Refreshable Braille Technology Report for
ICEB 8th General Assembly
May 2024

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The Refreshable Braille Technology Committee of ICEB has representatives from all ICEB countries and several observers.

The focus of the Braille Technology Committee in the last four years has been as follows:

## 1. Liblouis.

Improving the braille output from the Liblouis open source braille translation system, used in various screen readers, braille translators and even within braille displays.

Improvements in the last four years have included addition of the checkmark symbol, additional accented characters, additional mathematical symbols and of course many hundreds of fixes of how words are contracted.

At the 2022 Mid-Term meeting, two specific questions were discussed: how should spaced digits be handled and how should the dot 3 (apostrophe) be back translated? The decisions from this meeting have now also made their way into the latest version of Liblouis for all to benefit.

Doing this work has occasionally brought up some interesting side-issues, such as possible additions to the shortform word list, or how best to contract a particular word. Such issues have been fed back to the Code Maintenance Committee. The work has also sometimes raised questions about how certain things can actually be done in Liblouis.

My thanks in particular to those who helped with reviewing the work to ensure it was correct. My thanks also to the Code Maintenance Committee for very helpful advice when it was not always clear which rules might apply. Finally, thanks to the Liblouis community for all their help and support.

## 2. Encouraging Update.

Encouraging manufacturers to use the latest versions of Liblouis. A letter was sent to over thirty known manufacturers in 2021 and we received various responses. The majority were positive, but a couple of manufacturers noted that they don't use Liblouis, or the product is no longer available. We are pleased that it would appear that many manufacturers have got the message to stay up-to-date, and we may well send an additional letter as a reminder, thanking those who have already factored updates into their development processes.

Of course, it is not just those using Liblouis who should make sure they are up to date: braille technology continues to advance and we would also like to highlight the excellent work of Duxbury Systems in continually making improvements to the Duxbury Braille Translator software and the braille tables it uses. This includes updates to the UEB tables, as well as many other fixes and improvements.

Recently, a request was sent asking for suggestions and fixes for Duxbury. May I encourage people, if they have thoughts on how braille translation software may be improved generally, to get in touch with the manufacturers, feedback is always welcome.

## 3. New Standard for Braille Files.

In previous reports, I stated that a new braille file format could enable additional functions, such as improved navigation. In contrast to the 2020 Braille Technology report, I am now pleased to report that the American Printing House (APH) is spearheading the development of an Extended Braille Ready File (EBRF), in conjunction with the DAISY Consortium; there are many people involved from various countries. The work continues apace and there are regular meetings discussing all aspects of what the new format could do and how this might be accomplished.

There is an active mailing list where thoughts, proposals and ideas are shared, the new format promises great possibilities.

In 2023, there was a virtual meeting of the ICEB Braille Technology committee at which we were delighted to welcome Willow Free from APH to give a short presentation of the new braille file format. It was clear that not everyone attending knew about this project, so I should like to summarise four of the key benefits of the new format below:

1. Reflowable: different braille devices have different line lengths. Current braille file formats are set to a particular line width, meaning there may be problems if your braille device has a different line width. Not all braille displays cope well with different line widths of text and often this manifests with "long line, short line". The new format will allow devices to reflow the text to fill the available line space automatically, as is standard in web pages, word processors and so on.

2. International: in the English-speaking world, most braille files are encoded using characters based on the USA computer code. This is not the case in several other countries, where different character encodings are used. This means that braille files may not always be usable in other countries. The problem is that though the basic braille alphabet remains the same, other braille dot combinations may change to other arbitrary dot combinations making the file unreadable. The new standard will use Unicode braille characters to avoid this problem.

3. Navigation: The current braille file offers little in the way of structural navigation – about the best option is using the Find command on a braille display. It is hoped that the new file format will include all kinds of style and structure information so you will be able to jump to the next or previous heading, table, paragraph, and so on, in a similar way to the set of quick navigation commands screen reader users are familiar with. Not only this, but the new format should allow links, so you will be able to jump directly from an item in a table of contents to that section, or from a footnote reference to the actual footnote text, and back again.

4. Graphics: finally, with the advent of multiline and graphic-capable braille displays, the new file format can incorporate tactile graphics, bringing both text and images into a single file. Currently, all tactile images have to be stored, processed and produced separately.

Development is still very much in a technical stage, with in-depth discussion about the finer points of certain aspects and how these might relate to braille.

For more information about this project, and to find a sign-up form where you could get involved, visit daisy.org/activities/projects/ebraille

## 2020 Resolutions.

At the ICEB 7th General Assembly, the following resolution was passed:

Resolution 1: UEB Support In Digital Braille Tools

Whereas, Unified English Braille (UEB) has been widely adopted by braille authorities across the English-speaking world for the better part of a decade, and is increasingly recognised as the default English braille code in countries where English is spoken as a second language;

Whereas, braille readers, students, teachers and supporting professionals are increasingly exposed to and reliant on braille content produced by automatic digital braille translation systems, including but not limited to, screen readers, refreshable braille displays, electronic braille library services, braille transcription tools and embedded braille translation engines; and

Whereas, many such systems used in popular products continue to exhibit UEB translation errors resulting in inaccurate braille input or output and ultimately a suboptimal braille experience.

**This Seventh General Assembly of ICEB therefore resolves to:**

* Call on all manufacturers of digital braille products including English braille support to adopt UEB uncontracted Grade 1 as the default setting for braille input and output;
* Work constructively with manufacturers of digital braille products to identify and correct outstanding errors with UEB support;
* Distribute this resolution and supporting material to braille technology manufacturers pointing to relevant resources on the ICEB website at www.iceb.org.

With respect to this resolution, items 1 and 2 above, go a long way towards fulfilling this resolution. Great strides have been made improving the braille experience for many users, though we acknowledge further work is still needed.

I wish to finish by again thanking everyone for all their help and support during the last four years, your help is greatly appreciated.