

ISO/IEC JTC 1/SC 2/WG 2
PROPOSAL SUMMARY FORM TO ACCOMPANY SUBMISSIONS
FOR ADDITIONS TO THE REPERTOIRE OF ISO/IEC 10646¹.

Please fill all the sections A, B and C below.

Please read Principles and Procedures Document (P & P) from <http://www.dkuug.dk/JTC1/SC2/WG2/docs/principles.html> for guidelines and details before filling this form.

Please ensure you are using the latest Form from <http://www.dkuug.dk/JTC1/SC2/WG2/docs/summaryform.html>.

See also <http://www.dkuug.dk/JTC1/SC2/WG2/docs/roadmaps.html> for latest Roadmaps.

A. Administrative

1. Title: **Proposal to Encode the Astronomical Symbol for Uranus**

2. Requester's name: *Deborah Anderson (University of California, Berkeley, Script Encoding Initiative), Laurentiu Iancu, Murray Sargent (Microsoft Corporation)*

3. Requester type (Member body/Liaison/Individual contribution): *Liaison contribution*

4. Submission date: *2009-August-14*

5. Requester's reference (if applicable):

6. Choose one of the following:

This is a complete proposal: Yes

(or) More information will be provided later:

B. Technical – General

1. Choose one of the following:

a. This proposal is for a new script (set of characters): No

Proposed name of script:

b. The proposal is for addition of character(s) to an existing block: Yes

Name of the existing block: *Miscellaneous Symbols*

2. Number of characters in proposal: *1*

3. Proposed category (select one from below - see section 2.2 of P&P document):

A-Contemporary B.1-Specialized (small collection) B.2-Specialized (large collection)

C-Major extinct D-Attested extinct E-Minor extinct

F-Archaic Hieroglyphic or Ideographic G-Obscure or questionable usage symbols

4. Is a repertoire including character names provided? Yes

a. If YES, are the names in accordance with the "character naming guidelines" in Annex L of P&P document? Yes

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

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

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

6. References:

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

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

7. Special encoding issues:

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)?

Suggested UCD character properties are included.

8. Additional Information:

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 <http://www.unicode.org/Public/UNIDATA/UCD.html> and associated Unicode Technical Reports for information needed for consideration by the Unicode Technical Committee for inclusion in the Unicode Standard.

¹ Form number: N3152-F (Original 1994-10-14; Revised 1995-01, 1995-04, 1996-04, 1996-08, 1999-03, 2001-05, 2001-09, 2003-11, 2005-01, 2005-09, 2005-10, 2007-03, 2008-05)

C. Technical - Justification

1. Has this proposal for addition of character(s) been submitted before? If YES explain	No
2. Has contact been made to members of the user community (for example: National Body, user groups of the script or characters, other experts, etc.)? If YES, with whom? If YES, available relevant documents:	Yes <i>Members of the UTC; Barbara Beeton (AMS)</i> <i>Examples in proposal</i>
3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included? Reference:	No
4. The context of use for the proposed characters (type of use; common or rare) Reference:	Common <i>Section 1, 2, and 4 of proposal</i>
5. Are the proposed characters in current use by the user community? If YES, where? Reference:	Yes <i>Books, journals, magazines, the Web</i>
6. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP? If YES, is a rationale provided? If YES, reference:	No
7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)?	No
8. Can any of the proposed characters be considered a presentation form of an existing character or character sequence? If YES, is a rationale for its inclusion provided? If YES, reference:	No
9. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters? If YES, is a rationale for its inclusion provided? If YES, reference:	No
10. Can any of the proposed character(s) be considered to be similar (in appearance or function) to an existing character? If YES, is a rationale for its inclusion provided? If YES, reference:	No
11. Does the proposal include use of combining characters and/or use of composite sequences? If YES, is a rationale for such use provided? If YES, reference: Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided? If YES, reference:	No
12. Does the proposal contain characters with any special properties such as control function or similar semantics? If YES, describe in detail (include attachment if necessary)	No
13. Does the proposal contain any Ideographic compatibility character(s)? If YES, is the equivalent corresponding unified ideographic character(s) identified? If YES, reference:	No

1. Background

This proposal is to encode the astronomical symbol for Uranus as a distinct character, disunified from the existing U+2645 URANUS, to enable the contrastive representation of the two symbols that are in prevalent use today, ♂ and ♃.

Historically, the symbol for Uranus was encoded in the Unicode 1.0 Miscellaneous Dingbats block (later renamed Miscellaneous Symbols) at U+2645 as a single character unifying the symbols commonly used in astronomy and astrology. At that point, the glyphs ♂ and ♃, which are typical in astronomy and astrology, respectively, were considered glyph variants of the same symbol, URANUS. The Unicode 1.0 code charts had a way to illustrate glyph variants of a character by sharing the chart cell of the corresponding code point, as reproduced in Figure 1.

Miscellaneous Dingbats		260	261	262	263	264	265	266	267	268	269	26A	26B	26C	26D	26E	26F
0	☀	☐	☠	☷	♀	♁	♠										
1	♣	☑	☸	☷	♁♃	♃	♥										
2	☂	☒	☢	☷	♂	♊	♠										
3	☼	✕	☣	☷	♈	♁♃	♣										
4	✂		☦	☷	♁	♁	♠										
5	★		♀	☷	♁♃	♁	♥										
6	☆		♁	☷	♁	♁	♠										

Figure 1: Excerpt from the code chart of the Unicode 1.0 Miscellaneous Dingbats block, illustrating the glyph variants of the unified symbol URANUS at code point U+2645 (courtesy of Rick McGowan).

Starting with Unicode 2.0, the code charts have shown a single, representative glyph for any given character. Since URANUS appears in a set of astrological symbols in the range U+263D–U+2647, its representative glyph in the Unicode code charts has been ♃, as more commonly found in astrology. A symbol with a representative glyph of ♂ is not currently present in the Unicode repertoire.

While originally unified, the symbols are distinct and can be found in contrastive use, as illustrated in Figures 2 and 3. The symbol ♂ is a combination of the symbol for “Sun plus the spear of Mars, as Uranus was the personification of heaven in Greek mythology, dominated by the light of the Sun and the power of Mars” [1]. The symbol ♃ represents “a globe surmounted by the first letter of [Herschel’s] name,” as suggested by French astronomer Jérôme Lalande in 1784 in a letter to William Herschel, the discoverer of the planet Uranus [2].

Planets				
Name	Symbol	Unicode	Unicode Display	Symbol Represents
Mercury	♿	#9791;	♿	Mercury's winged helmet and caduceus
Venus	♀	#9792;	♀	Venus' hand mirror
Earth	♁	#8853;	♁	Globe with equator and a meridian
	♁	#9793;	♁	globus cruciger
Mars	♂	#9794;	♂	Mars' shield and spear
Jupiter	♃	#9795;	♃	Jupiter's thunderbolt, eagle or "Z" for Zeus, Jupiter's Greek name. ^[1]
Saturn	♄	#9796;	♄	Saturn's sickle or scythe
Uranus	♅			One of the two symbols for platinum or a combination of the symbols for Mars and the Sun
	♅	#9797;	♅	"H" from the discoverer's last name (Herschel)
Neptune	♆	#9798;	♆	Neptune's trident

The adjective of Uranus is "Uranian". Its astronomical symbol is ♅. It is a hybrid of the symbols for Mars and the Sun because Uranus was the Sky in Greek mythology, which was thought to be dominated by the combined powers of the Sun and Mars.^[40] Its astrological symbol is ♅, suggested by Lalande in 1784. In a letter to Herschel, Lalande

Figure 2: Wikipedia article on astronomical symbols, http://en.wikipedia.org/wiki/Astronomical_symbol, comparing inline graphics with Unicode characters. Of the two symbols for Uranus, only one has a Unicode character, U+2645 = ♅.
(Web page retrieved May 2009.)

Figure 3: Wikipedia article on Uranus, <http://en.wikipedia.org/wiki/Uranus>, contrasting the astronomical and astrological symbols.
(Web page retrieved May 2009.)

Both symbols are in prevalent use nowadays. In general, ♅ is used as the astronomical symbol and ♅ as the astrological symbol. There are instances where one of the symbols is used in the other context, such as ♅ being sometimes used in astrology. However, the widespread usage of the two symbols and their contrastive evidence warrant their encoding as distinct characters. Therefore, this proposal is to disunify the two Uranus symbols, keeping the existing symbol U+2645 URANUS as the preferred astrological symbol, and encoding a new character for the astronomical symbol.

The proposed symbol ♅ also appears in the PUA collection of the STIX project [3] and its encoding is beneficial from that perspective as well.

2. Character Name, Properties, and Glyph

The character proposed for encoding is U+26E2 ASTRONOMICAL SYMBOL FOR URANUS in the Miscellaneous Symbols block. The suggested UCD properties are listed below and were chosen by similarity with related characters, in particular with the astrological symbols in the range U+263D–U+2647 of the same block. A suggested glyph is illustrated in Figure 4, side by side with glyphs from two sources.

UnicodeData.txt entry (gc, ccc, bc, dt, Bidi_M, etc.)	Script	Line_Break
26E2;ASTRONOMICAL SYMBOL FOR URANUS;So;0;ON;;;;;N;;;;;	Common	AL

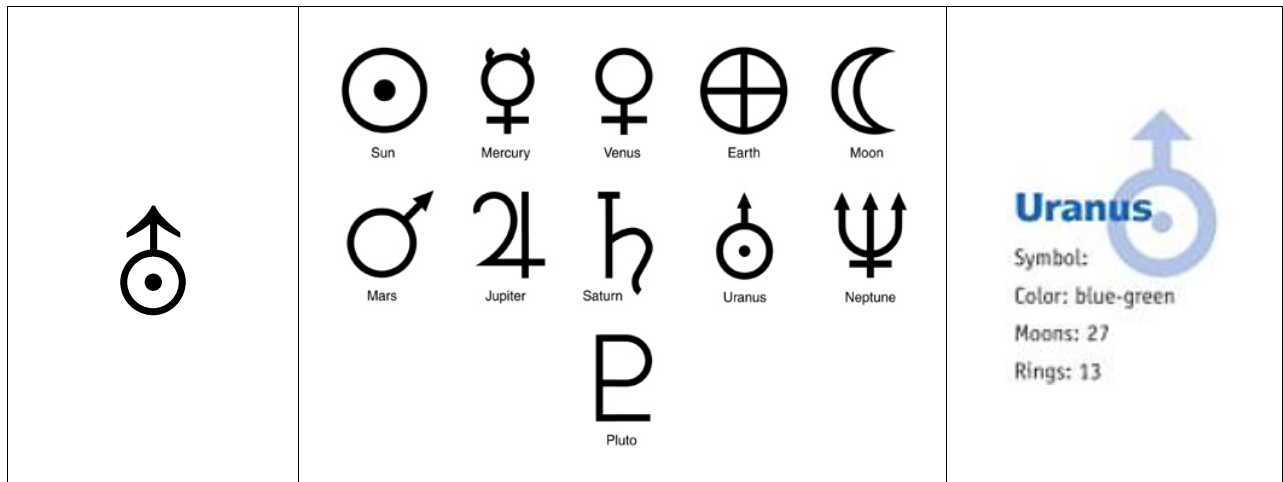


Figure 4: Suggested glyph for the symbol.

Figure 5: Astronomical symbols from a NASA Web page [1].

Figure 6: Reproduction from [4] p. 154.

3. Code Charts

UniBook code charts are appended at the end of this document. UniBook source project files and a font will be made available to the editors.

4. Supporting Evidence

The samples in Figure 7 illustrate the proposed ASTRONOMICAL SYMBOL FOR URANUS in use. In contrast, Figure 8 illustrates the astrological symbol with a glyph as it appears in the code charts since Unicode 2.0 for the existing U+2645 URANUS.

ASTRONOMICAL SYMBOLS.

The following are the symbols and abbreviations used in ordinary almanacs.

SIGNS OF THE PLANETS, ETC.

<p>☉ The Sun. ☾ The Moon. ☿ Mercury. ♀ Venus. ♁ or ♂ The Earth.</p>	<p>♂ Mars. ♃ Jupiter. ♄ Saturn. ♅ Uranus. ♆ Neptune.</p>
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1.2 ASTRONOMICAL SYMBOLS

The standard symbols for astronomical objects and zodiacal areas are given in Table 1.1.

Table 1.1. Sun, Moon, planetary, zodiacal, and orbit symbols [1, 2].

Symbol	Name	Symbol	Name	Symbol	Name
*	Star	☉	Sun	☾	Moon
☿	Mercury	♀	Venus	♁	Earth
♂	Mars	♃	Jupiter	♄	Saturn
♄	Saturn 2	♅	Uranus	♆	Neptune
♆	Neptune 2	♁	Pluto	♁	Pluto 2
♈	Aries (0°)	♉	Taurus (30°)	♊	Gemini (60°)
♋	Cancer (90°)	♌	Leo (120°)	♍	Virgo (150°)
♌	Libra (180°)	♎	Libra 2 (180°)	♏	Scorpio (210°)
♍	Sagittarius (240°)	♐	Capricornus (270°)	♑	Aquarius (300°)
♎	Aquarius 2 (300°)	♒	Aquarius 3 (300°)	♓	Pisces (330°)
♊	Ascending Node	♋	Descending Node		
♎	Autumnal Equinox	♈	Vernal Equinox		

References

1. Rahtz, S. & Rose, K. ftp to sunsite.unc.edu in directory pub/packages/TeX/cmastro
2. Schmitt, P. 1992, ftp to sunsite.unc.edu in directory pub/packages/TeX/astro


Figure 7: Samples from [5] p. 306 and [6] p. 2, attesting the proposed ASTRONOMICAL SYMBOL FOR URANUS. The latter source quotes two T_EX packages for astronomy.

Planets		
☉ Sun	☾ Moon	♀ Mercury
♀ Venus	♂ Mars	♃ Jupiter
♄ Saturn	♅ Uranus	♆ Neptune
♁ Pluto	♊ North Node	♋ South Node
♁ Chiron	♁ Pallas	♁ Juno
♁ Ceres	♁ Vesta	♁ Earth

Figure 8: Sample from [7] p. 31 showing the astrological symbol for Uranus matching the representative glyph of U+2645 URANUS in the Unicode code charts.

5. References

- [1] NASA, "Planet symbols," Solar System Exploration, http://solarsystem.nasa.gov/multimedia/display.cfm?IM_ID=167 (retrieved August 2009).
- [2] Francisca Herschel, "The meaning of the symbol H+o for the planet Uranus," *The Observatory*, volume 40, pp. 306–307, 1917, <http://adsabs.harvard.edu/abs/1917Obs....40..306H> (retrieved August 2009).
- [3] The STIX Fonts Project, <http://www.stixfonts.org/> and <http://www.ams.org/STIX/>.
- [4] Mary Kay Carson, "Exploring the Solar System: A History with 22 Activities," Revised edition, Chicago Review Press, 2008, ISBN 1556527152.
- [5] Isaac Sharpless, George Morris Philips, "Astronomy for schools and general readers," 4th edition, J.B. Lippincott Company, 1892.
- [6] Arthur N. Cox, "Allen's astrophysical quantities," 4th edition, Springer, 2000, ISBN 0387987460.
- [7] Eric S. Rabkin, "Mars: a tour of the human imagination," Greenwood Publishing Group, 2005, ISBN 0275987191.

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0																
1																
2																
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B																
C																
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E																
F																

Astronomical symbol

26E2 ☿ ASTRONOMICAL SYMBOL FOR URANUS

- not the astrological symbol
- use 2645 ♅ for the astrological symbol

→ 2645 ♅ uranus