Since the last column (see IEEE CG&A, January 1987), progress has been made in several areas of graphical standards. The Computer Graphics Interface standard (CGI) started its first public review period. This ends June 13, 1987. Comments received in the first half of this period were considered and in many cases incorporated into the US comments submitted to ISO on the CGI first DP (draft proposal) letter ballot.

The Programmers’ Hierarchical Interactive Graphics System (PHIGS) finished its second public review. There is reasonable consensus within the US on PHIGS, and language bindings are progressing at full speed. When PHIGS becomes an American National Standard (ANS), it will have at least PHIGS Fortran binding as an ANS at the same time.

Work is underway to extend the Computer Graphics Metafile (CGM) to provide the functionality of the Graphical Kernel System (GKS) Metafile. In addition there is some sentiment that CGM should be extended to support the functionality of GKS-3D. Stay tuned for other late-breaking developments.

**Registration of graphical items**

*Graphical items* is the term used to describe those items in a graphics standard that are defined by a list. In particular, they include the following:

- attributes: for example, line styles, marker styles, fonts
- generalized drawing primitives: for example, spline fitter, mesh/patch definition
- escape function: for example, downloading a font to a particular workstation
- generalized input methods: for example, a logical input device that returns both a locator and a choice value

All ANSI and ISO graphics standards share the same register. Thus line style 28, when registered, will have the same realization (within the constraints of the implementation and the resolution of your output device) in GKS, PHIGS, CGM, and CGI. Better yet, it will have the same realization across multiple implementations of the standards.

The concept is that the standards must be extendable and extensible. Therefore, while the standard specifically defines a certain number of line styles, etc., commonly used by a wide variety of applications,
each constituency will have its special set of line styles, etc. For example, there are a number of standard markers in the CAD/CAM world specific to, say, mechanical CAD. These markers can be submitted to the registration authority (the National Bureau of Standards for graphical items) to be registered. Once registered, these markers are assigned specific identifiers/indexes. Thereafter all programs, vendor and client alike, can use the registered identifier to produce a particular marker.

A marker representing an oil well, for example, is commonly used in the energy industry. Someone (probably a company rather than an individual) submits the well-marker definition for registration. On acceptance it is given the index 37. Henceforth, marker type 37 would be that well marker. At the next revision of each graphical standard, the well marker would be incorporated as part of the standard.

accepted by X3H3, it is forwarded (submitted) by the sponsoring authority to the registration authority for consideration. Criteria for acceptance include whether the proposed item is in common usage and satisfies a demonstrable need within some reasonably large constituency.

6. The registration authority refers the proposal to the ISO Computer Graphics Group (ISO Technical Committee 97/Subcommittee 21/Working Group 2) for advisement.

7. The Graphics Group distributes the proposal to all its members bodies for ballot.

8. Notice of recommended acceptance or rejection is returned to the registration authority.

9. If the proposal is accepted, the item is registered by the registration authority.

10. The sponsoring authority is informed of the acceptance or rejection of the proposal.

11. The submitter is informed of the decision.

Steps 2 through 11 are estimated to take one year. The letter ballots at both the national and international level extend the period. This is certainly a disadvantage. The advantage is that once an item is registered, the constituents have a reliable, standardized means of referencing that item.

Hardware and software vendors are the early submitters. Their standard symbols, line styles, fonts, etc., when registered, take on the aegis of standardization, increasing their marketability to clients. Registration will help portability of client software across vendor software. Companies will be more likely to survive a mix and match situation, at least with use of the constituency-related items.

The process
An international standard will define the registration process. This document is not yet a standard. Here is my understanding of how the process works.

1. Get the registration starter packet from the registration authority.

2. Submit the proposal to a sponsoring authority. In the US the sponsoring authority is X3H3. Submission of the proposal is accepted only from members, observers, or liaisons of X3H3. Any company without ties to X3H3 can recruit an X3H3 member to champion the proposal.

3. A formal proposal that has uniform wording and format is generated by the sponsoring authority after informal dialogue with the submitter.

4. The proposal is considered and either approved or rejected by X3H3.

5. If the proposal is rejected, the submitter is informed of the decision. If the proposal is approved by X3H3, it is forwarded (submitted) by the sponsoring authority to the registration authority for consideration. Criteria for acceptance include whether the proposed item is in common usage and satisfies a demonstrable need within some reasonably large constituency.

6. The registration authority refers the proposal to the ISO Computer Graphics Group (ISO Technical Committee 97/Subcommittee 21/Working Group 2) for advisement.

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