMAINS ESSENTIAL TO USE CAC SYSTEM

Opinions are offered in QST that "Morse became obsolete!" That claim is untrue whether CAC system were to become legalized or not. Morse code has been deciphered and displayed on microprocessor digital readout devices for some time. We should appreciate our homo sapien's ability to learn, remember, and copy Morse signals! A psychological copying barrier is often experienced around 8 WPM. Since CAC system can download text in a flash, 13 WPM code requirements could be reduced to 8 WPM. However, hams who enjoy breaking this code barrier would still enjoy using their Morse expertise when using TYPE mode in CAC system (in which plain language is used to supplement traffic in CODE mode). Let's not forget that deaf hams can use Morse to their advantage also. People who argue that Morse is "old fashioned" anymore are not likely to claim that Roman letters are "old fashioned" despite the fact that they are over two thousand years old. Functional utility factors must be weighed.

SIGNIFICANT BENEFITS OF CAC'S INVERTED COMMUNICATION SYSTEM

Q-codes serve as an analogue of what is meant by "inverted" communication systems. Upon speaking or sending "QSY" in Morse, most hams will remember that QSY means: "Change to another frequency." QSY, if sent in plain English, requires 28 characters to be coded. Q-codes still have a useful place in CAC system only they will be indexed numerically under a subject category such as "02. Q-CODES." Also, Q-codes would be listed in alphabetical order with three digit length indexes put in numerical order. Even though numeric indexes will be sent to reference Q-codes recorded in memory, only Q-code referents will display after commands execute the displays. Q-codes represent a tiny fraction of useful "message parts" which could be recorded in computer memory for convenient referencing.

Q-codes cannot be accessed conveniently when used without computer assistance. Nor can Q-codes be integrated easily with other recorded message parts unless they will have been assigned arbitrary indexes. Think of computer assistance as a process in which computer's memory is made available to support the user's memory. In this inversion process...transmitting hams lookup things in print media that they wish to communicate. Then, they send signals which receiving hams copy directly (or from decoding devices) and input decoded signals on keyboards. Computers display the messages without taxing any receiving ham's memory. In other words, the burden of communicating useful messages rests upon the operating knowledge and skills of hams who send. Magical displays can be created by sending at only 8 WPM!

Meanwhile, one of the most impressive benefits (unavailable on the Internet) is that sending hams will lookup message parts in any of twenty European languages and use universal Digital shorthand to reference foreign message parts. This is a dream that has come true fostered by philosophers centuries ago (who lacked means)[2].

EXAMPLE OF SUBJECT IN PRINT AND COMPUTER FILE "ALPHA 1" (Coded AL1)

Expression *Digital shorthand strings* is shortened to word *Digitex* when naming strings of written script. Subject 06. in File AL1, database HAMRAD98, follows:

06. MAKING CONTACTS: 165-200
165 Thanks for answering my call!
167 I copy you solid!
169 My CALL sign is
171 Try calling me again in 15 minutes.
173 This frequency is in use!
175 Can you QSY up 2 KHz?
177 Can you QSY down 2 KHz?
179 QSY to frequency (in MHz)
181 I'll QSY per your request,
183 Please repeat your last transmission.

DIGITEX TRANSMISSIONS

Hams will use protocols during CQing operations similar to those used during contests and field day operations. (Those are beyond the scope of this paper.) If TYPE and CODE mode signals were displayed on Morse decoders, they will appear somewhat as in the example listed below:

Five Line Digitex String

K9LTL **DE** WØLIQ ++165.173.175.++GA **K**

K9LTL will have inputted this Digitex message on his Morse decoder to read it and copy it on his computer keyboard. The translated display will be as follows:

K9LTL DE WØLIQ
Thanks for answering my call!
This frequency is in use!
Can you QSY up 2 KHz?
++GA WØLIQ

Both operators will be monitoring their status lines to keep track of their virtual category dynamics as follows:

a)	**TYPE AL1**	**HAMRAD98**	**Esc => MENU**	**F1 => HELP**
b)	**CODE AL1**	**HAMRAD98**	**Esc => MENU**	**F1 => HELP**

Status line a) confirms that TYPE mode, File AL1, and database HAMRAD98 are active. Line b) confirms that CODE mode replaced TYPE mode. Esc or F1 keys can be pressed to see options and return to the same screen display in process. The sending operator could have sent Digitex to display only four lines by joining record indexes:

Four Line Digitex String

K9LTL **DE** WØLIQ ++165.173-10-175-.++GA **K**

K9LTL **DE** WØLIQ
Thanks for answering my call!
This frequency is in use!_Can you QSY up 2 KHz?
++GA WØLIQ

The additional RI "10" inserts an "underline space" between joined sentences. Color monitors let users read white letters on blue backgrounds. Status lines have yellow backgrounds and black letters. Besides having the option of printed outputs, users could add digitized speech software and hardware to hear spoken messages. Notice that only a few Morse signals are required to display considerable information.

CONCLUSIONS

The authors realize that they are only in the "Kittyhawk" stage of development. Unfortunately, we lack the skills, legal assistance, and funds to promote CAC system technology as much as we would like. We have concluded that Morse isn't obsolete as some hams have claimed! Actually, we need to standardize some more characters.

REFERENCES

(1) **Ellis**, John M. "LANGUAGE, THOUGHT, AND LOGIC." **Northwestern University Press, Copr, 1993**

(2) **Knowlson**, James ,**"Universal language schemes in England and France 1600-1800." University of Toronto Press, Toronto and Buffalo, Copr. 1975**