Universal Multiple-Octet Coded Character Set
International Organization for Standardization
Organisation Internationale de Normalisation
Международная организация по стандартизации

Doc Type: **Working Group Document**
Title: **Final proposal for encoding the Glagolitic script in the UCS**
Source: **Michael Everson and Ralph Cleminson**
Status: **Expert Contribution**
Action: **For consideration by JTC1/SC2/WG2 and UTC**
Date: **2003-08-24**

This document is based on the proposal written by Joe Becker and published in UTR#3, and the proposal written by Michael Everson in N1659, revised in N1931. It is a revision of our N2555, and contains the proposal summary.

A. Administrative

1. Title
Final proposal for encoding the Glagolitic script in the UCS.
2. Requester's name
Michael Everson and Ralph Cleminson
3. Requester type (Member body/Liaison/Individual contribution)
Individual contribution.
4. Submission date
2003-08-24
5. Requester's reference (if applicable)
N1659, N1931, N2555.
6. Choose one of the following:
6a. This is a complete proposal
Yes.
6b. More information will be provided later
No.

B. Technical -- General

1. Choose one of the following:
1a. This proposal is for a new script (set of characters)
Yes.
Proposed name of script
Glagolitic.
1b. The proposal is for addition of character(s) to an existing block
Yes, three.
1b. Name of the existing block
General Punctuation.
2. Number of characters in proposal
97 (94 + 3)
3. Proposed category (see section II, Character Categories)
Category B.1.
4a. Proposed Level of Implementation (1, 2 or 3) (see clause 14, ISO/IEC 10646-1: 2000)
As an alphabetic script, Glagolitic requires Level 1.
4b. Is a rationale provided for the choice?
No.
4c. If YES, reference
5a. Is a repertoire including character names provided?

1

Yes.

5b. If YES, are the names in accordance with the character naming guidelines in Annex L of ISO/IEC 10646-1: 2000?
Yes.

5c. Are the character shapes attached in a legible form suitable for review?
Yes.

6a. Who will provide the appropriate computerized font (ordered preference: True Type, or PostScript format) for publishing the standard?
Michael Everson.

6b. If available now, identify source(s) for the font (include address, e-mail, ftp-site, etc.) and indicate the tools used:
Michael Everson, Fontographer.

7a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided?
Yes, see bibliography below.

7b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached?
Yes.

8. Does the proposal address other aspects of character data processing (if applicable) such as input, presentation, sorting, searching, indexing, transliteration etc. (if yes please enclose information)?
Yes, see below.

9. Submitters are invited to provide any additional information about Properties of the proposed Character(s) or Script that will assist in correct understanding of and correct linguistic processing of the proposed character(s) or script. Examples of such properties are: Casing information, Numeric information, Currency information, Display behaviour information such as line breaks, widths etc., Combining behaviour, Spacing behaviour, Directional behaviour, Default Collation behaviour, relevance in Mark Up contexts, Compatibility equivalence and other Unicode normalization related information. See the Unicode standard at http://www.unicode.org for such information on other scripts. Also see Unicode Character Database http://www.unicode.org/Public/UNIDATA/ UnicodeCharacterDatabase.html and associated Unicode Technical Reports for information needed for consideration by the Unicode Technical Committee for inclusion in the Unicode Standard.
Yes, see Unicode properties below.

C. Technical -- Justification

1. Has this proposal for addition of character(s) been submitted before? If YES, explain.
Yes, exploratory drafts in N1659, N1931, N2555.

2a. Has contact been made to members of the user community (for example: National Body, user groups of the script or characters, other experts, etc.)?
Yes.

2b. If YES, with whom?
Ralph Cleminson, Dr Hinko Muren (Slovenia), ISO/TC46/SC2, ISO/TC46/SC4

2c. If YES, available relevant documents
N/A

3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included?
Scholarly, ecclesiastical, and library communities.

4a. The context of use for the proposed characters (type of use; common or rare)
Originally used to write Old Church Slavonic, and used in parts of medieval and early modern Croatia for both secular and ecclesiastical purposes.

4b. Reference
See below. ISO 6861:1996 is a coded character set for Glagolitic, as well as the bibliography below.

5a. Are the proposed characters in current use by the user community?
Yes.

5b. If YES, where?
By scholars, churchmen, and librarians.

6a. After giving due considerations to the principles in Principles and Procedures document (a WG 2 standing document) must the proposed characters be entirely in the BMP?
Yes.

6b. If YES, is a rationale provided?
Yes.

6c. If YES, reference
Accordance with the Roadmap, and close relationship of Glagolitic and Cyrillic texts.

7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)?

2

Yes, they should be encoded in a single block as presented here.

8a. Can any of the proposed characters be considered a presentation form of an existing character or character sequence?

No.

8b. If YES, is a rationale for its inclusion provided?

8c. If YES, reference

9a. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters?

No.

9b. If YES, is a rationale for its inclusion provided?

9c. If YES, reference

10a. Can any of the proposed character(s) be considered to be similar (in appearance or function) to an existing character?

No.

10b. If YES, is a rationale for its inclusion provided?

10c. If YES, reference

11a. Does the proposal include use of combining characters and/or use of composite sequences (see clauses 4.12 and 4.14 in ISO/IEC 10646-1: 2000)?

No.

11b. If YES, is a rationale for such use provided?

11c. If YES, reference

12a. Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided?

No. Generic combining characters can occur with Glagolitic base forms.

12b. If YES, reference

13a. Does the proposal contain characters with any special properties such as control function or similar semantics?

No.

13b. If YES, describe in detail (include attachment if necessary)

14a. Does the proposal contain any Ideographic compatibility character(s)?

No.

14b. If YES, is the equivalent corresponding unified ideographic character(s) identified?

14c. If YES, reference

D. Proposal

User community

Glagolitic is considered to be the alphabet devised by St Cyril, probably in 862 CE, for his translation of the the Scriptures and liturgical books into Slavonic. The Glagolitic inscriptions and manuscripts which survive from the early period are relatively few in number, but of great philological importance. Amongst the Slavs of the Eastern Rite, Glagolitic was subsequently supplanted by the alphabet now known as Cyrillic (based on Greek uncials but following the order and function of the Glagolitic letters), which probably arose in late ninth-century Bulgaria. In those parts of Croatia where a vernacular liturgy was used, Glagolitic continued in use until modern times: the last Glagolitic missal was printed in Rome in 1893 with a second edition in 1905. In these areas Glagolitic is still occasionally used as a decorative alphabet.

Structure

In the encoding Glagolitic is treated as a separate alphabet from Cyrillic, both because of its historical primacy and because in almost every case the shapes of the letters in the two alphabets are completely dissimilar: the one can in no sense be regarded as a visual variant of the other. Glagolitic itself exists in two styles, known as round and square. Round Glagolitic is the original style and more geographically widespread (though surviving examples are less numerous); square Glagolitic (and the cursive style derived from it) was used in Croatia from the thirteenth century. There are a few documents written in a style intermediate between the two. The letter-forms used in the charts are round Glagolitic, since a number of characters found in this style are not represented in square Glagolitic, while the reverse (with

the exception of the last three characters in the table) is not the case.

Directionality

Like Cyrillic, the Glagolitic script is written in linear sequence from left to right with no contextual modification of the letterforms.

Ordering

The ordering of the Glagolitic alphabet is largely derived from that of the Greek alphabet, though nearly half the Glagolitic characters have no equivalent in Greek and not every Greek letter has its equivalent in Glagolitic. Scholars cannot recover the original (Cyrillo-Methodian) alphabet, there being no extant documents from this period; its content and order can nevertheless be reconstructed with reasonable certainty on the basis of later abecedaria and a number of acrostics of extremely early origin. It should however be recognised that the order of the alphabet as represented in the surviving documents is not entirely stable, particularly towards the end.

Variant Glyph Forms

Several of the letters have variant glyph forms. These are not given separate character codes here. In ISO 6861:1996 five variant forms are explicitly encoded, and were in N1659. Discussion with the convener of ISO/SC4/WG2 indicated that in bibliographical contexts, probably *most* current use transliterates Glagolitic into Cyrillic in any case, and it is suggested that the variant characters in ISO 6861:1996 be unified with the basic letters.

Punctuation and diacritics

A number of punctuation characters are used in Glagolitic. Several of these are generic punctuation characters: COMMA, FULL STOP, SEMICOLON (= GREEK QUESTION MARK), and MIDDLE DOT (= GREEK ANO TELEIA) are used, and in edited texts quotation marks are used. Three unencoded punctuation marks have been observed, which have also been noted from time to time in Latin and other scripts. We believe they should be encoded in the General Punctuation block. They form a part of this proposal.

,	002C	COMMA
.	002E	FULL STOP
;	037E	(GREEK QUESTION MARK
·	0387	GREEK ANO TELEIA
:	0589	ARMENIAN FULL STOP
⁚	10FB	GEORGIAN PARAGRAPH SEPARATOR
⁖	2056	TRIANGULAR COLON
⁘	2058	DIAMOND COLON
⁙	2059	QUINTUPLE COLON

The punctuation mark SEMICOLON is used, flanking a letter on either side, to show the numeric use of the letter (Faulmann 1880). Glagolitic uses numerous diacritical marks, many of them in common with Cyrillic. It is suggested that research on the use of these in both Cyrillic and Glagolitic be initiated, and that any characters missing from the UCS be added at a future date to the general Combining Diacritical Marks block if necessary. It has been observed that a line above or a tilde above a letter or letters can be used to show the numeric use of the letter. A number of additional punctuation marks are also required

Names

The names of the letters present a number of problems. The first is that regular phonological developments have caused some of them to diverge in the modem languages; ⱍⰱⰱⰲⰹ *črĭvĭ* CHRIVI, for example,

becomes *črv* in Croatian, *чръв črăv* in Bulgarian and *червь červ´* in Russian. Secondly, the names of some letters used only in very early documents (such as ⱒ SPIDERY HA) have not survived. This particularly affects the nasal vowels, all of which are known by the name *jus* (which corresponds to Slavonic ѫⱏⱄⱏ *jǫsŭ* YUSU), differentiated by various modern adjectives. For the letter ⱦ even the phonetic value is uncertain: *ö, jö* or *jo* have been suggested. We have used YO, which was also used to name this character in ISO 6861:1996. The names used here are in general use today, even though some of them are ancient. The letters have inherent numerical values. Those from 1 to 1000 are well attested; the values 2000, 3000 and 5000 for ⱎ SHA, ⱕ YERU and ⱓ YU respectively are supported by fifteenth-century evidence; the higher values assigned to some letters by modern authors are not reliable.

				Value	ISO 6861
ⱀ	ⱀⰰⰸ	azъ	AZU	1	1
Ⰱ	Ⰱⱆⰽⱏ	buky	BUKY	2	2
ⰲ	ⰲⱑⰴⱑ	vědě	VEDE	3	3
ⰳ	ⰳⰾⰰⰳⱁⰾⰻ	glagoli	GLAGOLI	4	4
ⰴ	ⰴⱁⰱⱃⱁ	dobro	DOBRO	5	5
ⰵ	ⰵⱄⱅⱏ	jestъ	JESTU	6	6
ⰶ	ⰶⰻⰲⱑⱅⰵ	živěte	ZHIVETE	7	7
ⰷ	ⰷⱑⰾⱁ	ʒělo	DZELO	8	8
ⰸ	ⰸⰵⰿⰾⱑ	zemlja	ZEMLJA	9	9
ⰺ	ⰺⰶⰵ	iže	IZHE	10	20
ⰻ	ⰻⰶⰵ	iže	INITIAL IZHEI	10	20
ⰹ	ⰹ	i	I	20	10
ⰼ	ⰼⰵⱃⰲⱏ	djervъ	DJERVI	30	—
ⰽ	ⰽⰰⰽⱁ	kako	KAKO	40	40
ⰾ	ⰾⱓⰴⱏⰵ	ljudъje	LJUDIJE	50	50
ⰿ	ⰿⱏⰺⱄⰾⰻⱅⰵ	myslite	MYSLITE	60	60
ⱀ	ⱀⰰⱎⱏ	našь	NASHI	70	70
ⱁ	ⱁⱀⱏ	onъ	ONU	80	80
ⱂ	ⱂⱁⰽⱁⰺ	pokojь	POKOJI	90	90
ⱃ	ⱃⱐⱌⰻ	rьci	RICI	100	100
ⱄ	ⱄⰾⱁⰲⱁ	slovo	SLOVO	200	200
ⱅ	ⱅⰲⱃⱐⰴⱁ	tvrьdo	TVRIDO	300	300
ⱆ	ⱆⰽⱏ	ukъ	UKU	400	400
ⱇ	ⱇⱐⱅⱏ	frьtъ	FRITU	500	500
ⱈ	ⱈⱑⱃⱏ	hěrъ	HERU	600	6000/600
ⱉ	ⱁⱅⱏ	otъ	OTU	700	700
ⱊ			PE		
ⱋ	ⱋⰰ	šta	SHTA	800	800
ⱌ	ⱌⰻ	ci	CI	900	900
ⱍ	ⱍⱃⱐⰲⱏ	črьvь	CHRIVI	1000	1000
ⱎ	ⱎⰰ	ša	SHA	2000	2000
ⱕ	ⰵⱐⱃ	jerъ	YERU	3000	4000
ⱖ	ⰵⱐⱃ	jerь	YERI		3000
ⱑ	ⱑⱅⱏ	jatъ	YATI	800	5000
ⱒ			SPIDERY HA		
ⱓ	ⱓ	ju	YU	5000	8000
ⱔ			SMALL YUS		—
ⱔ			SM. MASC. YUS		
ⱙ			YO		7000
ⱗ			IOT. SMALL YUS		—
ⱘ			BIG YUS		9000
ⱙ			IOT. BIG YUS		—
ⱚ	ⱚⰺⱅⰰ	fita	FITA		9/500
ⱛ	ⰻⰶⰻⱌⰰ	ižica	IZHICA		400

5

]	štapić	SHTAPIC
ⱶ		TROKUSTASTI A
Ⰿ		LAT. MYSLITE

Unicode Character Properties

Spacing letters, category "Lu", bidi category "L" (strong left to right)

2C00-2C2E

Spacing letters, category "Ll", bidi category "L" (strong left to right)

2C30-2C5E

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Annex A

Sample from Leskien 1922:212.

[Glagolitic script text, verses 6–10]

Note the use of COMMA, FULL STOP, GREEK QUESTION MARK , and GREEK ANO TELEIA here.

Sample from Хабургаев 1986:20.

Лист 3 из Киевских листков

Note the use of the ARMENIAN FULL STOP, the GEORGIAN PARAGRAPH SEPARATOR and the GREEK ANO TELEIA here.

TABLE XX - Row 2C: GLAGOLITIC

	2C0	2C1	2C2	2C3	2C4	2C5		205
0	ⴀ	ⴐ	Ⱎ	ⴀ	ⴐ	Ⱎ	6	∴
1	ⴁ	ⴑ	Ⰰ	ⴁ	ⴑ	Ⰰ		
2	ⴂ	ⴒ	Ⱌ	ⴂ	ⴒ	Ⱌ	8	∴
3	ⴃ	ⴓ	Ⰲ	ⴃ	ⴓ	Ⰲ		
4	ⴄ	ⴔ	Ⱔ	ⴄ	ⴔ	Ⱔ	9	∴∴
5	ⴅ	ⴕ	Ⱔ	ⴅ	ⴕ	Ⱔ		
6	ⴆ	ⴖ	Ⰶ	ⴆ	ⴖ	Ⰶ		
7	ⴇ	ⴗ	Ⱑ	ⴇ	ⴗ	Ⱑ		
8	ⴈ	ⴘ	Ⱑ	ⴈ	ⴘ	Ⱑ		
9	ⴉ	ⴙ	Ⱒ	ⴉ	ⴙ	Ⱒ		
A	ⴊ	ⴚ	Ⱚ	ⴊ	ⴚ	Ⱚ		
B	ⴋ	ⴛ	Ⱛ	ⴋ	ⴛ	Ⱛ		
C	ⴌ	ⴜ	Ⱓ	ⴌ	ⴜ	Ⱓ		
D	ⴍ	ⴝ	Ⱖ	ⴍ	ⴝ	Ⱖ		
E	ⴎ	ⴞ	Ⱞ	ⴎ	ⴞ	Ⱞ		
F	ⴏ	Ⱍ		ⴏ	Ⱍ			

G = 00
P = 00

TABLE XX - Row 2C: GLAGOLITIC

hex	Name		hex	Name
00	GLAGOLITIC CAPITAL LETTER AZU		59	GLAGOLITIC SMALL LETTER IOTATED BIG YUS
01	GLAGOLITIC CAPITAL LETTER BUKY		5A	GLAGOLITIC SMALL LETTER FITA
02	GLAGOLITIC CAPITAL LETTER VEDE		5B	GLAGOLITIC SMALL LETTER IZHITSA
03	GLAGOLITIC CAPITAL LETTER GLAGOLI		5C	GLAGOLITIC SMALL LETTER SHTAPIC
04	GLAGOLITIC CAPITAL LETTER DOBRO		5D	GLAGOLITIC SMALL LETTER TROKUSTASTI AZU
05	GLAGOLITIC CAPITAL LETTER YESTU		5E	GLAGOLITIC SMALL LETTER LATINATE MYSLITE
06	GLAGOLITIC CAPITAL LETTER ZHIVETE		5F	(This position shall not be used)
07	GLAGOLITIC CAPITAL LETTER DZELO			
08	GLAGOLITIC CAPITAL LETTER ZEMLJA		2056	TRIANGULAR COLON
09	GLAGOLITIC CAPITAL LETTER IZHE		2058	DIAMOND COLON
0A	GLAGOLITIC CAPITAL LETTER INITIAL IZHE		2059	QUINTUPLE COLON
0B	GLAGOLITIC CAPITAL LETTER I			
0C	GLAGOLITIC CAPITAL LETTER DERVI			
0D	GLAGOLITIC CAPITAL LETTER KAKO			
0E	GLAGOLITIC CAPITAL LETTER LJUDIJE			
0F	GLAGOLITIC CAPITAL LETTER MYSLITE			
10	GLAGOLITIC CAPITAL LETTER NASHI			
11	GLAGOLITIC CAPITAL LETTER ONU			
12	GLAGOLITIC CAPITAL LETTER POKOJI			
13	GLAGOLITIC CAPITAL LETTER RITSI			
14	GLAGOLITIC CAPITAL LETTER SLOVO			
15	GLAGOLITIC CAPITAL LETTER TVRIDO			
16	GLAGOLITIC CAPITAL LETTER UKU			
17	GLAGOLITIC CAPITAL LETTER FRITU			
18	GLAGOLITIC CAPITAL LETTER HERU			
19	GLAGOLITIC CAPITAL LETTER OTU			
1A	GLAGOLITIC CAPITAL LETTER PE			
1B	GLAGOLITIC CAPITAL LETTER SHTA			
1C	GLAGOLITIC CAPITAL LETTER TSI			
1D	GLAGOLITIC CAPITAL LETTER CHRIVI			
1E	GLAGOLITIC CAPITAL LETTER SHA			
1F	GLAGOLITIC CAPITAL LETTER YERU			
20	GLAGOLITIC CAPITAL LETTER YERI			
21	GLAGOLITIC CAPITAL LETTER YATI			
22	GLAGOLITIC CAPITAL LETTER SPIDERY HA			
23	GLAGOLITIC CAPITAL LETTER JU			
24	GLAGOLITIC CAPITAL LETTER SMALL YUS			
25	GLAGOLITIC CAPITAL LETTER SMALL MASCULINE YUS			
26	GLAGOLITIC CAPITAL LETTER YO			
27	GLAGOLITIC CAPITAL LETTER IOTATED SMALL YUS			
28	GLAGOLITIC CAPITAL LETTER BIG YUS			
29	GLAGOLITIC CAPITAL LETTER IOTATED BIG YUS			
2A	GLAGOLITIC CAPITAL LETTER FITA			
2B	GLAGOLITIC CAPITAL LETTER IZHITSA			
2C	GLAGOLITIC CAPITAL LETTER SHTAPIC			
2D	GLAGOLITIC CAPITAL LETTER TROKUSTASTI AZU			
2E	GLAGOLITIC CAPITAL LETTER LATINATE MYSLITE			
2F	(This position shall not be used)			
30	GLAGOLITIC SMALL LETTER AZU			
31	GLAGOLITIC SMALL LETTER BUKY			
32	GLAGOLITIC SMALL LETTER VEDE			
33	GLAGOLITIC SMALL LETTER GLAGOLI			
34	GLAGOLITIC SMALL LETTER DOBRO			
35	GLAGOLITIC SMALL LETTER YESTU			
36	GLAGOLITIC SMALL LETTER ZHIVETE			
37	GLAGOLITIC SMALL LETTER DZELO			
38	GLAGOLITIC SMALL LETTER ZEMLJA			
39	GLAGOLITIC SMALL LETTER IZHE			
3A	GLAGOLITIC SMALL LETTER INITIAL IZHE			
3B	GLAGOLITIC SMALL LETTER I			
3C	GLAGOLITIC SMALL LETTER DERVI			
3D	GLAGOLITIC SMALL LETTER KAKO			
3E	GLAGOLITIC SMALL LETTER LJUDIJE			
3F	GLAGOLITIC SMALL LETTER MYSLITE			
40	GLAGOLITIC SMALL LETTER NASHI			
41	GLAGOLITIC SMALL LETTER ONU			
42	GLAGOLITIC SMALL LETTER POKOJI			
43	GLAGOLITIC SMALL LETTER RITSI			
44	GLAGOLITIC SMALL LETTER SLOVO			
45	GLAGOLITIC SMALL LETTER TVRIDO			
46	GLAGOLITIC SMALL LETTER UKU			
47	GLAGOLITIC SMALL LETTER FRITU			
48	GLAGOLITIC SMALL LETTER HERU			
49	GLAGOLITIC SMALL LETTER OTU			
4A	GLAGOLITIC SMALL LETTER PE			
4B	GLAGOLITIC SMALL LETTER SHTA			
4C	GLAGOLITIC SMALL LETTER TSI			
4D	GLAGOLITIC SMALL LETTER CHRIVI			
4E	GLAGOLITIC SMALL LETTER SHA			
4F	GLAGOLITIC SMALL LETTER YERU			
50	GLAGOLITIC SMALL LETTER YERI			
51	GLAGOLITIC SMALL LETTER YATI			
52	GLAGOLITIC SMALL LETTER SPIDERY HA			
53	GLAGOLITIC SMALL LETTER YU			
54	GLAGOLITIC SMALL LETTER SMALL YUS			
55	GLAGOLITIC SMALL LETTER SMALL MASCULINE YUS			
56	GLAGOLITIC SMALL LETTER YO			
57	GLAGOLITIC SMALL LETTER IOTATED SMALL YUS			
58	GLAGOLITIC SMALL LETTER BIG YUS			